Working Papers Series Cahiers de recherche

# Regulation Reference Mandat sur la réglementation

CONSELL ECOUNCIL OF CANADA



Post Office Box 527, Ottawa K1P 5V6 Case Postale 527, Ottawa K1P 5V6 Working Papers are documents made available by the Economic Council of Canada, in limited number and in the language of preparation, to interested individuals for the benefit of their professional comments. Requests for permission to reproduce or excerpt this material should be addressed to:

Council Secretary Economic Council of Canada P.O. Box 527 Ottawa, Ontario KlP 5V6

The findings of this Working Paper are the personal responsibility of the author, and, as such, have not been endorsed by members of the Economic Council of Canada.

WORKING PAPER NO. 23 WOLUNTARY STANDARDS AS A REGULATORY DEVICE by Professor D.J. Lecraw The University of Western Ontario London, Ontario

ISSN-0225-8013

### ACKNOWLEDGEMENTS

This study was partially funded by the Centre for International Business Studies, The University of Western Ontario. I would like to thank those involved with standards development in Canada, the United States and Japan for their assistance in gathering data, the insights they provided during interviews into this complex, fascinating and important field, and their comments on earlier drafts of this paper. Special thanks should go to Mr. Dymond of the CSA and Mr. Maynard of the CGSB. Without the patience and prodding of Professor W.T. Stanbury, this project would never have reached fruition. Errors of fact, analysis, or conclusions are, unfortunately, my own.

### TABLE OF CONTENTS

CHAPTER	1	Introduction	р.	1			
CHAPTER	11	The National Standards System of Canada	p.	5			
CHAPTER		Types of Standards	р.	29			
CHAPTER	IV	Rationale for Standards	p.	51			
CHAPTER	V	The Standards Testing and Certification Process	p.	63			
CHAPTER	VI	The Effects of Standards	p.	69			
CHAPTER	VII	Conclusions and Recommendations	p.	87			
Footnotes	• • • •	· · · · · · · · · · · · · · · · · · ·	p.	97			
Bibliograp	hy .	·····	p.	103			
Appendix A Case Studies of Nine Standards							
Ca	seStu	dies:					
Polyethylene Pipe for Cold Water Services Hairdressing Equipment							
CSA Standard Structural Steel Shapes							
Structural Steel Quality							
Porcelain Enamelled Steel Plumbing Fixtures							
Safety Footwear							
Hockey Helmets							
	Face	Protectors for Hockey and Lacross Players	p.	34			
	Manu	facture, Control and Distribution of Drugs	p.	36			
Appendix B The Japanese Standards System							

### RÉSUMÉ

Les normes "volontaires", ou librement acceptées, sont devenues un mode de réglementation économique et sociale de plus en plus important, à mesure que l'économie a progressé et qu'elle est devenue à la fois plus complexe et plus intégrée, en raison de l'évolution des besoins et objectifs des particuliers et de la société. Les normes influent sur l'efficacité technique, dynamique et distributive de l'économie, de même que sur le commerce international, la répartition de la production entre producteurs, la répartition de la consommation entre consommateurs, et la répartition du revenu entre producteurs et consommateurs. Les normes volontaires peuvent créer ou corriger les défauts du marché, grâce à leurs effets sur le pouvoir économique des différents agents économiques, les conditions d'accès à une industrie et son ouverture au commerce, la quantité, la qualité et le coût des renseignements disponibles aux usagers, ainsi qu'à leurs effets sur le risque, imaginaire ou réel, inhérent à l'utilisation d'un produit. Les normes volontaires peuvent aussi influer sur la qualité, la disponibilité, la variété et le prix du produit. Les normes obligatoires, c'est-à-dire celles qui sont incorporées dans les lois ou la réglementation, peuvent être nécessaires pour remédier aux déficiences du marché attribuables aux facteurs externes de la production ou de la consommation, et aussi lorsque l'utilisation du produit comporte des incidences des points de vue de la santé, de la sécurité et du bien-être que les consommateurs ne peuvent facilement déterminer ou évaluer de façon exacte. Les normes peuvent également modifier les effets d'autres formes d'activités gouvernementales en matière de réglementation. Dans le présent rapport technique, nous analysons le Système de normes nationales, les effets qu'exercent sur l'économie canadienne le type, l'élaboration et l'utilisation des normes, ainsi que les essais et l'authentification des normes dans ce système.

Le Système de normes nationales (SNN) est composé d'organismes accrédités de rédaction de normes (OARN), des Comités d'authentification (CA), des organismes de laboratoires d'essai (OLE), du Comité national canadien de la Commission électrotechnique internationale, et du Comité national canadien de l'Organisation internationale de normalisation. Ces composantes du SNN sont relativement décentralisées, mais elles sont néanmoins coordonnées par le Conseil canadien des normes qui leur donnent également une certaine orientation. Au cours de la dernière décennie, le SNN est devenu un système national efficace. Bon nombre des problèmes identifiés par Leggett (1971) dans le domaine des activités relatives aux normes canadiennes ont été corrigés, et des progrès ont été réalisés vers la solution des autres problèmes. Cependant, certains problèmes demeurent. Le CCN et les CARN devraient mettre au point un ensemble d'objectifs globaux, intégrés et pratiques pour leurs travaux sur les normes au Canada, en tenant compte de l'environnement politique, économique, social, technologique et international de notre pays. Pour réaliser ces objectifs, ils devront coordonner et centraliser davantage leurs activités.

Si l'on considère le haut niveau de développement des travaux de normalisation réalisés par le SNN, et l'importance des normes internationales pour l'économie canadienne en ce qui concerne les importations et les exportations, l'influence internationale du Canada du point de vue de ses normes est faible, en comparaison de celle du Japon et de celle de certains pays industrialisés d'Europe. Le CCN et les OARN devraient intensifier leurs efforts en vue d'accroître l'influence des normes canadiennes au sein des organismes internationaux de normalisation ainsi que dans les divers pays étrangers, tout en visant en même temps à intégrer davantage les normes internationales dans les activités de normalisation au Canada.

- 2 -

- iv -

Les différences entre les normes adoptées au Canada et les normes appliquées chez ses principaux partenaires commerciaux peuvent se révéler nécessaires dans certains cas, en raison de conditions particulières au Canada ou de normes étrangères insatisfaisantes ou manquant d'homogénéité. Ces différences peuvent, toutefois, imposer des coûts à l'économie. Les différences entre les normes canadiennes et américaines peuvent réduire la disponibilité et la variété du produit au Canada, nuire au commerce international, entraîner une mauvaise répartition de la production et accroître les prix. Afin de réduire ces coîts, le Comité des normes, lors de l'élaboration d'une norme, devrait commencer ses travaux par une étude systématique des normes adoptées par les principaux partenaires commerciaux du Canada, en vue d'évaluer les avantages d'une norme améliorée, ou plus appropriée aux réalités typiquement canadiennes, au regard des coûts pouvant résulter de différences entre les normes.

Les normes sont souvent des biens publics : une fois élaborées, leur utilisation par un agent n'empêche pas les autres de faire de même. Les coûts économiques et sociaux, tout comme les avantages d'une norme, sont souvent difficiles à cerner, plus difficiles à quantifier, et encore plus difficiles à répartir entre les intéressés. Il est souvent difficile également de demander à ceux qui bénéficient des normes d'en assumer les coûts. En outre, les groupes d'intérêt peuvent tenter d'utiliser leur pouvoir économique, social ou politique pour élaborer des normes "secrètes" et ainsi s'offir une nouvelle répartition des ressources. Le "marché des normes" est donc souvent imparfait, en ce sens que l'élaboration et l'application optimales des normes dans l'ensemble de la société exigent souvent une intervention extérieure au marché, par des agents qui, individuellement ou collectivement, représentent l'intérêt

- v -

- 3 -

public. Le cadre institutionnel des normes influe donc fortement sur le niveau et la répartition de leurs avantages.

- 4 -

Les OARN au sein du SNN croient fermement aux normes établies par consensus par des comités équilibrés de normalisation et s'engagent à s'y conformer. Le danger de normes "tenues secrètes" ou de normes inutiles a donc été sensiblement réduit, sinon éliminé. Même les associations de consommateurs se sont montrées satisfaites des activités relatives aux normes au Canada. En général, les OARN n'élaborent une norme qu'à la demande d'un ou plusieurs intéressés à la norme, et à la condition que le financement en soit assuré. Cette orientation du marché a contribué à empêcher une utilisation excessive des normes.

L'Organisation internationale de normalisation, les Nations Unies et les membres du SNN recommandent, dans le cas des normes volontaires et obtenues par consensus, la "référence à la norme" comme le meilleur moyen d'incorporer les normes dans les lois et la réglementation. Certains ministères responsables de l'administration de la législation ou de la réglementation relatives aux normes se sont opposés à la référence à la norme car ils estiment que le processus de consensus aurait peut-être suscité des normes qui, sans refléter l'intérêt public, auraient pu exiger beaucoup trop de temps dans certains cas, et constituer une abdication de leur responsabilité légale. Dans une largue mesure, ces réserves ne sont pas fondées. Il faudrait accroître l'utilisation de la référence non datée aux normes.

Bref, le SNN et ses organismes composants forment un système efficace en vue de l'élaboration et de l'application de normes satisfaisantes pour notre industrie et l'ensemble de la société canadienne. Certains problèmes demeurent, mais en

- vi -

général, ils sont reconnus et des mesures sont prises en vue de les réduire ou de les éliminer. Le processus de consensus utilisé au sein du SNN pourrait servir de modèle pour la formulation et l'application de la réglementation économique et sociale, au lieu de l'approche adverse ou bureaucratique si souvent utilisée de nos jours.

N

### SUMMARY

Voluntary standards have become an increasingly important means of economic and social regulation as the economy has developed and become more complex and interdependent and as individual and societal needs and goals have evolved. Standards affect the technical, dynamic and allocational efficiency of the economy, international trade, and the distribution of production among producers, the distribution of consumption among consumers, and the distribution of income among producers and consumers. Voluntary standards are capable of creating or correcting market failure through their effects on the economic power of different economic agents, barriers to entry into an industry and its openness to trade, the amount, quality, and cost of information available to users, and through their effects on the perceived and actual risk of product use. Voluntary standards may also affect product quality, availability, variety, and price. Mandatory standards, i.e., standards that are incorporated into legislation or regulations, may be necessary to correct market failure due to externalities of production or consumption, and when product use has health, safety and welfare implications that cannot be easily determined or correctly evaluated by users. Standards may also alter the effects of other forms of government regulatory activity. This study analyzes the National Standards System of Canada and the effects on the Canadian economy of the type, development, and use of standards and testing and certification of standards within that system.

The National Standards System of Canada is composed of accredited standards writing organizations (SWUs), certification organizations (COs), testing organizations (TOs), the Canadian National Committee on the International Electrotechnical Commission, and the Canadian National Committee on the International Organization for Standardization. These components of the NSS are quite decentralized, but coordinated and given some direction by the Standards Council of Canada. Over the decade of the 1970's, the NSS has developed into an effective, national system. Many of the problems of Canadian standards activities identified by Leggett (1971) have been corrected, and progress has been made in correcting the others. Some problems, however, remain. The SCC and the SWOs should develop a set of comprehensive, integrated, action-oriented goals for standards work in Canada in relation to Canada's political, economic, social, technological and international environment. To achieve these goals, they will have to further coordinate and centralize their activities.

Given the high level of development of standards activities within the NSS and the importance of international standards for the Canadian economy through imports and exports, the international influence of Canada and Canadian standards is low compared to that of Japan and some of the industrialized countries in Europe. The SCC and the SWOs should intensify their efforts to increase the influence of Canadian standards in international standards organizations and in individual countries abroad while at the same time further integrating international standards into standards activities in Canada. Differences between a Canadian standard and the standard in its major trading partners may be necessary in some instances due to unique conditions in Canada or inadequate or non-homogeneous standards abroad. Differences between a Canadian standard and standards abroad may, however, impose costs on the economy. Differences between Canadian and U.S. standards may reduce product availability and variety in Canada, impede international trade, misallocate production, and raise prices. To reduce these costs, in developing a standard, the standards committee should being their work by systematically surveying standards in Canada's major trading partners in order to evaluate the benefits of an improved standard or one more appropriate to unique conditions in Canada, against the costs that may be imposed by differences between standards.

Standards are often public goods: once they are developed, their use by one agent does not diminish their availability to others. The economic and social costs and benefits of a standard are often difficult to identify, more difficult to quantify and even more difficult to allocate among its stakeholders. Charging those who benefit from standards for the costs of their development is often difficult as well. Moreover, interest groups may try to use their economic, social or political power to develop "kept" standards and thereby re-allocate resources to themselves. The "market for standards", therefore, is often imperfect in the sense that optimal development and use of standards for society as a whole often requires extra-market intervention by agents who either individually or collectively represent the public interest. The institutional framework for standards, therefore, greatly affects the level and distribution of their benefits.

The SWOs within the NSS have a firm belief in and commitment to consensus standards developed by balanced standards committees. The danger of "kept" standards or unnecessary standards has consequently been greatly reduced, if not eliminated. Even consumer groups expressed satisfaction with standards activities in Canada. In general, the SWOs develop a standard only at the request of one or more of the stakeholders in the standard and if they are provided the funding for its development. This market orientation has helped prevent excessive use of standards.

The ISO, the United Nations and the members of the NSS advocate "reference to standard" of voluntary consensus standards as the best means of incorporating standards into legislation and regulations. Some government departments responsible for administering legislation or regulations that contain standards have resisted reference to standards because they believe that the consensus process may not have developed standards that reflect the public interest, take an unacceptably long time to develop in some cases, and may be an abdication of their legal responsibility. These reservations seem to be largely unfounded. The use of undated reference to standards should be increased.

In summary, the NSS of Canada and its component organizations are an effective system for developing and using standards for the benefit of Canadian industry and society as a whole. Some problems remain, but in general they are recognized and steps are being taken to reduce or eliminate them. The consensus process as used within the NSS might well serve as a model of formulating and administering economic and social regulations instead of the adversarial or bureaucratic approach so often used today.

### CHAPTER 1

### Introduction

.

Standards pervade the economic, political, social and technological life of modern man. They are so much a part of the fabric of our life, however, that they have been largely ignored by the general public.<sup>1</sup> Yet Canada spends at least \$40 million per year (and probably much more) to create and update standards; this direct cost is only a fraction of the total direct cost which includes not only standards development, but also their implementation through testing, certification and monitoring.<sup>2</sup> In addition, standards may entail indirect costs since they can potentially facilitate restrictive trade practices at both the national and international level that may impose costs on the Canadian economy. On the benefit side, standards may facilitate the dissemination of information, coordination of economic activity (especially in production and rationalization of industry), and they can reduce risk and uncertainty for producers and consumers alike. Standards have become increasingly important in attaining society's goals in such areas as product and service quality, health, safety, and the regulation of the physical environment. In addition, standards may have indirect benefits since in some circumstances they may increase competition and facilitate international trade, thereby both increasing national income and lowering prices to consumers.

Traditionally, economists have viewed the use of standards in industry with suspicion since, in perfectly competitive markets, with perfect information for both buyers and sellers and no externalities, standards are not only unnecessary, but they also have the potential to be used to distort resource allocation in both consumption and production by reducing competition. In modern industrial societies, however, markets are often not perfect due to information asymmetries between consumers and producers, externalities of production and consumption, incomplete markets for risk bearing, incomplete contracts, and the possession of economic power by some participants in the market. Standards may help correct these types of market failure and move the economy toward the pareto efficient frontier. When a market participant has economic or political power, however, standards may be used to increase or preserve market inefficiencies to the advantage of one market participant or group of participants. When market failure occurs, however, the demand and supply of standards (the market for standards) do not necessarily lead to the optimum level of standards creation and use. Moreover, the standards created may be specified and administered in such a way as to increase market inefficiency depending on the relative balance of power between the stakeholders in the standard. The market for standards is not perfect in an economic sense. Consequently, in some industries, there is a need for an agent both to ensure that the optimum level of standards is reached and to control the specification and administration of standards so that the standards themselves do not cause or perpetuate market failure. This agent may either be government in its role of representative of the public interest or some other organization that can evaluate and balance the interests of all the stakeholders in the industry: producers, consumers and government. Alternatively, this agent can act to eliminate the causes of market failure by mechanisms other than the standards system (such as creating markets for risk bearing, conditional contracts, removing externalities, and providing information) or by directly controlling the behaviour of the stakeholders in the industry via competition policy, direct regulation or public ownership. In some industries, over time the market mechanism has led to the development of instruments for risk bearing (e.g., insurance, product warranties), information (e.g., Consumers Union) or completing contracts (e.g., conditional sales contracts, service contracts, and leasing). The relative costs and benefits of correcting market failure via standards or by other means vary from industry to industry and must be evaluated on a case-by-case basis in formulating government policy initiatives.

Given the importance of standards for almost every facet of the modern economy, surprisingly little research has been carried out either on the costs and benefits of standards or how a standards system can best develop and administer standards to increase the efficiency of industry, increase competition and international trade and ensure the health, safety and welfare of consumers.<sup>3</sup> There are several excellent

descriptive studies of the standards system in Canada<sup>4</sup> as well as studies that compare the standards systems of several industrialized countries.<sup>5</sup> Some theoretical work has been done on mandatory standards for product safety<sup>6</sup> and quality<sup>7</sup> and considerable theoretical and empirical work has been done in the area of mandatory standards for environmental protection.<sup>8</sup> Almost no theoretical, analytical, or empirical work has been done on the economics of <u>voluntary</u> (as opposed to mandatory) standards as a regulatory device; yet voluntary standards are far more pervasive than mandatory ones, and their effects on the economy may well be of a greater magnitude. This paper seeks to fill this gap in our knowledge with particular reference to Canada, by analyzing the effects of voluntary standards as a regulatory device. The next chapter describes the National Standards System of Canada, the institutional arrangement for standards activities in Canada.



### CHAPTER II

### The National Standards System of Canada

Prior to 1914, formal, codified standards in Canada were, for the most part, rarely used and rarely missed. During World War I, however, as Canada began to supply war material to Great Britain, the need for standards was recognized. At that time, there existed only one large engineering organization in Canada, the Canadian Society of Civil Engineers. Shortly before the Society's name was changed to the Engineering Institute, the British Engineering Standards Committee asked the Society's advisory board to consider setting up a standards committee in Canada. The committee was formed and headed by Sir John Kennedy, Chief Engineer to the Montreal Harbour Commission. The committee was supported by both the forerunner of the National Research Council and the Department of Trade and Commerce, establishing the collaboration of industry and government that was to remain a characteristic of the standards system of Canada.

From the time of its inception until World War II, the Canadian Engineering Standards Association (CESA) concentrated its activities in the engineering field. In the 1930s the Royal Commission on Price Spreads, under the chairmanship of the Honourable H.H. Stevens, recognized the need for standards oriented more toward the needs of consumers as well as producers.<sup>9</sup> Not until 1944 did the CESA broaden the scope of its standards work to include standards for consumer products. At that time it changed its name to the Canadian Standards organization in Canada with over 1180 published standards. Included in the list of areas of activity are automotive safety, electrical codes, health care technology, occupational safety codes, plumbing materials and some packaging materials.

In 1934, the Canadian Government Procurement Standards Committee was established under the auspices of the National Research Council. The principal purpose of this committee was to develop standards for goods and services purchased by government. Its major concern has been in the commodities field but the number of standards in other areas has grown as well. In 1948 it was renamed the Canadian Government Specifications Board (CGSB) and in 1979 its name was changed to the Canadian General Standards Board. It is now a part of the Department of Supply and Services. Currently the CGSB's scope of operations has expanded such that over fifty per cent of its work is outside the procurement field.

Over time, the international dimension of standards work became increasingly important. In 1964 the CSA requested increased federal government funding to help underwrite its international standards activities. This request led to a federal study and report and a federalprovincial conference on the subject of standardization. In 1970 the federal parliament culminated these activities by passing a bill establishing the Standards Council of Canada (SCC). The SCC created a national standards system that would rectify seven perceived shortcomings of the existing state of affairs. These included:<sup>10</sup>

- 1. a lack of coordination and long-term planning;
- 2. inadequate technical, financial and administrative support;
- 3. absence of a mechanism for establishing truly national standards;
- 4. lack of sufficient representation of all sectors of interest in the formation of standards;
- 5. inadequate coverage of certain industrial sectors;
- 6. insufficient attention given to consumer interests;
- 7. insufficient Canadian participation in international standardization.

### The Standards Council of Canada

The Standards Council of Canada was created by an act of parliament (the Standards Council of Canada Act) in 1970. The objectives of the council, as set forth in the Act, were to:

Foster and promote voluntary standardization in fields relating to the construction, manufacture, production, quality, performance, and safety of buildings, structures, manufactured articles and products and other goods, including components thereof, not expressly provided for by law, as a means of advancing the national economy, benefiting, assisting and protecting consumers, facilitating domestic and international trade and furthering international cooperation in the field of standards.<sup>11</sup>

On creation the council was faced with a difficult situation. Its mandate was to organize and promote a national voluntary standards system; yet it had no real power over the various organizations and interest groups that comprised the voluntary standardization activities at that time. The system, up to that time, was not a system at all. There were a large number of small independent organizations and a limited number of larger organizations. Some of these organizations were involved in writing standards, testing products and services to standards, and certifying products and services as conforming to standards, some were involved in only one area. Some had representation on international organizations, some did not. Some worked closely with others involved in standards activities, some did not.

In addition to these problems, the creation of the SCC was met with mixed reactions. Many participants in standards work in Canada felt that the coordinating role of the SCC would be of significant value. Some, however, felt that the existing state of affairs did not require a major modification such as the creation of a <u>new</u> coordinating body that would usurp their existing activities and powers. Some of these antagonisms have persisted to the present and manifest themselves in lack of cooperation and coordination, disputes over jurisdiction for standards in some product areas, foot-dragging on creating National Standards of Canada, etc.

The SCC has described its vision of the National Standards system and its role as follows:

In examining how to give effect to its mandate, the council conceived of a national federation bringing together first, established organizations involved in both private and public sectors, and second, organizations and laboratories involved in certification and testing. The federation has come to be known as the National Standards System (NSS).<sup>12</sup> The SCC described its role and objectives as:

The council (SCC) acts as a national coordinating body through which accredited organizations concerned with voluntary standardization may operate and cooperate to recognize, establish and improve standards in Canada and develop a comprehensive Canadian Standards program to meet both the national and international requirements and responsibilities.

The council is empowered, among other things to:

- promote cooperation among organizations concerned with voluntary standardization in Canada;
- promote cooperation between organizations concerned with voluntary standardization and departments and agencies of government at all levels in Canada;
- develop criteria and procedures for the preparation of voluntary standards and for testing and certification activities;
- accredit standards-writing, testing and certification organizations which meet criteria established by the Council;
- approve standards submitted by accredited organizations as National Standards of Canada;
- represent Canada as the Canadian member of ISO (International Organization for Standardization), IEC (International Electrotechnical Council) and similar international organizations engaged in the formation of voluntary standards;
- provide financial assistance to Canadian organizations concerned with voluntary standards to assist them in meeting national and international requirements;
- collect, translate and distribute information on standardization activity.<sup>13</sup>

### The National Standards System

The National Standards System (NSS) is composed of six major organizational components: Accredited Standards Writing Organizations (SWOs), Accredited Certification Organizations (COs), Accredited Testing Organizations (TOs), the Canadian National Committee of the IEC (CNC/IEC), the Canadian National Committee on ISO (CNC/ISO) and the Standards Council of Canada (SCC) itself. (See Table 1, solid boxes.) The SCC coordinates the NSS and overall policy for standardization in Canada. Overall policy is achieved through consensus agreements by the participants in the NSS. Beyond these tasks the SCC has the authority to accredit three types of organizations: Standards Writing Organizations (SWO), Certification Organizations (CO) and Testing Organizations (TO). SWOs write (create) standards, some of which are accepted by the SCC as National Standards of Canada (NSC). COs are organizations with registered trademarks that certify that products or services meet a standard. TOs test products or services to determine whether they meet the standard for that product or service and report the results of their tests. They also analyze substances to determine their content or attributes, test products to determine various parameters, etc. By 1980, the SCC had accredited five SWOs, but only one CO and no TOs.

The other major organizational components of the NSS are the two internationally oriented committees. They are the Canadian National Committee on the International Organization for Standardization (CNC/ISO) and the Canadian National Committee of the International Electrotechnical Commission (CNC/IEC). These CNC's try to coordinate the Canadian voice in international standardization and ensure that the international standardization voice is heard in Canada.

The NSS is a "voluntary" standards system. The term "voluntary" is applied to both the development and application of standards. In some cases, voluntary standards are referenced in legislation or regulations. In these instances, otherwise voluntary standards become mandatory under the authority of the federal, provincial, municipal government or other regulatory bodies. Compliance with standards is the responsibility of the agency enforcing the legislation, or those invoking standards through contract and not the SWO or any part of the NSS. For some standards, the determination of whether or not a product or activity meets a standard may be determined by COs. In these instances, the enforcement of the standard still remains with the regulating body or contracting agency. TOs simply carry out the tests prescribed in the standard and report the results; they do not determine whether a product meets a standard.)

- 9 -



THE NATIONAL STANDARDS SYSTEM

Within the NSS, standards are developed through the consensus process. Not all standards are approved unanimously, but rather standards are approved when substantial agreement between the interested parties has been reached at each step in the standards development procedure. The development process is initiated once the potential need for a standard has been brought to the attention of a SWO by one or more of the stakeholders in the standard. In most instances no action is taken until the funding for the standard <u>is</u> <u>assured</u>. This funding may come from a single source (e.g., manufacturing association, consumer group, government, etc.), or the expenses for the development are carried by the SWO or a group of interested parties. (See Chapter 6 for an analysis of some of the effects of this procedure of funding standards development.)

Beyond the funding question, the SWO must decide whether it wishes to develop a standard in the area. Some of the factors in the decision are the practicality of developing a standard, the scope of the standard and whether the SWO has or is able to acquire technical expertise in this area. Once a go-ahead decision has been made, a standards committee (SC) is formed. The SC is a group of experts representing the various interest groups that are affected by the standard. The SWO is responsible for forming a "balanced" SC, i.e., a SC composed of representatives from all relevant groups interested in the standard, with no group having an overriding influence in the standard created.

The function of the SC is to determine the need, breadth and specifications of a standard. The members initiate scientific testing, accumulate relevant data or material (e.g., work by other standards organizations) and determine the requirements to be covered by the standard. Generally the members of the SC are experts in the subject area who volunteer their services. They are usually well-equipped to deal with most technical aspects of standards development. In many instances, a standing committee may exist for a particular subject area. In these cases the committee may be in the process of creating a number of standards at any point in time. The work of the standards committee involves the analysis of opinions related to the standard, as well as any relevant scientific and technical data. Where necessary, the SC may order scientific testing to be carried out before a decision is reached on the scope, technical characteristics and testing procedures of the standard. Once a consensus had been reached among the SC members, the standard is passed to at least one level of review committee. At the review committee level, proceedings of the SC and any dissenting opinions are reviewed to try to ensure that all interest groups have been represented and that all positions have been considered. It is not the prime purpose of the review committee to re-evaluate the technical content of the standard.

Once the standard has passed the review committee(s), it is published and entered in the catalogue of the SWO; however, the responsibility of the SWO does not end there. The SWO has the responsibility to maintain the standard and update it when necessary or during periodic review. At their discretion, accredited SWOs may propose a standard as a National Standards of Canada (NSC). The requirements of a NSC are outlined in the following section.

The two other components of the NSS are Certification Organizations and Testing Organizations. By 1980 only one CO (Warnock-Hersey) and no TOs had been accredited by the SCC; rather, in several instances, the SWO, CO and TO function were performed by the same corporate body.

### The COs are:

an impartial body possessing the necessary competence and reliability to operate a certification system and in which the interests of all parties concerned with the functioning of the system are represented.<sup>14</sup>

In addition to test interpretation, the COs may also undertake plant inspections or complaint follow-ups in the determination of compliance with a standard. (A more detailed explanation of the role of COs is presented below.) A Testing Organization is: an organization with the administration and technical capability to perform tests in accordance with recognized standards and report the results in a well-documented manner.<sup>15</sup>

The anticipated role of TOs is to provide an independent source of test facilities. It is within the proposed purview of the TOs to supply test results, but not to interpret these results.

At present there is uncertainty and controversy of the role, scope and function of both COs and TOs in the NSS. Several SWOs question the need for any new organizations to test and certify products to standards beyond the already existing testing and certification operations currently lodged within their organizations. They are also unsure of the impact of independent COs and TOs on their proprietary standards trademarks and fearful that a proliferation of independent COs and TOs will lead to a loss of control over their standards and an erosion of quality even though their trademark would not appear on these products. If, as many within the standards industry believe, there are economies of scale in testing and certifying, increasing the number of COs and TOs would lead to inefficiencies in the NSS and ultimately higher costs to consumers. Certainly at present the SWOs achieve real economies of scale and of massed reserves due to the synergy between their standards writing, testing and certification activities. Some maintain, however, that a separation between standards writing and certification produces better standards because if there is separation, standards must be written clearly in order to be used by COs and TOs. Others feel that the conglemeration of SWO, CO and TO within one organization without outside TOs or COs accredited within those product or service areas sometimes has led to monopolistic practices. The question of whether the benefits of increased competition arising from unbundling standards writing, testing and certification activities would offset the costs of possible losses of economies of scale and complimentarity presently enjoyed by the SWOs, if independent COs and TOs were accredited within the NSS, has not been resolved. The evidence that can be brought to bear on this question does not lead to any strong conclusions. At present the CGSB uses independent TOs for the bulk

of its testing needs and is a strong supporter of this arrangement. The CGSB feels that competition between TOs ensures better testing at a lower price. The CSA has its own test facilities and feels that inhouse testing allows more efficient utilization of its staff. As evidence on this point, the CSA cites the disproportionate increase in its total activities relative to its total costs of operations.

One possible resolution of this dilemma would be for the SCC further to encourage increased formation of independent TOs and COs so long as they meet the respective Criteria and Procedures for Accreditation of the SCC.<sup>16</sup> If economies of scale were important, these TOs and COs would be unprofitable and would cease operations. Two problems might arise if this procedure were followed: 1. Since producers would be able to shop around, the TOs might reduce the quality of their services and compete on the basis of the ease with which they reported results that showed the product to be in conformance to standard. Similarly COs might compete on the basis of the ease with which they certified products or services to standard and used their trademarks. 2. If SWOs retained the ultimate right to certify products to their standards, they might use this power to drive independent COs and TOs from the industry by refusing to allow their trademarks to be used on products that they had not tested or certified themselves, thereby reducing the incentive for producers to use the services of independent TOs and COs. There is no evidence, however, that SWOs would use this power, particularly in light of the seriousness with which they take their legal, moral, and corporate obligations and their commitment to the efficient working and development of the NSS. This problem has been resolved in the case of Warnock-Hersey, the sole accredited CO. As yet, the problem of the proper role and number of COs and TOs in the NSS has not been resolved, although the SCC has expended considerable time and effort in this area.

As previously mentioned, the CNC on the ISO and the CNC of the IEC are the international components of the NSS. The function of these organizations is to coordinate Canadian input to international standardization activities. One of the objectives of these international standards organizations is to eliminate duplication of standardization effort and reduce the proliferation of different national standards that create barriers to international trade. The CNC attempts to ensure that international standards conform to Canadian practices and that international standards do not impose unfair costs on Canadian producers. This task is accomplished by arranging for Canadian representatives to attend international technical committees to present the Canadian view in order to influence the content of international standards. In addition, these representatives are able to inform members of national standards committees of international standards work and the point of view of other countries.

In the past ten years, interaction of the NSS with standards bodies around the world and with the ISO and the IEC has increased markedly, but further progress is necessary: 1) The number of Canadian National Standards is significantly below that of other industrialized countries as is the number of the staff of the SCC. (See Table 2.) These numbers, however, do not provide an accurate reflection of Canada's standardization activities. The SWOs within the NSS employ hundreds of workers and have thousands of standards developed via the consensus process which are readily available to all interested parties. Nonetheless, the lack of a large number of National Standards does reduce the impact of Canadian standards at the international level. Coordination of information to and from the ISO and IEC on Canada's position has sometimes been slow and unsystematic. Until late 1979, there were two separate committees to interact with the ISO, one between the ISO and the SCC and one between the SCC and the Canadian SWO's and industry. This system sometimes led to information falling between the committees. For example, Canada voted in favour of an ISO standard on pallets (it was defeated in spite of Canada's affirmative vote) that was significantly different from the Canadian standard and whose adoption would have led to significant difficulties for Canadian shippers. This problem of coordination is exacerbated by differences in National/International scopes and subjects. 2) Canada's obligations on standards under the new GATT regulations are sometimes not well-understood or appreciated by some of the components of the NSS. The federal, provincial, and municipal government departments and agencies sometimes also do not have a good understanding in some instances of the impact of the GATT on their standards activities, especially in relation to harmonization of standards.<sup>17</sup>

### National Standards of Canada

One of the powers of the SCC is to approve standards submitted by the accredited SWOs as National Standards of Canada (NSC). It has attempted to encourage the development of a large collection of NSCs to provide a ready source of standards to be utilized nationally and internationally in the belief that a large, well-maintained set of nationally recognized standards will reduce the number of standards in Canada that are incompatible with themselves and with international standards and increase the influence of Canadian standards abroad.

The SCC applies fourteen criteria to a standard before accepting it as a National Standard of Canada.<sup>18</sup> In short they are:

- the scope of the standard is not restricted as long as the other criteria are met;
- the standard carries statements identifying the intended coverage, the interests represented in the preparation of the standard, and criteria by which the user can judge the suitability of the standard;
- the limitations of the standard are delineated;
- the requirements of the standard are quantifiable and the criteria for compliance are clearly enunciated;
- performance characteristics are specified, if practicable, so that variation in design is not limited;
- the standard is not framed to act as a restraint on trade;
- the standard is consistent with international standards;
- the standard has been prepared or reviewed and revised when necessary by an accredited SWO;
- there is only one NSC for the same subject;
- the standard is written in accordance with good standard writing practice;
- the standard is reviewed and maintained so long as it meets the criteria;
- the standard is available in French and English; and
- the metric system (S1) is used where possible. If a conversion to other units is shown, only one set of units will be designated as the official one.

### Table 2

## Selected Standards Statistics For National Standards Bodies in 1979

	NCD	NO. OF	PERCENT STANDARDS		
	STAFF	STANDARDS	VOLUNTARY	COMPULSORY	
U.S.S.R.	500	22,120		100	
CZECHOSLOVAKIA	1,841	13,507		100	
GERMANY	610+	18,000	100		
BULGARIA	1,850	12,817		100	
FRANCE	393+	10,465	99	1	
POLAND	800+	9,664		100	
HUNGARY	400+	9,893		100	
INDIA	1,622	9,710	99	1	
JAPAN	94	7,720	100		
U,K,	1,009	7,800	100	1000	
U.S.A.	115	9,092	100		
ITALY	44+	5,491	99.5	0.5	
S. KOREA	84+	6,186	99.4	0.6	
SPAIN	40+	5,280	96	4	
SWEDEN	71+	5,186	100		
SWITZERLAND	16	2,780	100		
NETHERLANDS	117	2,944	99	1	
AUSTRALIA	210	2,921	70	30	
TURKEY	169+	3,244	81.5	18.5	
S. AFRICA	1,188	1,998	99	1	
CANADA	58	275	100		

SOURCE: ISO MEMBER BODIES, THIRD EDITION, 1979.

Any standard may become a NSC if it is submitted to the SCC, prepared or reviewed by an accredited SWO, and meets the criteria for NSC. The SCC has:

... recognized that not all standards which form the total network of standards required in Canada need be identified as National Standards of Canada... When a situation exists where a standard is required to satisfy a need but may be unable... to conform with the criteria for National Standards of Canada, the Council encourages accredited standards-writing organizations to respond to this need but urges compliance with as many as possible of the criteria for National Standards of Canada.<sup>19</sup>

To further its objective of developing more National Standards of Canada, the SCC has provided modest grants (\$581,000 in fiscal 1979/80) to the SWOs for development of standards and has written an outline describing how SWOs can increase their productivity in standards writing.

### Standards Writing Organizations

At present there are five SWOs accredited by the SCC. These organizations make up a major portion of the total of standards writing organizations in Canada. However, some other smaller organizations also write standards. These "other" non-accredited organizations are being encouraged by the SCC to submit standards through the existing accredited organizations for adoption as NSCs. Currently, no limit has been set on the total number of organizations that can be accredited. An unlimited number of accredited SWOs might not be in the national interest for several reasons: there may be economies of scale in the creation of standards; too many SWOs will leave the areas of accreditation too specialized, reducing the coherence between standards in one area and standards in another, or leading to overlapping areas of responsibility; and too much competition might cause SWOs to lower their standards for standards-writing to remain in business, thus defeating the purpose of standardization. On the other hand, a larger number of SWOs might lead to increased competition between the SWOs especially if their areas of responsibility did overlap and possibly lower

costs to standards users. On balance, however, there have been few complaints of abuse by the SWOs of their monopoly position within these areas of responsibility, so that a significant increase in the number of accredited SWOs would seem to be unwarranted.

The SCC has twelve criteria for accreditation of standards writing organizations:

- the organization be able to produce standards to meet the criteria established for NSC (CAN-P-2B) or be willing to meet the criteria;
- the organization already exists, has a good reputation and is a going concern;
- the organization is national in nature;
- major national interests are taken into account when standards are proposed;
- the organization has separate management between standards preparation and testing or certification functions;
- knowledgeable staff with appropriate facilities exist;
- adequate organization support exists;
- procedures for preparation, review, publication and distribution of standards exist;
- the preparation committees be open to all interest groups;
- the organization be willing to undergo public examination of preparation committee membership;
- the organization identify and publish a list of its standards; and
- the records of committee meetings be maintained for inspection by the SCC.

The SCC also attempts to delineate different subject areas and recognizes that individual SWOs have a primary interest in particular subject areas; e.g., it is recognized that CSA has a primary interest in both wiring and electrical appliances.

The procedure for delineating and recognizing subject areas is for the SWO to request for identification of a subject area. The SCC gathers information about the subject area and consults with the SWOs until agreement is reached. If SWO agreement is not reached, those with an interest in the subject area are consulted to obtain a consensus. At that point the subject area will be assigned to a SWO. Where a consensus cannot be reached, the matter is submitted to the Executive Committee of the SCC. The five accredited SWOs (and a description of their subject areas) are:

### The Canadian Gas Association (CGA)

The CGA is a non-profit organization, founded in 1907 by industry, which began an equipment testing and certification, and a standards-writing program in 1956. It certifies all types and sizes of gas-fired equipment, and offers testing services for both gas-fired and electrical features of gas-fired equipment.<sup>20</sup>

The CGA standards activities are in the area of safety and performance standards for natural and propane gas appliances and accessories, including installation codes for gas.

### The Canadian General Standards Board (CGSB)

The CGSB was created in 1934 as a result of an interdepartmental conference to establish the Canadian Government Purchasing Standards Committee to prepare federal government purchasing standards. Its role was to deal with standard requirements outside the engineering field.<sup>21</sup>

Until 1980 the CGSB was a standards writing body only, but in 1980 it also started to provide certification, thus broadening its role. The CGSB, the official voluntary standards writing body of the Federal Government, attempts to meet the needs of a broad number of government activities, including consumer protection, procurement, and technical regulation. Specifically, the subject areas covered include procurement standards, building and construction product standards, consumer standards to assist consumers at the point of sale, technical and administrative practices and other miscellaneous areas.

### The Canadian Standards Association (CSA)

The CSA was incorporated in 1919 as the Canadian Engineering Standards Association, a not-for-profit voluntary standards organization. In 1944 this association became the Canadian Standard Association (CSA) when it broadened its field of standards activity to embrace many sectors of the Canadian economy. It also provides a complete certification, testing and inspection service for a variety of products and services in support of standardization. CSA is supported by government and industry with a number of standards and certification programs referenced in legislation.<sup>22</sup>

The CSA is the largest Canadian standards writing organization with over 5000 technical committee members and a budget of over \$20 million for its standards writing, testing and certification operations. Its recognized subject areas are in the engineering, safety, construction and electrical products fields. These fields include civil engineering, mechanical engineering, electrical work, automotive work, ferrous and non-ferrous metals, timber, structures, welding and other areas such as definitions and symbols, data processing, photography, etc.

### Underwriters' Laboratories of Canada (ULC)

ULC is a non-profit organization incorporated in 1920. It operates under the sponsorship of the Canadian Underwriters' Association. The organization provides certification and testing services, issues standards, specifications and classifications related to life, fire and casualty hazards or crime prevention.<sup>23</sup>

ULC is involved in producing standards for products and practices related to fire, accident and crime prevention.

### The Bureau de normalization du Quebec (BNQ)

The BNQ was founded in 1962 primarily in order to meet the standards needs of the Province of Quebec. In 1966 it became a standards service offered to industry in Quebec by the provincial Ministry, Trade and Commerce.<sup>24</sup>

The BNQ propagates standards primarily for regional needs and is funded by the Quebec government. It provides certification in a few areas.

### Certification Organizations

The criteria and procedures for accrediting certification organizations in Canada are described in the SCC publications CAN-P-3 and CAN-P-1500, "Criteria and Frocedures for Accreditation of Certification Organizations" and "Guidelines for the Implementation of the SCC Program for Accreditation of Certification Organizations". The ten criteria for the accreditation of Certification Organizations (CO) as outlined in these documents are:

- the organization be a going concern, able to certify compliance with standards and have the capacity and procedures to ensure that concerned interests are involved with certification policy-making;
- staff is knowledgeable in certification testing and quality assurance;
- the organization has technical expertise in its accredited subject areas;
- access to test facilities is available;
- procedures exist for initiation and application of certification programs, continued monitoring of compliance, legal arrangements with applicants, and appeal procedures;
- the organization is able to operate nationally;
- the organization is prepared to give consideration to any application for certification;
- the organization not be dependent on one source of financing and/or backing creating a conflict of interest;
- the organization allows examination by SCC of test data pertinent to the determination of compliance by SCC; and
- the organization maintains a list of certifications granted.

By the beginning of 1980 no COs had been accredited. The CGSB, the CGA, the CSA and ULC operated certification programs outside the NSS. Each of these organizations was also an accredited SWO and certified substantially in the same subject areas as its standard writing operations. In addition to these organizations, there are a number of government and some private certifying or quasi-certifying organizations. The largest of the public agencies are the Ministry of Transport, Supply and Services, National Defence and Public Works. These federal government agencies are mostly involved in certification to mandatory standards as are some Provincial agencies. In 1980, one CO, Warnock-Hersey, was accredited as a CO and another application for accreditation was being processed by the SCC.

### Testing Organizations

There are seven criteria for the accreditation of testing organizations. The testing organization must:

- be able to operate and maintain a testing capability;
- be managed by knowledgeable people and maintain records and reports;
- have technical expertise in testing;
- have access to adequate facilities;
- have acceptable procedures for maintaining records, confidentiality, standards of accuracy, calibration of test equipment, monitoring test work, settling complaints and tracing calibration to national standards;
- be prepared to allow the SCC to examine records and procedures, and verify accuracy of results; and
- establish a system of independent surveillance where conflict of interest may occur.

At the beginning of 1980 no TOs had been accredited.

### Harmonization of Canadian and International Standards

Canada has a program to harmonize Canadian and International standards work. The objectives of this program are to:

- 1. make the most effective use of the scarce resources available for standards activity by eliminating duplication of effort;
- 2. diminish the opportunity for undertaking commitments that cannot be implemented nationally;
- 3. increase compatibility between Canadian standards and international standards;
- 4. improve communication between national and international standards writers; and
- 5. make technical committees more responsive to national and international demands.

The SCC has a policy that "Standards Writing Organizations accepting accreditation shall undertake to co-operate and support the...(SCC) in carrying out its responsibilities."<sup>25</sup> SCC policy also encourages SWOs to become knowledgeable internationally in their areas, and work closely with the Canadian National Committees (CNCs) to different international bodies. The SCC's objectives in international standardization are to:

- ensure that international standards take into account the policies and interests of Canada;
- ensure Canadian votes are cast in accordance with a consensus view of Canadian interest; and
- ensure that an overall coordinated Canadian position is maintained on international issues.

Canada through SCC participates in three non-governmental standards organizations, the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC) and the Pacific Area Standards Congress (PASC). The first two develop international standards while the third is a means of communication and exchange of ideas between certain member bodies of the first two organizations. The SCC Act designates the Council as the member body for Canada in such organizations and gives it a mandate to ensure effective Canadian participation in these and other such organizations.<sup>26</sup>

Internationally, the ISO and the IEC are the largest and most influential standards writing organizations. Each was formed before 1947. On February 27, 1947 the ISO rules and procedures were ratified by national standards organizations creating an international standards organization. The IEC is financially and technically independent of the ISO. It carries a substantial portion of the International Standards workload with jurisdiction over:

- Electrical terminology, units, symbols, ranges, and standard test methods;
- materials important in electrical practice; copper, aluminium, solid, liquid and gaseous insulants, magnetic materials;
- apparatus used in electrical power generation, transmission and industry; electrical installations components - cables, instruments, relays, fans, batteries, lamps, fuses, appliances and accessories;
- electronic components and assemblies used in radio, television, communications and in industrial controls and systems;
- performance, safety and reliability of applications of electrical power and control in different kinds of installations - in buildings, ships, electric traction, mines, machine tools, hospitals, process control - and in specialized uses such as welding, heating, refrigeration and air-conditioning.<sup>17</sup>
To cover this broad range of topics the IEC has over 600 technical committees, sub-committees and working groups. The positions on these committees are filled with the members of the 42 National Committees (including Canada).

The ISO is structured in a similar manner to the IEC with members of national committees serving on its technical committees. Canadian representation on the ISO technical committees is administered by the Canadian National Committee on the ISO (CNC/ISO). The ISO writes standards in areas not covered by the IEC including mechanical, agricultural, metals, chemicals, transportation, building, information processing, terminology, dimensions, test methods, etc. In total there are 86 full member countries and 18 correspondent member countries represented in the ISO.

Canada has both the need to influence standards developed by the ISO and the IEC and the potential to do so. Since Canada is highly dependent on exports, if international standards are compatible with Canadian standards, Canadian products will find wider markets abroad and will face fewer barriers from foreign governments. Also, compatibility between Canadian and international standards will increase the number of suppliers available to Canadian firms, thereby reducing the cost of inputs and increasing the competitive position of the final product. Canada has the <u>potential</u> to influence international standards since standards development via the consensus process is relatively advanced in Canada and has a true national, integrated standards system.

Since the creation of the SCC, Canadian participation in the activities of ISO and IEC has grown rapidly. However, Canada's total participation is still not large overall in relation to the high level of development of its standards system and the importance of international standards for Canada.

### Metric Conversion

Metric conversion has given a strong impetus to standards development. It has created an opportunity for standards to be accepted by a large number of manufacturers and to penetrate all aspects of the manufacturing process. It has also created pressure on the SWOs to produce more new standards and revise older ones. This opportunity derives from the fact that a major segment of the Canadian manufacturing industry is in the process of converting to the metric system. By incorporating standards into the conversion, long-term cost efficiencies may be gained since primary suppliers will be able to supply "standard metric parts". In addition, if metric standards are available when producers go metric, they will be more likely to manufacture products that conform to standard.

### Education

In the view of some, the most important responsibility of the SCC is to promote standards and inform and educate producers, legislators, regulators, and consumers, about the existence of standards, standards writing organizations and the NSS. The SCC has recognized this important task. It publishes a quarterly journal, <u>Consensus</u>, reporting on standards activities in Canada and abroad. Compared to Japan, for example, public awareness of standards is low in Canada possibly due to the greater emphasis the Japanese Standards association places on consumer education and the greater demand by Japanese for high-quality products.

In 1977 the SCC published a "Survey of Provincial and Municipal Government Standards Activity".<sup>28</sup> The object of this study was to develop "an overview of non-federal government involvement with standards". The analysis "of the responses indicates that 85% of standards prepared or used at the provincial level are in support of legislation, with the balance in support of procurement or for internal use....The survey indicates that the majority of standardization activity at the provincial level takes place in relative isolation".<sup>29</sup> Inevitably, many of those standards have been developed elsewhere causing a wastage of resources resulting, in incompatible standards, and provincial and international barriers to trade. One of the primary goals of the SCC has been to eliminate these discrepancies throughout Canada. The results of the study clearly indicate that more education for government regulators, especially at the provincial and municipal levels, in the existence and use of standards is required.



### CHAPTER III

#### Types of Standards

The Standards Council of Canada (SCC) has defined a voluntary standard as: "A standard developed through the NSS (National Standards System) is said to be voluntary. This term applies both to the process of development and to the subsequent application of the standard."<sup>30</sup> Under this definition a standard is "voluntary" if it is developed <u>voluntarily</u> by the consensus process by experts and other interested parties who are <u>volunteers</u> and if compliance by producers is on a <u>voluntary</u> basis. The SCC contrasts voluntary standards to mandatory standards:

Standards may also be prepared and approved outside the NSS by a restricted group of participants, or where a participating member has overriding authoritative influence. This process may be used by a company, or industry, and is frequently used by the regulatory authorities at all levels of government to support the laws which they administer. In this latter application such standards are referred to as 'mandatory'.<sup>31</sup>

Although both these definitions were written by the coordinating body of the Canadian Standards System, the Standards Council of Canada, neither of them is precise or useful for analytical purposes. The problems with these definitions arise largely because of the complexity of the standards system itself, and are perhaps unavoidable. For example, a voluntary, consensus standard may become mandatory if it is referenced under a law, either municipal, provincial or federal.

Before continuing with the main thrust of this paper, the analysis of voluntary standards as a regulatory device, it is necessary to set up an analytical framework for describing and classifying standards. Precision in the definitions of the categories within this framework is necessary, since one of the most important controversies between the participants in standards activities in Canada (the various standards bodies, users of standards and those responsible for standards under the law) has revolved around the costs and benefits of formulating and using various types of standards given the economic, social, political and legal factors that surround the product or process to which the standard is applied.

Standards can be usefully described and categorized along two dimensions: the <u>development</u> of the standard and the <u>usage</u> of the standard. A standard can be <u>developed</u> along the spectrum from <u>bureaucratic</u> standards to <u>consensus</u> standards. The <u>usage</u> of a product or process standard can range from no standard (or different standards for different producers) to one of the many forms of mandatory standards.<sup>32</sup> (See Table 3.)

### Development of Standards: The Consensus Process (Consensus Standards)

Ideally, a consensus standard is developed by a balanced committee of the major interested parties such as producers, consumers, other users, third parties and government. The views of each party are aired, and, if possible, reconciled and reflected in the standard. If differences arise between the parties over specification of the standard, these are discussed, and reconciled if possible. If differences remain, a standard may be written in spite of objections by one of the parties, although this has rarely happened in Canada within the NSS. The consensus process for standards writing is crucial to the standards system in Canada. (See Chapter 2 for a description of how a standard can become a National Standard of Canada and how dissenting views are handled.) The consensus process as used by the Standards Writing Organizations (SWOs) in Canada generally works well in practice, in spite of the many ways by which it might be abused. It is particularly effective in combining and reconciling divergent viewpoints, as long as the interests of the parties are not so far apart as to be totally incompatible. (Even in this situation, the consensus process is useful to delineate the areas of agreement and disagreement.) The consensus process forces each party to present its viewpoint clearly and support it with technical data before a group of peers whose respect is desired. The process discourages frivolous objections and viewpoints and blatant

## Formulation and Usage of Standards

## Formulation

Bureaucratic Standard

# Consensus standard with modifications

<u>Use</u> -	No standard	Voluntary standard		Dated reference to standard	Standard written into an act	<u>Use</u>
	Standard of use		Open Reference to Standard	Standard written into a regulatio	on	
		Consensus	Standard			
		Formul	ation			

attempts by parties to influence the standard for their benefit. One drawback of the system is that it can discriminate against underfunded, non-technically oriented groups.<sup>33</sup> (This potential problem will be analyzed further on in the chapter.)

The consensus process may also take an unacceptable length of time to develop a standard, especially if the viewpoints of the parties are initially widely divergent. In these cases, if the need for the standard has arisen from health, safety or consumer protection concerns, a government department or agency has sometimes stepped in and either banned the product until an acceptable consensus could be written or has written the standard itself outside the consensus process. Once these bureaucratic standards become part of legislation or regulations they have often proven difficult to change or remove when an acceptable consensus standard has been developed. A provisional standard can help solve this problem. Similarly, if significant or irreconcilable differences arise between the members of the standards writing committee, and if the standard is used or will be used in legislation, in some instances the representatives from government have acted so that their views (not necessarily those of the majority of the committee) have predominated. If this overriding happens, the standard is no longer a consensus standard. These actions by representatives of government departments may reflect their viewpoint that government must be the final arbitrator in areas that impact on the public interest, however defined. It also implicitly incorporates the assumption that government employees know what the public interest is and act to achieve it, are unbiased and fully informed, an assumption that is open to some doubt.

Standards developed by the consensus process can be applied either voluntarily or mandated (if referenced in federal, provincial or municipal laws or regulations). The <u>process</u> of developing and formulating the standard, however, is voluntary in that the committee that writes the standards is composed of unpaid volunteers (with the assistance of employees of SWO).<sup>34</sup> As mentioned above, this voluntary system may limit the participation by representatives of some groups.

- 32 -

On the other hand, it is an efficient means of assembling the technical expertise necessary to write standards with a minimum of overhead and wasted resources, while at the same time allowing the representation of diverse interests and backgrounds to participate. Of all the groups, firms and individuals who were consulted during the course of this study, the most dissatisfaction with the consensus standards process was expressed by a few government bureaucrats, especially those who were responsible for administering various Acts and Regulations that contained standards in some form. This dissatisfaction was by no means universal among those in government, but it stood out prominently since other interest groups (the SWOs, producers, consumers, etc.) were, in general, enthusiastic about the consensus process for developing standards, as it currently operates in Canada.<sup>35</sup> As an interesting note, the Canadian General Standards Board (CGSB) is lodged within the Department of Supply and Services, and, as one of the SWOs in the NSS, participates fully and enthusiastically in writing consensus standards. The CGSB has sometimes found itself at odds with other government departments over both the standards it writes via the consensus process and its advocacy of consensus standards.

### The Bureaucratic Process (Bureaucratic Standards)

A bureaucratic standard is one that has been formulated by an individual organization (e.g., a firm, government department or government agency) or group of organizations outside the consensus system. A bureaucratic standard, as defined here, is one for which the consensus process has not been used.<sup>36</sup> The potential costs of the bureaucratic process for the formulation of standards are two-fold: 1) sources of information and expertise may not be known, utilized or taken into account; 2) the diverse interests of all those affected by the standard may not be reflected in the bureaucratic standard. Consequently, bureaucratic standards may be more easily captured by one interest group, may conflict with other standards (or not be uniform across jurisdictions), or may have adverse effects not envisioned by those who formulated them. As a trivial example, in some provinces the doors on boiler rooms must open outward, in others

inward. Business both in Canada and the United States has voiced concern that some bureaucratic standards set by one government department conflict directly with those set by another department. For example, until recently there were five different and sometimes conflicting plumbing codes in British Columbia. Businessmen point to these cases as prime examples of the way government can hamstring business. Conversely, some bureaucratic standards set by private interest groups have had highly restrictive effects on competition, international trade, and market entry and have raised prices to consumers and supra-normal profits for those who have "kept" the standard.<sup>37</sup> IBM's language standards are examples of this use of bureaucratic standards.<sup>38</sup>

In some instances, bureaucratic standards may have advantages over consensus standards in the speed with which they can be formulated in response to a sudden perceived need for the standard. In these cases, however, it is difficult to see why the bureaucratic standard cannot be adopted as a provisional standard until a consensus standard can be developed. For example, in the case of the exploding soda bottles, the government banned the sale of the soda in one litre bottles while it developed a bureaucratic standard. No attempt was made to formulate a consensus standard. Bureaucratic standards may also be necessary (again, only temporarily) if the interest groups in the consensus process cannot reconcile their differences, and some standard must be set. In such a case, the government department responsible for the standard may need to formulate a bureaucratic standard to override the impasse. Similarly, government may have to set a bureaucratic standard if those involved in the consensus process do not work in good faith and a true voluntary consensus standard that reflects all interests cannot be reached. Alternatively, the federal government in its areas of jurisdiction can raise the threat of a highly restrictive bureaucratic standard in order to force the parties in a consensus standard to move forward or formulate a true consensus standard.

The SWOs and the SCC differ sharply from some members of government departments (who are responsible for formulating and

- 34 -

administering laws and regulations that contain standards) as to the relative costs and benefits of consensus standards and bureaucratic standards, and on the appropriate conditions under which each type should be used. Part of the difference of opinion arises from differences in responsibilities and perspective between these two groups. More fundamentally, however, the problem stems from differences in the philosophy of regulation via standards between the two groups. This point will be elaborated in the next chapter.

### USAGE OF STANDARDS

No Standard: For many products there are no standards at all or standards differ between firms in the industry. Each firm may produce to a different standard of measurement, quality, function, performance, etc. Even when there is no standard for the product as a whole; however, various parts or facets of the product may be produced to a standard. For example, flashlights come in all sizes, qualities, complexities, and performance characteristics. Yet most use one or more of a few standard-size batteries and, less often, standard light bulbs. A product group will tend to have no standard if: 1) it is a consumer end-product that does not have to be interchangeable with other products; 2) the purchase price does not represent a significant part of the consumer's budget; 3) there are frequent repeat purchases; 4) information about the product is readily available to the consumer at low cost; 5) the product's technology is new, rapidly changing, and a significant source of competitive advantage to the producer; 6) there are no health, safety, or environmental implications in the use of the products.

Of course, over time a product may move from having no standard to having a standard, either voluntary or mandatory, come into usage or be developed for it if a need arises. In fact, the evolution of a product standard along the spectrum from no standard to a mandatory standard is one of the most important processes in the standards system. The six variables listed above can change over time, so that a standard becomes beneficial to some interest group that may bring pressure to bear on producers, government or a SWO so that a standard is written. Of particular interest are the changes in public and government perception and concern in the areas of health, safety and environment (including energy use).

If some group or groups with an interest in the product producers, consumers or government - finds it advantageous that an explicit standard be formulated, it can try to have a standard for the product written either by a SWO using the consensus process or as a bureaucratic standard by government or industry. The standard developing body responds to a demand from groups with a stake in the standard. The commitment of the SWOs in the NSS to the consensus process using a balanced committee allows little chance that the interest group that initially demands the standard can manipulate the SWO or the standards committee and less chance that it can influence the standard disproportionately for its own benefit. This protection does not exist for bureaucratic standards. One problem with the market orientation of the SWOs in the NSS that will be analyzed in the next chapter is that since the SWOs in the NSS respond largely to outside demand, and outside funding, however motivated, there may be an underutilization of standards in some areas and an overutilization in others. Once the need for a standard has been accepted by the standards writing body (not necessarily a SWO in the NSS), the standard may take any of the forms described below, depending on the reasons for the perceived need for the standard, the urgency of the need, the relative strengths of the groups involved, and the area in which the standard lies, e.g., health. For example, a leading firm in the industry may try to impose its product's characteristics as a standard of custom or use and eventually lobby for a voluntary or mandatory standard to be developed around its product's characteristics. Conversely, the government in its role as a buyer or as a protector of the interests of consumers may have a standard again either voluntary or mandatory - developed if it perceives that one of the factors in the environment has changed and a standard would yield net benefits (however determined).

Standard by Custom or Usage. In some cases, especially when the characteristics of the product are stable, or when one manufacturer or buying group is dominant, over time a standard may gradually come into use by custom or usage, until the products of all the firms in the industry (or procedures for producing the product) conform to the standard. This standard may or may not be explicitly codified. Although this type of standard is not mandatory in the sense that the force of law is not behind it, it may be very difficult for a firm either to produce or to sell its products unless they conform to the standard (or have been produced by procedures that conform to the standard). There is considerable danger of this type of standard being a "kept" standard, i.e., one that benefits one firm, group of firms in the industry, to the detriment of other interest groups that are affected by the standard. If a firm can seize a standard, it may be able to reap substantial economic gain both in terms of higher profits and reduced competition from other firms in its industry or from imports. Firms recognize the competitive advantage they can achieve if the specifications of their product either explicitly or tacitly become the standard for the industry. Consequently, for some products (particularly those whose technology is new) there can be considerable rivalry between firms over product and process standards. If one firm dominates the industry, it may use (and change) its standards as a competitive device to increase the difficulty of firms to enter the industry. The classic case of this type of behaviour was (and is) IBM's use of different computer languages and specifications to exclude competitors from the market. (This subject is analyzed further in the chapter concerning the motivation for creating standards.)

Mandatory Standards. Mandatory standards are standards that are incorporated into a law or a regulation under a law by some means. Products or processes that fall under these categories must conform to the standard. Mandatory standards can be at the federal, provincial or municipal level. There is no accurate count or even an estimation of the total number of mandatory standards in force in Canada at all levels of government.<sup>39</sup> The means by which standards are made mandatory vary widely and have different economic implications. Open Reference Standard. An open reference to standard occurs when an Act or regulation references a standard, often one written by a SWO using the voluntary consensus process. The standard is then a mandatory one that must be followed by products or processes that fall under the Act or regulation. The key word is "open". This word means that the reference to the standard is undated and sometimes unnumbered. For example, for drugs, a reference may be made by Health and Welfare Canada to CGSB standard for "Manufacture, Control and Distribution of Drugs (74-GP-le) as amended".<sup>40</sup> If the SWO (in this case the CGSB) changes the standard, the new standard is automatically incorporated into the law. In the example, when the CGSB changed the standard (from 74-GP-1d November 1971 to 74-GP-1e in September 1975), the revised standard was automatically incorporated in the regulation. This method of referencing a standard allows continuous, rapid updating of the standard used in the Act or regulation by the voluntary consensus process if conditions change in Canada or if new information is brought to the attention of the SWO by one of the parties affected by the standard. An open reference to a standard has three major drawbacks:

1. Control of the standard <u>as it appears in the legislation</u> is effectively removed from the government department that has the ultimate responsibility under the law for the standard. This loss of control presents two problems. First, the standard may be changed by the SWO without the consent of the department responsible for the standard. Second, there is a possibility that the revised standard may not be satisfactory to the government for a variety of reasons. These problems can be mitigated by participation of government representatives on the standards committee that revises the standard.

2. When open reference to standards is used, there is a question of legal liability for the performance of products and processes under the standard. Some lawyers from government departments think that the Acts under which a standard has been made mandatory require that the department responsible for the legislation that contains the standard must at the very least have ultimate control over the standard as it appears in the legislation. They conclude that open reference to a

standard is an abdication of that responsiblity for the contents of the legislation to a third party. This reservation about open reference standards was voiced by several lawyers and regulators in government departments during the course of interviews.<sup>41</sup> This objection loses some of its weight for two reasons. Open reference standards currently are used quite extensively by government at all levels for diverse products and processes. A review of the use of open reference standards as compared with other forms of mandatory standards does not reveal any logical differentiation between characteristics of products and processes with open reference standards and those that are subject to other forms of mandatory standards. In other words, whether a standard is made mandatory in legislation by open reference or some other form (dated reference, written into the legislation in total, etc.) seems to have been largely arbitrary or at most dictated by the circumstances that surrounded the creation of the mandatory standard. Moreover, federal Acts and regulations reference foreign standards, company standards, and, in one instance a standard that could not be identified or its origin traced (Preston, 1979). Legal scholars, members of SWOs and some government bureaucrats saw no fundamental legal obstacle to the use of open reference to standards, if the standard had been developed by the consensus process with input from the government departments that were responsible for the legislation or regulation that references the standard. At the very least, the Acts and regulations that contain sections pertaining to standards could easily be written to give explicit recognition to the use of an open reference to consensus standards.

For these reasons, the legalistic objections to an open reference to standards would seem to be largely spurious. The objections to open reference to standards would seem to reflect the deep-seated belief by some regulators within government that they are the best arbitrators of the public interest and their suspicion that if they do not have absolute control of the standard as it is written in the law, the standard may be captured by an interest group for its own special purposes that do not reflect the wider public interest. Although the record of the NSS is not without blemish, the instances of failure are few and the costs of failure have, in general, been low. Hence, these suspicions would seem to be largely unfounded. As described below, in more detail, the benefits of open reference to standards outweigh the costs in most instances. Every effort should be made to overcome the <u>legalistic</u> problems of using an open reference to standards. The argument by government regulators that they have no alternative, given their responsibility under the wording of the Act, begs the question. Since government regulators usually have a major input into the wording of the Acts that they administer, the claim that their choices of how a standard is incorporated into the ACT (or into regulations under the Act) would seem to be somewhat disingenuous.

3. Writing a voluntary consensus standard by a balanced committee within the NSS may be very time consuming and involve considerable delays, especially if there are widely divergent viewpoints among the parties with a stake in the standard. In some cases, government may not be able to wait until a standard is developed by the voluntary consensus process due to the high costs of having no standard or a standard that has been shown to be inadequate for current needs. Even in these rare cases, however, there seems to be little cost if an interim bureaucratic standard is written, and used, but only until a consensus standard can be written.

The SWOs and the SCC are convinced that for the vast majority of standards, the consensus process is both sufficiently fast and effective in dealing with new information and that consensus standards are preferable to bureaucratic standards. Bureaucrats in several federal government departments expressed significant reservations concerning the speed, the effectiveness, and the lack of bias of the consensus process, especially when a revised (or new) standard had commercial implications for one or more of the interest groups on the standards writing committee. Ironically, given the central role of "consensus" in the standards system in Canada, no consensus has been reached on the relative merits of reference to standards compared to bureaucratic standards written into regulation.

- 40 -

In summary, the problems with using an open reference to a voluntary consensus standard developed by a SWO, using a balanced committee, can be overcome at least in the long run. The most serious problem occurs when the stakeholders in a standard have divergent interests so that a consensus standard cannot be written, at least in the time frame necessary for regulatory purposes. This conclusion is important, and may create considerable controversy.

Open Reference to Standard - provided that the standard writing group is of a specified composition. This type of reference to standard is not used often. Its purpose is to ensure that if the referenced standard is revised subsequent to its first reference under the law, the committee that revises the standard will have a specified composition. This provi sion is usually incorporated to ensure that the interests of government are represented at the previous (or some specified) level or at least that the revisions of the standard are carried out via the consensus process. In this way, government can ensure that its interests in a referenced standard are protected, yet allow for periodic revisions of the standard by the SWO. The only cost of this increase in certainty and control for government, is that the stakeholders in a standard may change over time or additional stakeholders may be identified or may desire to have input into the revision process. This problem can be eliminated if only the minimum level of representation of government is specified or simply if any subsequent revisions to the standard are made by a "balanced" committee via the consensus process.<sup>42</sup> This remedy should be acceptable to government unless it desires to have an "unbalanced" committee with the power resting with representatives from government.

On the other hand, the benefits of this type of reference would not seem to be significant in view of the current standards system in Canada and the commitment of SWOs to the consensus process.

Dated Reference To Standards. A dated reference to standard is a more restrictive reference to a standard. For example, the reference to standard could be "Standard for: Manufacture, Control and

Distribution of Drugs, 74-GP-le September 1975". If a dated reference to standard is used, subsequent revisions of the standard do not take on the force of law. This type of reference gives complete certainty of the specification of the standard to the government department responsible for the law that contains the standard. It ensures that the standard used under the law cannot be revised in such a way as to go against the objectives of government or to become "kept" by one interest group.<sup>43</sup>

A dated reference to standard has several costs. If, over time the standard becomes outdated and is modified by the SWO, the standard under the law does not change. If different government departments or levels of government reference different dated standards, manufacturers may be caught between conflicting standards. If a dated standard is referenced by a wide-ranging regulator (e.g., regulations on drugs), the incentive for product modification and improvement is reduced since manufacturers are bound by the previous version of the standard until the regulation (and sometimes the Act itself) is changed. Dated standards reduce the flexibility of the standard in the Act or regulation in meeting changing conditions both in the technical aspects of the standard, the product itself, and in the groups with an interest in the standard. The standard tends to become "cast in concrete". As described further on in the paper, one of the major drawbacks of standards of any kind is that they may impede technological progress and development and use of new, better or cheaper products and processes. The case study on standards for drugs found that one of the major complaints of manufacturers of drugs was that the referenced standards did not change quickly enough to reflect new technology and procedures. Use of dated reference to standards exacerbates the problem of the technological obsolescence of standards. It would seem that the costs of using dated reference to standards outweigh the benefits.

Standard Written into a Regulation. In some cases, the complete text of a standard is written into a regulation. This method is much the same as the use of a dated reference to a standard except that the dated

reference to standard can be either in the Act itself or in a regulation under an Act. If the standard is written into the regulation under the Act, it can be changed more easily by the responsible department than if a dated standard is written into the Act or if the entire standard is written into the Act. With this method, the flexibility of the standard is usually reduced and changes in it are more difficult to achieve. In theory, the department can change the standard written into the regulation guickly in response to a new perceived need. Often, however, the government department is isolated from the marketplace, so that it is not sensitive to technological progress in the product or process or to changes in the product's economic environment. On the other hand, the government department may be more sensitive to the public interest, particularly consumers' interests, than the standards committee.<sup>44</sup> If the standard is written into a regulation, the government department often has the authority to modify the standard as it appears in the regulation quickly to serve the public interest or in response to public pressure. If an open reference or a dated reference to standard is used, these changes are more difficult (since the standards committee must be reconvened and again reach consensus), especially if there are significant differences in the viewpoints of the members of the standards writing committee. The argument has been made that for products coming under the Hazardous Products Act or under the mandate of the Department of Health and Welfare, rapid changes in standards may be necessary as new information comes to light. The argument continues that if a consensus standard is to be used at all for this type of product, the standard must be written into the regulations, so that the standard in the regulation can be modified easily. In this case, it would be incumbent on the SWO that had written the original standard to convene a committee to modify it considering the new information. In theory, the department responsible for the law that contains the standard could then incorporate the revised consensus standard into the regulation.45

The crucial factors in deciding whether a standard is best written into a regulation or best written as an undated reference to standard, are the probability of a significant change in impact of the standard (or product under the standard) on the public interest, the speed with which a change might have to be effected, the speed with which the standard could be changed through the consensus process by the SWO responsible for the standard, and the potential costs of a nonconsensus standard replacing a consensus standard. There is considerable controversy over these issues both in general and for specific standards. Another factor often cited by government regulators is that when a standard is written into legislation, the total requirement is available to the user from one source; he does not have to obtain a copy of the standard to determine the total requirement.

In general, however, it would appear that open reference to standards is preferable to a standard written into a regulation. The number of instances when a standard in a regulation must be changed immediately (or before a consensus standard can be developed or modified) is small compared to the number of changes in standards that are necessitated by technological change or in order to harmonize standards on an international basis. The costs of writing all the technical details into a regulation have been recognized by international organizations in their position towards standards. For example, the United Nations Economic Commission for Europe advocates the principal of "reference to standards".<sup>46</sup> If the technical details of the standard are written into a regulation, it is usually more difficult to change them in light of new information or to reduce differences in product regulations on an international level.

This effort to harmonize standards at the international level has taken on increasing importance through the Tokyo Round negotiations of the GATT, to which Canada is a signatory. Technical regulations have been identified as significant, non-tariff barriers to trade. Under the GATT and through the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) considerable work has been undertaken to reduce the trade-distorting effects of national standards through harmonization of standards at the international level.<sup>47</sup> Therefore, in order to facilitate the harmonization of standards in Canada with those in other countries and with ISO standards, every attempt should be made to reference standards in regulations rather than incorporate detailed requirements into the regulation.

Standard Written "as is" into Legislation. The difference between this type of mandatory standard and the previous one is in the location of the standard. Here the standard is written directly into the legislation rather than into a regulation under the legislation so that the standard can only be changed if the Act is changed or superseded. This type of mandatory standard gives parliament absolute control over the standard as it appears in the legislation. If the SWO responsible for the standard changes it, this change is not reflected in the mandatory standard in the legislation. Similarly, government bureaucrats are powerless to change the standard that is in force under the legislation, unless the standard in the legislation itself is changed by parliament. By this means parliament, the body ultimately responsible for the public interest, can retain control of the standard as it is applied under the law. The drawback of this method of making a standard mandatory is that it may retard change and improvement in the standard as it is applied under the law (and hence the products or processes covered by the standard) in the future. Surety and control are achieved at the expense of flexibility and progress. There are only a few instances when this procedure makes any economic sense at all, such as when some national policy takes precedence over all other considerations, e.g., bilingualism.

### Standard with Modifications Written into Legislation (or Regulation)

This type of mandatory standard is similar to the previous ones, with one important difference. Someone (or some group) in the government, either government bureaucrats or parliament, has gone outside the standard developed by the consensus process and changed the consensus standard. The motivation for this action may be complex and is often not well-articulated. The modification may be due to a belief that the consensus standard did not go far enough (i.e., was not restrictive enough) along some dimension, e.g., health, safety, or consumer protection. One of the dissatisfactions of some interest groups with consensus standards is that in some rare instances they may represent the "lowest common denominator". Producers and sellers are seen as resisting any requirements to increase the quality, safety, etc., of the product if such a modification also increases costs or involves costly modifications of plant, equipment and product, or will necessitate further research and development, more extensive product warranties, or the recall of previous products. Consumer or government interest groups on the standards committee may be able to push for some tightening of the standard to try to meet the needs of consumers, but in some instances, the viewpoint of the commercial interests on the committee may largely determine the standard. It is then tempting for a bureaucrat in the department responsible for the Act or regulation that contains the standard (or parliament in framing the legislation with the advice of department bureaucrats) to have the final say in the formulation of the standard as it appears in the Act or regulation by modifying the consensus standard to reflect his viewpoint.

modify the consensus Another reason to standard when incorporating it into an Act or regulation is that the standard is outdated in some respects and there is not sufficient time to update it by the consensus process. As long as the picture of a government bureaucrat as the best representative of the public interest (and having the necessary information and technical competence to set the standard) is accepted, modifications of consensus standards incorporated in regulations and legislation may be seen as benign. This picture of the actions (if not the role) of the government bureaucrat has come under increasing disbelief in recent years. This is not to denigrate government bureaucrats, but simply to view them as rational economic and political agents who respond to the incentives of the system in which they operate. Government bureaucrats do not bear the costs of the regulations they put in place; these costs are borne by the public, a public that is both largely unaware of the costs of regulation and unable to calculate these costs. The department responsible for an Act or regulation that contains a standard is often the recipient of direct and indirect public pressure via consumer complaints and pressure by

- 46 -

elected representatives if products or processes covered by the standard cause problems. Bureaucrats often have an incentive to make the standard as stringent as possible in order to reduce the number of complaints, even if by so doing they impose additional, possibly larger, costs on all consumers. Similarly, government bureaucrats also have an incentive to attempt to reduce the risk of consumer reaction to adverse health, safety, or welfare implications of products, by increasing the stringency of standards under their control. In general, government bureaucrats are only at risk from attacks by a committed, vocal group of consumers who have had an unfavourable experience with the product, not by general consumers who bear the increased cost of stricter standards. Ideally, the costs and benefits of increasing the stringency of a standard could be weighted by the standards writing committee via the consensus process. Under the SCC, the SWOs in the NSS of Canada are committed to attain this ideal through the formulation of standards using balanced standards committees and the consensus process. As already noted, in rare instances, the process may break down when the viewpoints of the interest group are divergent, when the committee is not well-balanced, or when the only way consensus can be reached is by writing an ineffective, "lowest common denominator" standard. In these very few cases, bureaucratic intervention may be But, considering bureaucrats' proclivity for empire necessary. building, their risk aversion, and their sensitivity to publicity and pressure by committed interest groups (and in some cases outright capture by an interest group), bureaucratic intervention is not a good remedy for this problem and should be avoided. For example, in Britain, government regulators rejected safety standards for drug containers that would have saved one life for every \$2,200 expense (a low profile issue with a diffuse interest group) and instituted building standards for apartments that added \$44 million per saved life after an apartment building collapsed.

Bureaucratic Standard in Legislation or Regulations. Government bureaucrats or parliament can go one step further away from a consensus standard by writing a standard into an Act or a regulation under an Act with or without taking the consensus standard, if available, into account. Bureaucratic standards are written into legislation and regulation by government, for much the same reasons that consensus standards are modified before being placed in legislation and regulations: the government's view that the consensus standard is inadequate for its purposes. In addition, the pressures of the moment may make it necessary to develop and give the force of law to a standard very quickly in response to a suddenly perceived need that cannot be met by other means. Not only does this procedure tend to cement a standard in place so that change is difficult in the future, but also the standard is not developed by the consensus process so that the viewpoints and technical expertise of all interested parties may not be reflected in the standard. In many respects, this bureaucratic standard may be a "kept" standard since it may only reflect the interests and viewpoint of one group with an interest in the standard, albeit arguable the group with the widest, most neutral position, if not the widest technical expertise.

Most members of the SWOs and the Standards Council of Canada are strongly opposed to mandatory bureaucratic standards. One reason for their opposition is that they view this method of writing standards as an infringement of their rights and power within the NSS. More importantly, the member organizations within the NSS are firmly committed to the development and use of consensus standards both by agreement and by belief. They view the voluntary consensus process as a powerful tool to provide the relevant technical information, delineate the viewpoints of interested groups, and make trade-offs between the costs and benefits of alternative formulations of a standard. They strongly believe, based on their experience with the voluntary consensus process, that this process is the best method for developing standards. They see three useful roles for government in the consensus: 1. To act as an active participant in the consensus process; 2. To act as an initial impetus for the development of a consensus standard; 3. As a last resort, if consensus cannot be reached on a standard that affects the national interest, especially one that involves matters of health, safety, welfare or the environment, to step in and act as the final creator and arbitrator of the standard. They believe that this last role

should be adopted in very few cases, and then only if all other avenues have been tried and failed.<sup>48</sup>

Not surprisingly, government bureaucrats in departments responsible for various Acts and regulations that contain standards view their role as more extensive, more activist, and more conclusive. This difference of opinion on the role of the consensus process and the government in that process is likely to persist in the future as the demand by the public for standards, especially standards in the areas of health, safety, welfare, consumer protection and the environment, increases. This subject will be explored further in the chapter on the demand for standards.



### CHAPTER IV

### Rationale for Standards

In the past, economists have usually viewed standards with suspicion as a means by which firms individually or as a group could build barriers to entry into their industry, limit imports, reduce competition by increasing their ability to coordinate activities, and retard product and process innovation and development to the detriment of the public interest. Against these real and potential costs, few benefits were seen to flow from the use of standards, except perhaps standards for measurement. This view is correct if all markets are perfect in the sense that all buyers and sellers can obtain perfect information at no cost about a product's characteristics and its performance under all conditions, there are contingent markets through which risk can be diversified and shifted, and there are no externalities of production and consumption.

As the level of industrialization has increased, however, products and processes have become more complex and interdependent, their performance has become more difficult and costly to evaluate, and the costs of product failure have increased. The potential for production and consumption externalities, the potential cost of those externalities, and the public's awareness of and sensitivity to those costs have all increased as well. Market failure is the rule, rather than the exception in modern industrial economies. The development and use of standards has increased over time in order to correct this market failure, or ameliorate the consequences of market failure. Standards, if properly developed and used, can both increase the level and efficiency of economic activity and reduce the negative effects of that activity on individual users and society as a whole. Standards also can have (and have had) negative effects on technical, allocative, and dynamic efficiency and on income distribution, particularly when their development and use is "kept" by a dominant interest group.

Standards can increase the technical efficiency of the economy by increasing the ease with which products of one firm can be substituted for products of another and used in combination with each other. Interchangeability and compatibility between products can increase the number of sources of supply, promote competition, reduce risk, reduce the size and cost of inventories, increase worker productivity, and promote economies of large-scale operation. Standards can also be used to rationalize products in an industry by reducing the number of different shapes, sizes, etc., that firms produce. Product rationalization may lead to increased efficiency through economies of scale in production, inventories, and consumption. (This increased efficiency, however, may be offset by a decrease in product variety and availability, especially if standards differ between countries. This trade-off will be analyzed in Chapter VI, Effects of Standards.) Standards that increase interchangeability, compatibility, and rationalization can increase economic efficiency.

As products have become more complex, information about their performance characteristics has become more difficult and costly to obtain. Leland (1979) has shown that standards may be justified on economic grounds if there is information asymmetry between a product's buyers and sellers. This asymmetry often occurs since buyers often do not possess sufficient, accurate information about the product (and to obtain such information is costly) with which to evaluate the purchase in light of their funds, utility functions and risk preferences. Leland stated (p. 1336):

Minimum quality standards will tend to be more advantageous in markets with: a) greater sensitivity to quality variations, ...b) low elasticity of demand ...c) low marginal cost of providing quality...d) a low value placed on low quality service...

There are, of course, other means by which information on product characteristics and performance can be provided to users and market failure reduced. Producers can provide information themselves at the point of sale or through advertising. For some products, however, the buyer would have to be given and would have to process and evaluate a large amount of information in order to make an optimal decision. If the products are produced to meet a standard, the amount of information necessary to make a decision can be reduced substantially in many cases. Moreover, the evaluation of this information may be easier and less costly if it is provided by a third party, rather than the producer, since information provided by the producer may be perceived by the user to be biased and unreliable. Product information and the evaluation of product characteristics and performance may also be provided by non-market sources of information such as Consumers Union, government, and inclustry association, sometimes in conjunction with minimum performance standards. Standards may therefore yield net benefits if markets fail due to asymmetric information between producers and purchasers.

Standards may reduce the risk of product failure and reduce the users' perception of the risk of product failure. These effects of standards may facilitate entry of new products, expand demand, and facilitate international trade. Product warranties, insurance, service contracts and contingent contracts can serve the same purposes and can be used instead of or in conjunction with standards. Standards may correct market failure by recucing the potential risk of product use and the users' perception of the risk of product use.

One of the primary purposes of standards is to try to help correct the market failure that arises when the price of a product in the competitive market system does not reflect the true costs to society for producing or consuming the product. In such instances, government may make standards mandatory under Acts or regulations to help correct the market failure and ensure the optimum production of the product from the viewpoint of society at large. Classic examples are: (1) standards for air, water, and noise pollution (pollution has no market price); (2) standards for gas mileage for vehicles (the price of oil in Canada and the U.S. does not reflect the true opportunity cost of oil); (3) some standards for safety, health, and quality (consumers and other market participants may not have sufficient information to evaluate the real costs of product use in a rational manner, cannot accurately evaluate the real costs of product use even if they did possess all the relevant information, or the consumers do not bear the full costs of consuming the product).

To use a specific example, recently standards have been written for safety belts in cars, and Ontario has passed a law that levies fines for not using safety belts. These standards were set and the use of safety belts conforming to these standards has been made mandatory, despite widespread public knowledge that safety belts significantly increase the safety of passengers in vehicles. Government intervention was thought to be necessary for three reasons: (1) all the information of the effects on benefits (reduced injury and the probability of death) associated with different seat belts may not be available to consumers; (2) people may not make correct choices between costs (in this case the cost of safety belts and the discomfort and inconvenience of wearing them) and benefits (reduction in the expected severity of injury and the probability of death) for events that occur with low probability; (3) society at large pays for some of the costs associated with not using safety belts through OHIP, unemployment insurance, etc., so that the individual's incentive to avoid injury is reduced below the social optimum. For these reasons, government has intervened in the market to foster the development of standards for safety belts, to make their installation in cars mandatory, and to enforce their use by consumers, i.e., it has imposed its evaluation of the true costs and benefits of the use of seat belts and the trade-off between these costs and benefits on society at large. (Similar examples are the mandatory standards and enforcement of the use of products conforming to standards for floatation devices for pleasure boats, hockey helmets and masks, etc.; see Appendix A.)

At least in theory, however, instead of direct intervention via mandatory product standards and mandatory use of products that conform to standard, the government could act instead to correct the market imperfections in many cases. For example, in the case of seat belts, it could cancel or reduce OHIP coverage for those who sustain injury depending on the type of seat belt used (or not used), or require seatbelt manufacturers to provide the consumer with further information on the effect of their product on reducing injury and death. If these procedures were followed, drivers and their passengers might be in a better position to evaluate the costs and benefits of the use of different safety control devices according to their own driving habits and ability and their own risk preferences. The cost to producers of producing that information and the costs of processing and evaluating that information might be high in relation to the cost of mandating the installation of and use of seatbelts that conform to standard and enforcing their use.

In some cases, correcting market failure by other means may lead to a higher level of net benefits than the use of government mandated standards and the enforcement of the use of products that met those standards. Such a return to the market would only be beneficial, however, if sufficient information could be provided consumers at low cost and that if they could and would evaluate it correctly in light of their own risk preferences. There are many examples of cases in which government and private enterprise have moved to correct market failure without the use of standards: (1) instead of mandating the standards for cigarettes, government requires manufacturers to provide information on the level of tar and nicotine in cigarettes and publishes information on the relationship between these variables and health; (2) some life insurance companies charge different premiums depending on the life style and consumption habits of policy holders, e.g., their and smoking habits; (3) product warranties or service drinking contracts are provided or can be purchased for many products; (4) consumer information services have been set up to fill the information gap for many products. Government has also sometimes intervened via the price mechanism rather than directly via standards by levying taxes on some products with substantial negative externalities (cigarettes and alcoholic beverages) or subsidizing products with positive externalities (home insulation, university education) rather than mandating the level and standard for their use.

There are many means by which economic and social activity can be regulated when private decisions do not lead to optimum behaviour from the point of view of society as a whole. Standards can be used whether by themselves or in conjunction with other forms of regulations to bring individual behaviour closer to the societal optimum. The effects of regulation by the use of standards, either by themselves or in conjunction with other forms of regulation, are complex and difficult to determine. Regulation via standards as with any type of regulation imposes costs as well as benefits on the economy through its effects on the technical, allocative, and dynamic efficiency and on the distribution of income of the economy.

The magnitude, direction and distribution of these effects of standards depend on the characteristics of the product and consumers' demand for the product, level of standards usage, the types of standards developed and the process and institutional framework of standards activities. This chapter concludes with an analysis of the determinants of the level of standards usage.

### The Demand for Standards

Standards are one means of regulation to correct for market failure due to costly information, lack of contingent markets to shift risk, and externalities of consumption and production. The market for standards for most goods and services is itself highly imperfect. The most efficient level and usage of standards will not, in general, be reached through competitive market forces. This failure in the market for standards is due to several factors, some of which have already been mentioned in the preceding analysis.

For many products, there are no economic reasons to prefer one specification of product characteristics over another, e.g.,  $8\frac{1}{2} \times 11$  vs. 8 X 12 paper, 50 cycle vs. 60 cycle current, so that the competitive market system may lead to a proliferation of products with different characteristics and a decrease in the overall technical efficiency of the economy. If these products are produced to a single standard, the

technical efficiency of the economy will increase, yet a standard will not be developed unless some stakeholder in the product or an extra-market agent intervenes in the market and develops a standard for the product.

Standards are a "public good" in that once developed their use by one producer does not decrease their availability to others. Moreover, all the beneficiaries of a standard may be difficult to identify and charge directly with the cost of developing the standard. Hence, unless an agent outside the market system intervenes directly, the level of standards development and use will be below the optimum level.

Even after standards have been developed, the benefits of use of products that conform to standards may be difficult to quantify for both producer and user alike. When firms do not appreciate or cannot calculate the value of standards, their demand for standards may be below the optimum level. This problem has been recognized by those engaged in developing standards (Rosenwald, 1962):

The lack of ability in this area of evaluation [of the benefits of standards] is the single greatest deterrent to a flourishing of the standards movement in the United States. I place this item as the number one obstacle (even over the obstacle of selling management on the standardization concept), because if we could evaluate better and more objectively our sales job would be easier.

Regulation via product and process standards and the specification of the standards may confer differential costs and benefits on the different stakeholders in the product or process. These effects may give one stakeholder or a group of stakeholders an incentive to demand regulation via standards or to develop a "kept" standard. Standards may alter industry structure, conduct, and performance, the relative competitive position of firms within an industry, the distribution of income between producers and users, and between different users. (The effects of standards will be analyzed in Chapter VI.) Whether a standard for a product is developed when one or more of the stakeholders in the product would benefit from a product standard depends on their relative economic, social and political power. Large buyers of a product may be able to impose their will on producers. Government may be in a particularly strong position to influence the use of standards since, in many industries, it is a large buyer, or may view itself as the custodian of the public interest (and hence has the right to impose a standard), and often has easier access to SWOs than do private parties. (See Federal Trade Commission, 1972.) If users are small (especially small relative to the producers), inexpert or unorganized, they may have no effective way of making their desires felt. As illustrated in the case on the standard for Structural Steel Shapes (Appendix A), even if the buyers are well informed (as is the case of buyers in the steel construction and fabricating industries), a standard may not be written if the buyers are small relative to the producers, unless, as happened with this standard, they can use their industry association to coordinate their demands. Once coordinated, the buyers may be able to impose their demands on the reluctant producers. In this case, after initially resisting efforts for standards of rationalization, the steel producers (except one in the U.S.) saw the value of reducing the number of structural shapes they produced and joined in the standards writing process.

The low voluntary standards coverage for consumer goods compared to the high one for producer goods may in part be due to the larger size and concentration of the buyers of producer goods compared to buyers of consumer goods.<sup>49</sup> The distribution of the gains from standards among purchasers may not be uniform, however. Large purchasers may gain relatively less than small ones if a standard is put in place since large purchasers may be able to write their own standards and force producers to meet them, and there may be economies of scale in standards development. If large purchasers gain relatively less than small ones, they may resist uniform standards since benefits of the standards would accrue disproportionately to the smaller firms. On the other hand, if no formal standards exist, small firms can appropriate the large firms' standards at little cost, so that the relative gains from industry-wide standardization may be more equal across producers.

Established large producers may resist standardization for several reasons: (1) Standardization may remove product differences that producers use to differentiate their products. (2) If there are economies of scale over smaller firms, advantages would disappear if the number of products in a "full line" were reduced by standardization. (For example, if all automobile companies were only allowed to produce one "standard" model, General Motors might lose considerable competitive advantage.) (3) Large firms may be the only producers of some lowdemand items, and hence may be most affected by standards that seek to rationalize the number of sizes, shapes and qualities of the products of an industry. Conversely, small firms often produce in niches in the market that may be eliminated by standardization, small firms are often not able to afford the investment in equipment; research and development, and quality control necessitated by standards; and small firms may face a higher cost per unit to have their products tested and certified to standard.

In summary, standards may increase economic efficiency when they are used to reduce costs by increasing rationalization, interchangeability and compatibility, to correct market failure due to production or consumption externalities, asymmetric information between buyers and sellers, and the absence of mechanisms for shifting and reducing risk. The very market failure that makes standards advantageous, also causes the demand for and supply of standards by the stakeholders in standards to attain a level of standards usage that may not be an optimum for society. The market for standards is far from perfect and the stakeholders may use their economic and political power to bargain over the extent of standards usage and specification of standards. Standards that are created may disproportionately favour one stakeholder over another depending on the relative power of the stakeholders in the standard and product.<sup>50</sup>

In a separate study (available from the author), statistical analysis using a sample of two hundred consumer and producer products gave some support to the hypotheses described above that industry structural variables and product characteristics may have had some influence on the level of standards coverage for products. Standards coverage tended to increase with increased buyer and seller concentration and government purchases, and tended to be lower for products with high elasticities of demand, law product complexity of use, and if the product was a consumer good whose use had few safety and health implications. This influence of industry structure variables on the level of standards coverage may indicate that the market for standards has failed to provide the optimal level of standards coverage, i.e., the market for standards may have failed. In instances of failure in the market for standards, there may be a role for a non-market agent, e.g., government or a SWO, to correct this failure through direct intervention in the market for standards. Such non-market intervention raises three problems: identification of industries and products with a non-optimal level of standards development; finance for these activities; finding the appropriate agent to undertake these activities.

One of the characteristics of the free market system if it is working correctly is that information on benefits and costs to users of the product or service is reflected in the demand curve and information on costs to producers is reflected in supply curve. In the case of standards for some industries, however, the market for standards would appear to have failed for some products and services, so that the optimal level of standards activity in Canada has not occurred. Examination of industry structural variables by those engaged in the development of standards might aid them in identifying products for which the market for standards had failed.

Even if the information necessary to determine the optimal level of standards in these markets could be gathered, the money to support the formulation of the standards and testing and certification programs may not be forthcoming from the usual sources: producers and
producer associations, large users and government acting under its mandate for health, safety, consumer and environment protection and general protection of the public interest. Even though society as a whole (both as producers and consumers) may benefit from increased usage of standards in some industries, the fragmented nature of both producers and users creates a "free rider" problem so that individual consumers and producers may not be willing to contribute funds to support standardization. It would seem as if general government revenues are necessary if this activity is to proceed. This conclusion will be anathema to many in the standards community in Canada who pride their industry's "market orientation". In many industries standards are a "public good" and like all public goods must be financed out of a general levy if the optimum usage of standards is to be achieved. In these industries no one beneficiary or group of beneficiaries may be willing to bear the cost of developing standards and testing and certification programs.

Finally, even if the first two problems were overcome, the optimal locus of this new standardization activity is not clear. In light of the organization of the NSS so that the SWOs have responsibility for separate product areas, there is no obvious location for this new thrust in standardization activity. The SWOs are the centre of knowledge, experience and expertise on the creation of standards by the consensus process. They are not well-versed, however, in actively seeking new products for which standards should be written (nor do they have an incentive to discourage the development of a standard if some interest group is willing to provide the funding). In the past, the original impetus for a new standard typically has come from outside the SWOs, although on occasion the need for a standard has been identified and a standard created from within a SWO. Even in these cases, the need for the standard has been highlighted by a complaint from one of the stakeholders in a product. Organizations such as the Consumers Association of Canada, a division within the Department of Consumer and Corporate Affairs, or the Canadian Federation of Independent Business may be more attuned to the needs of consumers and small firms than the SWOs and consequently, may have better access to information concerning the needs for standards in industries that would benefit from a higher level of standards usage.<sup>51</sup> In addition, civil servants in DCCA have expertise in the analysis of the structural and competitive variables that influence the level of usage of standards. These groups, in general, have little expertise in standards creation via the consensus process. They could, however, increase their present role as sources of information about the need for standards and participate more fully in the consensus process for standards in industries with unconcentrated buyers and sellers.

In summary, the problem of non-optimal usage of standards in some industries might be ameliorated if the following steps were taken: (1) The Federal Government allocated increased funds to consumer and producer groups representing small buyers and sellers and to SWOs specifically to identify industries in which the development of standards has been non-optimal. (2) Once the need for a change in the level of standards use has been identified, the standard is developed or reviewed by the voluntary consensus process within the present system of SWOs, funded in part by the Federal Government. For such a standard, the standard writing committee should have a high representation from consumer, retail, and small business interests, again funded by the government. Although these recommendations call for increased government regulation, they will increase the efficiency of the market for standards and hence increase the efficiency of product markets in Canada.

## CHAPTER V

#### The Standards Testing and Certification Process

Once a standard (either voluntary or mandatory) has been formulated, producers can show that their product or service conforms to standard in three ways: 1) they may have a testing organization test their product and report the results to a certification organization that may certify the product based on the test results; 2) they can certify to the certification organization that their product conforms to standard; 3) they can certify to the purchaser that their product conforms to standard. (Of course, with a voluntary standard the producers do not have to produce to standard at all.) All three of these methods are used within the National Standards System of Canada.

The Canadian Standards Association has taken a strong position on the best method of testing and certification to standard. Their CSA trademark cannot be used on any product unless it has been tested and certified to standard by the CSA or one of its affiliated organizations outside Canada. If a SWO's standard is mandatory or if, as is sometimes the case, the standard is a voluntary standard but practice among buyers is such that certification to standard is necessary to sell the product, testing and certification by CSA becomes a pre-condition for production and sale. This situation gives rise to the potential for abuse in two areas. First, if the SWO is a private, profit-seeking organization, it is in a position for these products to seek monopoly returns to their testing and certification operations. 52 Second, Canadian manufacturers may have an incentive to lobby for standards to be formulated for their products (especially if these standards are mandatory by law or usage) if the SWO has testing and certification procedures that discriminate against one group of producers or potential producers in the industry. Thus, even if the standard itself is not "kept" by one interest group, i.e., if the standard is a consensus standard written by a balanced committee, the testing and certification program may serve as a barrier to entry to the market.

Testing and certification costs are usually small in relation to the cost of production. For example, as a rule of thumb, the CSA tries to maintain testing and certification costs below 1% of sales and, in most cases, they are often much less. Even if testing and certification costs are low, they are largely "up-front" costs, i.e., the manufacturer must incur them without knowing if the product will pass the tests or if it will be successful in the market. This may be a substantial barrier to entry especially for small firms that are just entering the industry either by domestic production or by exports from abroad. Small, new exporters from countries that have not previously exported substantial manufactures to Canada are especially affected by the difficulty of having their products tested and certified to standard. To try to reduce this problem, the same SWOs have appointed certain standard organizations located in some of Canada's major trading partners as their representatives. These organizations are authorized to carry out plant inspections, tag products for testing, and in some cases use certification marks. This help is not very useful for a firm in Bangladesh, for example, if the nearest representative is in Japan. As long as products must be tested and certified to standard either in Canada or in only a few locations abroad, this problem will remain.

Testing and certification to standard by an independent body may act to <u>reduce</u> barriers to entry and trade. If a SWO certifies that the product of a new entrant in the market conforms to standard, that product may gain acceptance in the market more easily than if customers had to rely simply on the reputation of the producer and their own evaluation of the product.

Canadian standards developed by the SWOs and testing and certification of products to standard by the SWOs have served as a useful tool to increase Canadian exports. Many foreign buyers recognize the high level of development of standards in Canada and accept testing and certification in Canada. Unfortunately, although progress is being made, reciprocity has not been granted by standards organizations in some of Canada's export markets, most notably Japan.

- 64 -

The impact of the two effects of standards and testing and certification to standard on barriers to entry is uncertain and varies from product to product. It would seem, however, that standards writing, testing and certification organizations potentially have an opportunity to use their control over granting certification for some products to earn excess returns on their operations. As an extension, they may have an incentive to try to increase the level of standardization, testing and certification. Established firms in the industry may also have an incentive to support these activities of the SWOs in order to restrict entry by local producers and importers into their markets. (Some indirect evidence to support this hypothesis is presented in a subsequent chapter.) This tendency toward overstandardization (both too many standards and standards that are too tight) may be masked behind statements by industry that standards are necessary to prevent "low quality" products, "unfair competition", and "dumped" products from abroad. (See the case studies on "Porcelain Enamelled Steel Plumbing Fixtures", "Polyethylene Pipe for Cold Water Services", and "Structural Steel Shapes" in Appendix A.)

These problems may not be severe if producers can themselves certify to their customers that their products conform to standard. Such a procedure would allow firms in foreign countries to export their products to Canada without the delays that are sometimes the case when products have to be tested and certified under the current system. Self-certification, however might pose problems of legal liability for importers and the ultimate sellers. Importers and the ultimate sellers have the opportunity to have testing and certification performed if they desire certainty from a legal point of view or want to show their customers that the SWOs or other testing and certification organizations have tested and certified their products to standard. Producers could then choose between self-certification and certification by CSA, ULC or CGA based on the relative costs of each procedure and the relative acceptance by consumers of their products. The trademarks CSA, ULC and CGA are trademarks, however, and could not be used on products that had been self-certified.

Another potential benefit of more widespread self-testing and self-certification would be that legal liability for product failure would be partially shifted from the testing and certification organizations to the producers. Since at present some SWOs also test and certify products for which they have written standards and these products bear their mark, they may have an incentive when writing standards to make them too stringent thereby reducing the chance of product failure and the chance that they are held liable for that failure.<sup>53</sup> Since the SWOs do not bear the increased production costs of overly stringent standards, and since they may have to bear the costs if products certified to their standards fail, especially if those products bear their marks, they have an incentive to write overly stringent standards even if the costs to society of these standards exceed their benefits.<sup>54</sup>

The CGSB has moved one step toward self-certification. Under its testing and certification procedures, the producer arranges for a testing laboratory (either within its firm or an independent lab) to test and certify its product. The CGSB must then approve of the laboratory and the procedures it uses to test the product to standard. When the lab tests the product to standard, it submits an affidavit to the CGSB; that is then taken to a certification panel of three to ten experts drawn from government, other laboratories, and possibly from the industry association. If the test results were accepted by the panel, the CGSB inspects the firm's production facilities and its quality control and management. If the firm passes the inspection, it may then use the CGSB logo on its product, and the firm must put on every product or package, "We certify that this product meets the CGSB standard..." (Emphasis added). The CGSB periodically makes spot checks of the product at the factory, wholesale and retail levels, and tests at CGSB contract labs the samples it collects. The CGSB certification procedures are still far from self-certification, but they are a step in that direction.

Some government departments (e.g., the Department of Consumer and Corporate Affairs) try to monitor conformance to standards solely via inspection in the marketplace. They do not, in general, inspect the firm itself to determine that its procedures for production and quality control are such that its products will conform to standard. Relying solely on sampling in the market often increases the costs of monitoring conformance to standard. For example, in the case of home insulation, the inspector would have to test the insulation both at the point of sale and after it was installed, a difficult procedure at best.

# International Aspects of Testing and Certification

The new Standards Code under the GATT recognizes that testing and certification procedures, as well as the standards themselves, can act as non-tariff barriers to trade (NTBs). Under the Standards Code, acceptance of the certification of a product in the country of origin is encouraged when the standards organization or government department is satisfied that such certification is equivalent to certification in the consuming country. The U.S. government has recognized its obligations under the Standards Code by forming a Task Force of the International Standard Sub-committee of the Interagency Committee on Standards Policy to report on the implications of the Standards Code on the rather chaotic standards system in the U.S., particularly the implications for the standardization activities of the Federal Government. In Canada, this activity falls under the mandate of the SCC. As yet, however, due to the decentralized nature of the NSS some of the component organizations of the NSS have been slow to change their procedures into compliance under the Standards Code of the GATT. The international aspects of testing and certification of products to standard will present problems for a long time to come. For some products, standards in Canada may necessarily differ from standards in other countries due to Canada's unique economic, social, technological, and climatic conditions. Testing and certification procedures may necessarily differ as well. Standards organizations abroad may not be able to test and certify products to these standards or the costs of testing and certification may be prohibitive outside Canada. Moreover, the standards organizations in many countries are not as developed as those in Canada so that the SWOs in Canada would be abdicating their responsibilities to the Canadian public to allow them to test products and certify products as conforming with Canadian standards. Selfcertification by foreign producers might entail even greater problems and risks.

Self-certification by firms in Canada often has not been satisfactory, especially when consumer health and safety is an issue or when the product is complex, a single-purchase, large-ticket item, and when the customer is not knowledgeable about the product.<sup>55</sup> Some progress, however, has been made by the CGSB and the SCC in conjunction with the Canadian International Development Agency to train those involved with standards in some developing countries.<sup>56</sup> The SWOs in Canada are continually expanding their relations with standards organizations abroad in an effort to reduce the trade-distorting effects of Canadian standards and testing and certification to standard. It will be a long time, however, before these efforts will eliminate the effect on trade of the testing and certification system in Canada.

# CHAPTER VI

#### The Effects of Standards

The use of voluntary standards for products, processes and services confers economic benefits and imposes economic costs on Canada. This chapter analyzes the economic costs and benefits of various types of standards, their use in the economy, and the National Standards System of Canada. It analyzes the effect of standards on the technical, allocative, dynamic, and administrative efficiency of the economy and on the equity of the distribution of the costs and benefits of standards.

Given the wide use of voluntary standards in a modern economy and their complex interaction with other components of the economic system, it is not surprising that it is usually impossible to attach a specific monetary figure to the total costs and benefits of a specific standard, let alone to the standards system as a whole. This problem was described by B.H.E. Maynard, the director of the CGSB, in the case study, "Manufacturing, Control and Distribution of Drugs" (See Appendix A):

The possibility of identifying and assigning reliable total relevant costs of development and implementation of the standard, in terms of the programs that it has supported and continues to support, is so remote as to render such exercise in estimation virtually meaningless. an The exercise of quantitative cost-benefit analysis has been attempted on many occasions by many standards organizations and users as a means of offering justification for the costs of standards development, but these attempts almost inevitably founder or tender misleading information, because of the virtual impossibility of acquiring reliable comparable "before and after" statistical data. It is considered more forthright and useful to address the question in terms of general qualitative considerations that reflect the inherent advantages of the voluntary standards approach to problem solving.

In a similar vein, the LaQue Report (1965) concluded (p.87):

Measurements of Effectiveness and Benefits -- There does not currently exist either in government or industry any uniform measures by which potential benefits achievable through the use of standards can be identified, appraised and evaluated, and thus provide a basis for making sound technological, economic and logistical trade-off decisions. It is often possible and useful, however, to describe in qualitative terms the potential costs and benefits of standards - their creation, usage, certification and testing - to provide those involved in standards work with a framework by which standards and the standards system can be evaluated on a cost-benefit basis. Identification of these potential costs and benefits (and in some cases quantification of their magnitude) can aid in the formulation and use of standards. The next section of this chapter describes, often in qualitative terms, the actual and potential effects of standards on the technical, allocative, dynamic, and administrative efficiency of the economy, on income distribution, and on the international dimension of Canada's economy.

# EFFECTS ON EFFICIENCY

## Administrative and Compliance Costs

The resources spent on developing a standard (and a testing and certification program in one is used), are costs to the economy. Due to the market orientation of the SWOs in Canada, fairly accurate figures have been assembled on the costs of standards development by the SWOs for those standards that have been created as part of the NSS. These costs, however, are a relatively small part of the costs of standards development. Since the NSS is largely voluntary in the sense that standards are often developed by a committee composed of volunteers, the direct costs to the SWOs of creating standards are typically less than the costs borne by the voluntary members of the standards committees. Mr. Dymond of the CSA estimated that costs to members of standards committees as a whole were ten times the costs to the SWO responsible for writing the standards. If this estimate is accurate, standards written by the five SWOs cost in excess of \$50 million in 1979. These costs are borne by the various interest groups whose representatives form the standard committee and are ultimately passed on to the consumer (in the case of manufacturers) or the general public (if government funding is involved). These direct costs of standards development are often the least of the total out-of-pocket

costs of a standard. The costs for firms in an industry to modify their capital equipment or invest in new equipment, to reorganize their production systems and retrain their workers in order for their products to conform to standard, outweigh the costs of creating the standard. Data on these costs are not collected either at the industry or firm level and are only indirectly factored into the standards system by those participating in the standards creation process.<sup>57</sup> An executive involved in the NSS gave a private rule of thumb of \$10 of cost to the manufacturers for each \$1 in costs for writing standards. If this figure is of the correct magnitude, total direct costs of standards within the NSS were on the order of \$500 million in 1979. This figure does not include the costs of firm-level or industry standards developed and used in Canada.

As already described, additional costs are incurred by both producers and those administering standards in testing and in certifying to standard. Departments and agencies at all levels of government also incur costs in monitoring conformance to standard for products and processes that fall within their mandates. The size of these costs is unknown and could not be estimated.

#### Effects on Technical Efficiency

One of the greatest benefits of standards development and use is their effect on the technical efficiency of industry through increases in product rationalization, compatibility, and interchangeability. These effects are particularly important in Canada due to the prevalence of small, scale-inefficient firms in the Canadian economy.<sup>58</sup> The cost savings to industry from standards and programs to increase the use of inputs that conform to standards have often acted as the impetus for standards development. The greater coverage of standards for producer goods than for consumer goods in part reflects the greater cost savings that can be achieved through standardization of producer goods, goods that are used by downstream industries to produce final products. Industry has experienced continuing difficulty in calculating the cost savings that arise from the use of inputs that conform to standards. As described by Toth: With returns of this magnitude (from four to twenty dollars saved in cost reduction for every dollar invested in firm level use of standards), there should be no problem getting an adequate budget to operate a standards organization. We know from experience that this is not the case. Service, support, or overhead functions are always vulnerable to budget cuts. This does not mean that specific standardization tasks and needs are not the essential requirement. Some managers and accountants, though, pay considerable attention to reported cost savings. But often the same people who demand a justification for a program are at a loss to provide the cost data needed for proper evaluation.

Recognition of this problem by those engaged in standards development has led to the development, publication and dissemination of standards to calculate the benefits of the use of standards. In the United States, the National Aeronautics and Space Administration has developed a standard (NAS 1524) for calculating cost savings from standards use due to: increased quantity purchases; reduced paperwork and handling; storage requirements; engineering search time; items in inventory; use of a stocked standard part rather than designing a new part; using a non-stocked part; or detailing each design element. Use of this NAS standard, however, requires detailed cost data, data that is often not available or expensive to generate.

The effect of standards on the overall technical efficiency of the economy cannot be quantified. Fragmentary evidence, case studies, and the general consensus of industry and government lead to the conclusion that standards greatly increase the technical efficiency of the economy. In recognition of this effect, over the past fifteen years, government and industry have both increased their demand for standards and their use of standards programs once standards have been developed.<sup>59</sup>

## Effect on Allocative Efficiency

Standards can affect the allocation of resources among industries, among producers within an industry, and the allocation of consumption between products. A useful method of analysis of problems of resource allocation is the structure-conduct-performance paradigm of industrial organization.

# Structure

The analysis in Chapter IV, "Demand for Standards", concluded that industry structure has had an important impact on the extent of the use of standards across industrial sectors in Canada. The relationship can work in the opposite direction: standards can also affect industry structure. This relationship has been recognized by some firms that have pushed for the development of standards in order to enhance their competitive position and to erect barriers to entry and international trade in their industries. Standards can affect industry structure via their impact on cost of production, product price, quality and design, the level and quality of information available to buyers and sellers, barriers to entry and mobility in the industry and on international trade, and the rate and direction of technical change. Through their impact on industry structure, standards affect the conduct and performance of industry. Depending on their impact on industry structure, standards can either increase or decrease the level of competition in industry and hence either increase or decrease industry performance. In general, when standards alter structure so that competition is decreased, economic efficiency is also decreased and vice versa.60

Standards for rationalization, interchangeability, and compatibility may lower costs for small firms more than for larger firms that are already scale-efficient. Firms may also have secret processes or ingredients that they have to make public or stop using under rationalization, thereby eroding their competitive advantage. For these reasons, these standards may be resisted by the larger firms in the industry. (See the case in Appendix A, "Structural Steel Shapes".) Standards for rationalization may, however, serve to restrict entry. Smaller firms may be less able than larger firms to change their production processes and product characteristics to meet the new standards. In addition, small firms often operate in niches in the market, i.e., they produce specialized products on a job-shop basis, that may be eliminated when rationalization occurs. Change may be resisted by old, entrenched firms if they have high sunk costs in machinery designed to produce to the old standard, or if the market may initially resist products that conform to new standards, but have higher prices.

Quality and performance standards may also affect industry structure via their impact on the ease of entry of new firms and new products into the market. On the other hand, if a new product or the product of a new entrant in the market is certified as conforming to standard, buyer acceptance may be increased and market entry facilitated. Quality and performance standards provide information to the consumer and reduce the perceived risk of product failure. This benefit is particularly valuable for big ticket, non-repeat purchases, for which the buyer has little information, a low ability to evaluate the product performance, and for which the costs of obtaining information are high. By providing information and reducing the consumers' real and perceived risk in purchasing the product, performance standards can increase total demand for the product.

These benefits are obtained at a cost, however. Quality standards, particularly if they are mandatory by law or usage, may eliminate products valued by some consumers from the market. Some firms, particularly large, entrenched ones, may advocate the creation of quality standards for the products in their industry in order to restrict entry or eliminate low-cost, low-quality products manufactured either domestically or abroad. The use of the consensus process by a balanced committee by the SWOs in Canada, however, has greatly reduced this type of behaviour.

Standards also may affect another key industry structure variable, exposure and participation in international trade. Standards of interchangeability, rationalization, and compatibility increase technical efficiency and hence increase the competitiveness of Canadian firms both in the local market and at home. If Canadian standards are compatible with standards abroad, Canadian producers may have easier access to export markets and possibly have access to lower-cost imported inputs. To the extent that Canadian standards and testing and certification programs are recognized abroad, Canadian products may find easier acceptance on the export market. Exports increase the total market for the product and allow the firm to reduce costs through economies of scale. Imports may increase competition in the Canadian market and lower input costs and final prices to the consumers.

On the other hand, when Canadian standards are not compatible with those of Canada's major trading partners, they may reduce both imports and exports, raise costs and prices, and misallocate resources in production and consumption. For example, quality standards may be undertaken in the name of eliminating "fly-by-night" producers or "unfair" competition from imports. One of the many reasons industry advocated the high quality required by "Quality Standards for Structural Steel" was "dumping" of inferior imported steel in Canada. (A more important reason for the stringency of the standard was the requirement by the structural steel users in most of Canada for tougher, more easily weldable steel than was used abroad.)

#### Conduct

Standards can potentially affect the conduct of firms in an industry in two ways: 1) they can alter the structure of an industry from what it would have been without standards and hence alter the conduct of firms within the industry; 2) they can alter the conduct of firms directly. The relationship between the structure of an industry and the conduct of the firms in that industry has been well-documented. The analysis here will concentrate on the direct effects of standards and the use of standards on the conduct of firms in an industry.

Some standards reduce the diversity of the characteristics of goods produced by different firms in an industry, i.e., the products of different firms become more homogeneous in shape, size, quality, performance, etc. The effect of product homogenization on the level of competition, however, is ambiguous. On the one hand, firms may be able to monitor the activities of their competitors more easily and hence increase their ability either to tacitly or overtly engage in parallel activities, notably parallel pricing, in order to increase joint profits. On the other hand, product homogenization may reduce the ease with which firms can differentiate their products and lead to increased competition based on price. In industries for which standards increase the ability of firms to engage in parallel activities, if the tacit coordination breaks down (as it often does), the ensuing competition will be more vigorous, since the standard has reduced product differentiation in the industry. In recognition of the potential for standards to lead to price competition, in some industries, firms expend considerable resources on advertising to try to differentiate their products in spite of the uniformity imposed by some standards. One of the incentives for industry and government to develop standards for the goods they purchase has been to increase the number of suppliers, increase competition between suppliers and reduce the price of their purchases.

Testing and certification to standard may also increase the ability of firms to engage in tied selling in order to extend their monopoly power in one product into the market for a complementary product. An importer of lamps and lamp components stated in an interview that the standard for lamp sockets and especially the process of testing and certification to standard made it difficult to have imported lamp sockets for incandescent lamps certified to standard, thereby reducing imports of these products into the Canadian market. Imported cords for lamps, however, were certified to standard relatively easily. The importer further stated that lamp socket manufacturers in Canada were reluctant to sell their sockets without the attached cord, so that imports of cord were reduced even though the standard for cords did not act as a barrier to trade in itself.<sup>61</sup> This effect of a standard is extremely rare in Canada since standards and the testing and certification procedures for standards are developed through the consensus process by balanced committees. One of the objectives of these committees is to make the certification process simple, expeditious and inexpensive while at the same time ensuring the quality of the standard and that products certified to standard do in fact meet it.

The dominant firm in an industry may use its firm-level standard in one of its products to extend its dominance into other products. IBM has manipulated the language standards of its computers to extend its dominance in computer main frames into peripheral equipment. When other firms have invaded the peripheral equipment industry, IBM has changed the language used in its computers to make its competitors' products incompatible. Some dominant firms have used similar tactics to enforce their position of price leaders in their industries. The ability of dominant firms to impose their own standards on other firms in their industries was greatly reduced if a consensus standard developed within the NSS existed.

#### Performance

Standards affect industry performance both through their impact on industry structure and conduct and more directly through their impact on costs and technological change. <u>A priori</u>, the magnitude and direction of the effects of standards on performance cannot be known in general across industries. Even such straightforward standards as standards for rationalization, interchangeability and compatibility may have effects that operate in different directions and with different magnitudes.

Hard data on the direct costs and benefits of a standard, let alone on its indirect effect on industry structure, conduct and performance, are usually not available when a standard is developed. One of the great strengths of the consensus process using a balanced standards committee is the wide range of knowledge and experience that the committee members bring to bear when they develop a standard. It is the responsibility of the committee to make the trade-offs between the costs and benefits of different formulations of a standard (or between a standard and no standard at all) At least in theory, a balanced consensus committee minimizes the occurrence of standards and certification and testing programs that are "kept" by one firm, one group of firms, or by the industry as a whole. Even if a standard does not confer differential benefits or costs to one of the interest groups, its costs may outweigh its benefits if the standard was not well conceived initially or if the standard is not changed to reflect changes in the economic and social environment. In general a standard will increase the allocative efficiency of the economy if it encourages imports and exports, reduces barriers to entry of new firms and new products and increases the level of competition in the industry.

Standards may affect consumption efficiency via their impact on production costs and on the availability, variety and quality (including health and safety characteristics) of products in the market. Leland (1979) demonstrated how under certain behavioural assumptions information asymmetry may lead to the deterioration of product quality. (In recognition of this phenomenon, the Japanese government has set minimum quality standards for many products exported from Japan.) There is also a possibility for a minimum quality standard to become the effective maximum quality standard. Once a firm's products are certified as meeting the standard, it may advertise that its product meets the standard and other firms may have little incentive to produce to a higher standard since they have difficulty convincing consumers that their products both are of higher quality and that this increased quality justifies a higher price. Examples of this phenomenon abound: Sears (generally perceived as a middle of the line producer) prominently displays in its catalogue that certain of its products meet CSA standards; meat packers state "Our products meet the stringent U.S. Department of Agriculture Grade A Choice standards." In some industries, firms follow a competitive strategy to design their products to meet the standard, and no more.

Almost any type of standard may exclude products from the market that may be valued by some users. At the low end, standards exclude products from the market that do not meet standard. At the high end, standards may reduce the incentives for producers to exceed standard. Standards can therefore decrease the variety of products available to consumers. This phenomenon can occur even when optimal standards are developed and used. Essentially, the problem arises due to the use of a single standard, as opposed to multiple standards, for most products, processes and services.

The use of multiple standards for some agricultural products, e.g., Grade A, B, and C eggs, reflects the demand of users for agricultural products of different qualities. Agricultural products have several distinctive characteristics that facilitate the use of multiple standards. They have low unit costs, are purchased frequently, and their characteristics are usually readily apparent when used. Users can discover the product characteristics in each grade quickly, at low cost and with little risk of harmful side effects. Users can then use their knowledge of the product characteristics implied by each standard to trade off between the characteristics and the price of each grade of product. Most products, however, do not have all these characteristics-low unit cost, frequent repeat purchases, and characteristics that are readily apparent with use. For these products, multiple standards do not provide the necessary information to users at low cost for use as a basis for trade-offs between product characteristics and price. The value of single standards for products is especially clear for products whose use has health and safety implications. Although single standards may be a blunt instrument by which to regulate product characteristics, the use of multiple standards for most products would reduce the efficiency of users' consumption decisions.

# Effects on Dynamic Efficiency

Standards affect the dynamic efficiency of the economy through their impact on technical progress in production techniques and materials and on new product development. Standards can foster technical change, product innovation and the use of new materials in established product lines by reducing the risk users and consumers perceive in using new products or products made of non-traditional materials. For example, standards for plastic pipe for use in home plumbing served to assure buyers that this new (and cheaper) material was satisfactory for the job (Appendix A). On the other hand, standards may impede technological change and reduce intra-industry competition by specifying the use of particular materials. Even performance standards (as opposed to those specifying input composition, size, shape, etc.) can retard innovation. For example, the testing and certification procedures for the standard for iron and enamel bathtubs may be unnecessarily restrictive when applied to plastic bathtubs, yet a plastic bathtub may perform as well as an iron and enamel one as far as the end user is concerned, even though it cannot pass the performance tests specified in the standard. One solution to this problem that was used by the SWOs in some cases was to have standards for the same product that differ depending on its composition.

Once a standard has been developed and accepted by industry, there may be considerable inertia and outright resistance to change on the part of both producers and consumers. This problem is exacerbated if the standard is written into an Act or regulation under an Act so that even if the standard is changed, the standard in the Act or regulation remains the same. The benefits of "reference to standards" for mandatory standards is clear for products that are undergoing rapid technological change. One of the advantages of the consensus committees is that they tend to protect against unnecessary standardization, particularly in the case of new products, since they are aware of current and future developments in technology that may render a standard obsolete.<sup>63</sup>

# Effects on Equity

Standards may confer differential costs and benefits both among different groups in society and among different members within those groups. They can affect the equity, the "fairness", of the economic system either positively or negatively. Moreover, there may be an inseparable link between the effects on equity of a standard and its effects on the efficiency of the economy. A standard that increases the technical efficiency of the economy as a whole, may force some producers out of business. A standard that increases the quality or safety of a product, may raise its cost above the means of low-income consumers. A standard that is suitable for climatic conditions in one region of the country may be unsuitable for another region.<sup>63</sup> The analysis in the previous sections of the chapter has already described

some of the effects of standards on equity between and within groups: large producers and small producers, local producers and producers abroad, producers and buyers (individuals, firms, and government). The trade-offs between the effects of a standard on equity (between and within groups) and technical, allocative and dynamic efficiency are difficult to list, much less quantify. This problem is one of the root causes of the continuing controversy between the SWOs and some government departments over the relative costs and benefits of consensus standards developed by a balanced committee and bureaucratic standards developed by government in its role of arbitrator between interest groups and guardian of Canada's overall welfare.

Of particular interest is the effect of standards on consumers. As has been repeatedly noted in the literature on regulation, the interests of consumers are chronically underrepresented in the regulatory process. The budget of the Consumers Association of Canada (CAC) in 1979 of \$600/year for standards work was woefully inadequate to undertake its proper role in the creation of standards in Canada. This problem was compounded by the CAC's policy of rotating its representatives on standards committees among the committees for different industries in order to avoid "capture" by a standards committee or SWO. One of the greatest problems faced by consumer representatives on these committees, however, was their initial unfamiliarity with the highly technical aspects of the standards for the product, their lack of information, and their initial low credibility. Frequent rotation to the committees for different products often did not allow the consumer representative sufficient time to acquire the information necessary to evaluate the effect of a particular formulation of a standard or testing and certification program on the interest of consumers. It also reduced their credibility with the other members of standards committees. This CAC policy was designed to avoid "capture" of the consumer representatives by representatives from industry, a phenomena that has often been observed in the regulatory process. This policy to avoid "capture", although its intentions were laudable, has led to results that are not beneficial for consumer interests in the standards writing

process. Despite these problems, Mary Kyles, Consumers Association Co-ordinator for Standards, stated that she was "very pleased with the present standards system"; "all consumers want are 'good' voluntary standards that help the 'ordinary guy!", and that "very reasonable standards were always developed when the consensus process was used". She ridiculed the standard for car seats for children of the Department of Consumer and Corporate Affairs as an example of an inappropriate bureaucratic standard. The only problem she saw in the present system was obtaining sufficient travel money for consumer representatives on standards writing committees.

# A Diagramatic Exposition of the Effects of Standards

The previous sections have described the <u>potential</u> effects of standards on the technical, allocative and dynamic efficiency and on the equity of the economy. Whether these potential effects are ever realized depends on conditions in the economy, and how standards are developed and used. This section seeks to analyse the effects some standards have had on resource allocation, technical efficiency, and product availability in a more theoretically precise way.

Assume that a product can potentially be produced both in Canada and abroad (for simplicity, in the United States).  $C_1C_1$  is the cost curve for production of a single firm serving only the American market as a function of the volume of its output. Assume that demand in Canada is potentially 1/10th that in the U.S. at any given price, e.g., if U.S. demand at price A is 100 units, Canadian demand is 10 units and total demand 110 units. Under this assumption,  $C_2C_2$  is the unit cost curve for the firm to serve both markets.  $C_2C_2$  lies below and to the left of  $C_1C_1$ , since the horizontal axis is output to serve only the U.S. market, but for  $C_2C_2$  Canadian output is added to U.S. output, i.e., the unit cost of 100 units on  $C_2C_2$  is the unit cost of 110 on  $C_1C_1$ . Exports to Canada allow the firm to produce at lower unit costs for each level of demand in the U.S. market if there are economies of scale in production. The cost curve for production <u>in Canada</u> is  $C_3C_3$ . Note that the scale for  $C_3C_3$  (as read on the horizontal axis by the



DEMAND

lower scale numbers) has been expanded to compensate for the size of the Canadian market, here assumed to be 1/10th the U.S. market (i.e.,  $C_3C_3$  is simply  $C_1C_1$  drawn on a 10:1 scale). When the Canadian tariff is added to U.S. production costs, the landed cost of the good produced in the U.S. for the Canadian market is obtained (i.e.,  $C_4C_4$  is  $C_2C_2$  plus the tariff). Then, if the demand for the good exceeds X\* in the U.S. (and by assumption X\*/10 in Canada) the firm will produce in Canada to meet Canadian demand, since for demand greater than X\* (to the right of X\* in Table 4),  $C_3C_3$  lies below  $C_4C_4$ . Conversely, if demand is less than X\*, the firm will serve the Canadian market from the U.S. ( $C_4C_4$  is below  $C_3C_3$ ). Essentially, if there are large economies of scale in the range of potential demand, low demand products, i.e., those with low output or short runs, will be produced in the U.S.

Assume that the standards for the product differ between the U.S. Producers in the U.S. may have to change their and Canada. production techniques, equipment and procedures when they produce goods for the Canadian market. If these changes impose additional costs for producing goods for the Canadian market,  $C_A C_A$  shifts up to  $C_5C_5$ . The magnitude of the shift is a function of the size of the difference in the standard between the two countries and the costs of altering production to produce to the two standards. Note that this effect is a function of the difference between standards, not the costliness of producing to standard of one standard compared to the other. (If a firm changes production for the Canadian market, the cost of production for goods for the U.S. market will also increase since the economies of increased scale due to serving the Canadian market will be reduced, i.e.,  $C_2C_2$  and hence  $C_4C_4$  shifts upward to the right.) The shift from  $C_4C_4$  to  $C_5C_5$  has two effects: 1) The landed cost of the product in Canada will increase if the firm continues to produce the product in the U.S.; 2) More production may be located in Canada, since X\*\*, the new demand point that divides U.S. and Canadian production, is to the left of X\*.  $(C_5 C_5 \text{ is always about } C_4 C_4.)$ These effects occur regardless of whether the Canadian standard is more or less stringent than that in the U.S., so long as the firm changes production for the Canadian market and the changes increase

costs. (If the U.S. standard is more stringent than the Canadian one, the firm may simply produce to the U.S. standard. This procedure would increase the costs of production in the U.S. relative to production Canada, however.) They arise from the difference in the standard between the two countries. The degree of the rise of  $C_4C_4$  to  $C_5C_5$  depends on how much the difference in the standards affects downtime, set-up time, the learning curve, inventories, etc. This analysis implies that the higher the tariff, the greater the difference between the standards in the two countries, the more important the effect of scale on cost, and the stricter the Canadian standard relative to the U.S. standard, the greater the differential between the cost (and price) of the product in the U.S. and Canada.

Statistical analysis in another study by the author on the effects of standards on product prices in Canada relative to the United States gave some support to these hypotheses based on a sample of one hundred and forty-two consumer products. In general, prices tended to be higher in Canada than in the U.S. reflecting the Canadian wholesale sales tax and the propensity of firms to price up to the tariff level. Prices in Canada tended to increase relative to those in the United States as the difference between Canadian and American standards increased, as Canadian standards became more stringent than those in the U.S., as tariffs increased, as seller concentration increased, and as the importance of economies of scale increased.

Another implication of the model of the economic impact of standards concerns the location of production between the U.S. and Canada: the greater the difference in the standard between the U.S. and Canada, the more likely that production will occur in Canada. Other factors might also influence the location of production: as tariffs increase, production might shift from the U.S. to Canada; low volume producers (ones with a low market share) might tend to produce in the U.S. and export to Canada; if economies of scale were important, production might tend to be located in the U.S..



The Effect of Standards on the Cost of Firms of Different Sizes

Table 5

Differences in standards may also eliminate the products of some firms, particularly smaller firms, from the Canadian market entirely. This effect is illustrated in Table 5. Consider an industry with cost curve  $C_1C_1$  and two firms A and B with sales of  $X_A$  and  $X_B$  in the U.S. and sales in Canada of  $X_A/10$  and  $X_B/10$ . If Canadian and U.S. standards are the same, each firm can produce at cost  $C_{AB}$ . If Canadian standards differ from those in the U.S. to the extent that each firm must have separate production runs for Canadian products and U.S. products, the cost increase (loss of economies of scale) will be less for A than for B ( $C_B$  greater than  $C_A$ ) and B may be forced out of the Canadian market.<sup>64</sup> The probability of a product being sold in Canada would therefore decrease as its market share in the U.S. decreased, as the difference between U.S. and Canadian standards increased, and as economies of scale increased in importance.

The preceding analysis has shown some of the costs that may be incurred when Canadian standards differ from those in other countries: increased costs of production, higher prices, misallocation of production, and reduced product variety and availability. For some products, conditions in Canada do differ from those in other countries and unique Canadian standards may be necessary. Standards abroad may not exist or may be inappropriate for the product. The costs of different standards may, however, outweigh the benefits of standards tailored to conditions in Canada, yet since those costs are often hidden or may be incurred indirectly, they can easily be overlooked or incorrectly evaluated when standards are developed. More attention should be paid by the SWOs to these often hidden effects of standards on the Canadian economy when they develop standards.



## CHAPTER VII

## Conclusions and Recommendations

This paper has analyzed voluntary standards as a regulatory device that affects the efficiency and equity of the economy. The effects of voluntary standards depend on the level of standards usage, the specification of standards, the process of testing and certifying products to standard, the mechanisms by which standards are administered, and economic, political, social, technological, and the international environment. At present, economic analysis of standards is still in its infancy so that only limited and tentative conclusions can be reached on their costs and benefits. Stronger conclusions will only be possible when the theories of information, risk, imperfect markets, and bureaucracy are developed further and have been quantified by empirical testing. For example, only recently have the potential net benefits of standards in markets characterized by information asymmetry been demonstrated on theoretical grounds (Leland, 1979). Even this pioneering work, however, was based on strong behavioural assumptions, did not quantify the magnitude of the net benefits, and did not compare the net benefits of the use of standards to the net benefits of the use of other means (such as providing more information to buyers) of reducing market failure caused by information asymmetry.

The National Standards System of Canada has developed rapidly in the decade of the 70s into a truly national standards system. In 1980, despite this impressive record of achievement, some problems remain that limit the effectiveness of standards activities in Canada in some instances. The major strength of the NSS is the dedication, intelligence, technical competence, and enthusiasm of those involved in standards work within the NSS in Canada and their commitment to voluntary consensus standards. This description is based on extensive personal interaction with those involved with standards during the course of this study. Even consumers (as represented by the Consumers Association of Canada), a group that often loses in the regulatory process (especially when regulation has a heavy input from industry), has been pleased with the functioning of the NSS. The criticisms and recommendations that follow should not lead to the conclusion that the NSS and the voluntary consensus process does not work well, in general it does and is improving steadily. The NSS is still an imperfect mechanism, however, and improvement in some areas has been unnecessarily and unacceptably slow.

The two problem areas in the NSS were identified in this study: lack of a concrete, operational, cohesive set of goals; and insufficient coordination of and control over the components of the NSS. To take these problems in order:

<u>Goals</u>: There is no lack of statements of goals for the NSS in the publications of the SCC and the components of the NSS: increased product development, use and knowledge of standards to promote production efficiency, quality, international trade, environmental protection, and to protect the health, safety and welfare of workers and consumers. What is lacking is a framework for relating these general goals to the economic, social, and political needs of Canada so that the scarce resources available for standards work can be used to best advantage.<sup>65</sup>

Since in some instances there is market failure in the "market for standards", the market orientation of standards writing organizations (SWOs) may have led to a non-optimal resource allocation for standards development and mutual suspicions between some of the stakeholders in standards (especially between some government bureaucrats and the SWOs) regarding the motivations for creating (or not creating) standards in some areas, the consensus process by which standards are created, and the quality of standards themselves. In some instances, the SWOs accuse government bureaucrats of empire building and an elitist predilection for bureaucratic standards and deplore their resistance to encouraging open reference to consensus standards in legislation and regulations. The SWOs and industry feel that government use of standards is sometimes irrational and contradictory. For their part some government bureaucrats think that some consensus standards are "lowest common denominator" standards, "kept" standards, or do not serve the broad national interest.

- 90 -

<u>Recommendation 1</u>: The stakeholders in standards in Canada - the SWOs, government at all levels, consumers, industry and trade - should be brought together under the auspices of the SCC to reach a <u>consensus</u> on specific, concrete, action-oriented, goals for the NSS, the priority of those goals, and the allocation of resources to achieve those goals.<sup>66</sup>

<u>Coordination</u>: The NSS is a conglomeration of standards organizations each with its own area of expertise and responsibility, distinct philosophy, institutional arrangements, and history. Over the ten years that the NSS has existed, coordination and cooperation between these organizations has increased, but some antagonisms and conflicts still persist and reduce the effectiveness of the NSS.

<u>Recommendation 2</u>: The standards organizations within the NSS should increase their efforts to define their areas of responsibility and coordinate the thrust of their standards activities and procedures both at the national and international level. The SCC should play a central, but not dominant, role in this process.

Standards have important ramifications at the international level. Standards activity takes place in all industrialized countries, many less industrialized countries, and in the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). International Standards have important implications for standards in Canada and for the NSS. Since Canada engages in extensive international trade, if standards in Canada differ from those in its major trading partners, imports and exports are impeded, resources are misallocated, prices are raised to the consumer, and product variety is reduced. (See Chapter VI.) Despite the efforts of some individuals and the SCC, Canada's involvement in international standards and standards activities has not been proportional to their importance for Canada. The SCC needs both to influence international standards so that they are compatible with Canadian standards and Canada's interests and to foster the development (or revision) of Canadian standards so that they are compatible with those of Canada's major trading partners (unless there are unique circumstances in Canada that demand unique Canadian standards).

<u>Recommendation 3</u>: Canada should increase its involvement with the ISO and the IEC and its interaction with standards organizations in its major trading partners.

Standards are a "public good", i.e., once they have been developed, they can be adopted by others at little or no cost.

<u>Recommendation 4</u>: When writing or revising standards, the SWOs should use existing international standards at least as a starting point for Canadian standards, and preferably as an end point. Arguments based on "unique conditions in Canada" requiring unique Canadian standards should be viewed with suspicion. The benefits of tailor-made standards are often outweighted by the many costs if standards in Canada differ from those of its major trading partners.

Due to the market orientation of the SWOs (except for some funding through the SCC), the stakeholders in a standard (including government) must be willing to pay the costs of its development by the SWO. In general, the demand for standards in the current system is a bottoms-up process, i.e., if the stakeholders in a product or service - producers, consumers and government - think that a standard is needed, they approach the appropriate SWO. The analysis in Chapter IV concluded that this system has led to a low level of development of standards in some industries, notably those in which buyer concentration was low and in which large oligopolistic producers would have lost some of their competitive advantages if standards were put in place. In addition, in industries in which some firm, group of firms, or the industry as a whole would gain competitive advantage if a standard existed, overproduction of standards may occur. The voluntary consensus process partially reduces the likelihood of overstandardization, since it reduces the potential for standards to be kept by one interest group and the SWO or technical committee may decide that any standard for a particular product would not yield net benefits. This total rejection of any standard is unlikely, however, given the pro-standardization orientation of the organizations in the NSS.<sup>67</sup> This problem has led to the suspicion of some stakeholders in the standards system (notably government) and has tended to foster an

adversary situation. In short, the current almost total reliance on a bottoms-up demand for standards and the market orientation of the SWOs has led to underutilization of standards in some products and the overdevelopment of standards for some others.

<u>Recommendation 5</u>: The SCC, the SWOs and government should make a systematic study of standards coverage in order to identify industries in which there has been overstandardization and understandardization. This study should be done in conjunction with their effort to formulate the goals and priorities of the NSS (Recommendation 1). The NSS should incorporate a top-down approach to identification of the need for standards to complement its current bottoms-up approach to standards development.

Funding for this study and the creation of standards in areas of understandardization will often not be forthcoming from the usual sources of funds - the major stakeholders in a particular standard. The beneficiaries in standards created (and standards eliminated) by this method will be large in number, but small, difficult to identify individually, and underfunded: consumers, small producers, importers and producers abroad. Even if the beneficiaries can be identified, there will often be a "free rider" problem in obtaining direct funding from them.

Recommendation 6: Funding for the activities undertaken in Recommendation 5 should come from a central source, either the government through the SCC or by a general levy on all standards work undertaken within the NSS.

This recommendation will not be well-received by some of the SWOs in the NSS since they take justifiable pride in their market orientation and financial independence from funding raised by the government from the general public. In addition, if this recommendation were followed, their highly valued (and closely guarded) independence might be reduced. Although the current bottoms-up, market orientation of the SWOs has many benefits such as responsiveness to the market demand for standards and cost efficiency in standards production and administration, it has also imposed costs on the economy. If Recommendation 6 were followed, these costs would be reduced, without a significant reduction in the benefits of the present system.

One of the most annoying problems for industry and some of the standards organizations in the NSS, is the lack of coordination between government departments and between different levels of government in their demand for and use of standards. Just as unique conditions in Canada may necessitate differences between Canadian standards and international standards, so different conditions across Canada may necessitate differences between their costs are often very high. These differences in standards are often the result not of unique local conditions, but of lack of knowledge of the NSS, lack of coordination, and empire building by government departments. The total Canadian market is often too small for Canadian producers to realize economies of scale in production. Differences in standards across provinces further exacerbate this problem.

<u>Recommendation 7</u>: Government should increase its efforts to coordinate its standards requirements and activities between government departments and between the three levels of governments. This coordination would be facilitated if all levels of government made more extensive use of "reference to standards" developed within the NSS and made efforts to coordinate their use of standards.

Reference to standards is one of the most controversial issues in the world of standards. Standards organizations both in Canada and abroad are firmly committed to encouraging reference to standards by government in its legislation and regulations. Use of reference to standards has increased in Europe and the United States (Harter, 1979, U.S. Department of Commerce, 1980), and has been recommended by the Economic Commission for Europe (1977) and the ISO (1975). Government bureaucrats are sometimes wary of reference to standards for three reasons: 1. They think that existing consensus standards may not represent the public interest because they are "kept" by one interest

group or that they are "lowest common denominator" standards. 2. They think that in some cases voluntary consensus standards take an unacceptably long time to develop. 3. More fundamentally, they think there may be legal reasons why they cannot delegate their responsibility under the law to an organization outside government that is not under their control.<sup>68</sup> To take the objections in order: 1. The voluntary consensus process for writing standards is highly developed in Canada. The SWOs take care that standards committees have a balanced representation from all interest groups in standard, the including government. Negative votes on a standard are considered by review committees and a standard is rarely ratified over the objections of one interest group. 2. The creation of voluntary consensus standards can be time consuming. Only in rare cases, however, is the need for a new standard or the modification of an existing standard so pressing as to require direct intervention by government. In these few instances, the bureaucratic standard imposed by government could be instituted as a temporary standard, until a consensus standard is written. 3. Federal acts and regulations already use both dated and undated reference to standards developed both within and outside the NSS, both in Canada and abroad, i.e., in many instances government already delegates its authority to organizations outside its control, even in such areas as health, safety, and environmental protection.

<u>Recommendation 8</u>: Government at all levels should increase its usage of undated reference to consensus standards. If no acceptable standard exists, instead of creating a permanent bureaucratic standard, government should act to give the incentive (and funding) for the creation of a voluntary consensus standard.

There is considerable controversy over the role and the optimum number of SWOs, testing organizations (TOs) and certification organizations (COs) within the NSS. By early 1980 no TOs and only one CO had been accredited within the NSS. There are economies of scale in standards writing, testing, and certification both individually and as a group.<sup>69</sup> A proliferation of TOs and COs might both lose these economies of scale and lead to "cheap" testing and certification thereby reducing the high quality of standards now developed under the NSS. If for some product or product group, economies of scale are not important, special expertise can be developed in related products, or testing and certification activities can be carried on in conjunction with other related activities, additional COs or TOs may increase the efficiency of the NSS. There may be a difficult problem of legal liability for the SWOs in using the results of outside TOs to certify products to their standards or of letting outside COs certify products to SWO standards. This problem may increase if, as has happened in the recent past, society becomes more litigious in the future. Ths problem is increased if a certification mark is used, e.g., if a CO outside the CSA were to use its mark. One possibility for reducing this problem would be for the outside CO to certify the product to standard without using the mark.

Recommendation 9: The SCC should actively pursue the accreditation within the NSS of TOs and COs outside the existing SWOs and encourage SWOs to accept the test results of TOs in their certification program and certification by COs when legally feasible.

<u>Recommendation 10</u>: The SCC and SWOs should increase their efforts to develop links with standards organizations outside Canada so that SWOs in Canada can accept the test results and the results of plant inspections of foreign standards organizations in order to facilitate certifying products from abroad to Canadian standards. Conversely, increased pressure should be applied on foreign standards organizations and foreign governments to accept testing and certification by Canadian standards organizations for Canada's exports.

The number of Canadian standards developed by SWOs within the NSS by the consensus process using a balanced committee is comparable to the number of national standards developed in other industrialized countries. The number of National Standards of Canada (NSC), however, is far below the number of national standards of many other industrialized countries. This relative lack of national standards has somewhat reduced the influence of Canadian standards abroad. This is an unfortunate situation given the high quality of Canadian standards in many areas
relative to standards in other countries and the importance to Canada of international trade. If Canada's trade partners used Canadian standards as models for their own standards or referenced Canadian standards in their legislation, Canadian producers would gain easier access to international markets.

<u>Recommendation 11</u>: The SCC should increase its efforts (by providing funds, if necessary) to encourage the SWOs to make their standards NSC, especially for products that are traded internationally.

Several of these recommendations require additional funds to be allocated to standards organizations and to the NSS itself. Given the importance of standards to the Canadian economy and the benefits of standards to Canada, these funds would be well-spent.



### FOOTNOTES

- Recently, however, <u>60 Minutes had a short</u>, <u>satirical piece on the</u> confusion that can arise from incompatible standards concerning clothing sizes.
- <sup>2</sup> Estimate by Mr. D. Dymond of the Canadian Standards Association.
- <sup>3</sup> The economics of standards have been studied by Hemenway (1975, 1979) and authors in Caves and Roberts (1975) among others.
- <sup>4</sup> See especially Leggett (1971) and the Standards Council of Canada (1975).
- <sup>5</sup> See Leggett (1971) Chapters 9 and 10 and Hemenway (1979). Notably absent are readily available studies of the standards systems in Japan, but see Agency of Industrial Science and Technology (Japan), May 1979.
- <sup>6</sup> See Oi (1973) and Spence (1973).
- <sup>7</sup> See Akerlof (1970), Spence (1975), and among many others Leland (1977).
- <sup>8</sup> See Proix (1979), Dewees et. al. (1975) and Dorfman (1977).
- <sup>9</sup> See Royal Commission on Price Spreads (1935).
- <sup>10</sup> Hemenway (1979), p. 6.
- <sup>11</sup> Standards Council of Canada Act, p. 992.
- <sup>12</sup> See Standards Council of Canada, CAN-P-5 (1978).
- <sup>13</sup> SCC, CAN-P-500, pp. 1-2.
- <sup>14</sup> See Standards Council of Canada, CAN-P-3 (1977).
- <sup>15</sup> See Standards Council of Canada, CAN-P-4 (1978).
- <sup>16</sup> See SCC CAN-P-3 and CAN-P-4. Although these documents explicitly state that more than one organization may be accredited in the same subject area, there seems to be a general presumption that this would rarely be the case.
- <sup>17</sup> The U.S. government, through the Task Force of the International Standards Subcommittee of the Interagency Committee on Standards Policy (1978), has made a detailed study of federal agency practice, awareness and compliance with the new GATT standards Code and made detailed recommendations on how the government should change its standards activities to conform to the Code.

- <sup>18</sup> See SCC, CAN-P-2B, pp. 2-3.
- <sup>19</sup> SCC, CAN-P-500 (1975), p. 4.
- <sup>20</sup> SCC, CAN-P-5, p. 9.
- <sup>21</sup> SCC, CAN-P-5, p. 9.
- <sup>22</sup> SCC, CAN-P-5, p. 9.
- <sup>23</sup> SCC, CAN-P-5, pp. 9-10.
- <sup>24</sup> SCC, CAN-P-5, p. 10.
- <sup>25</sup> SCC, CAN-P-1B (1977).
- <sup>26</sup> SCC, CAN-P-5, p. 20.
- <sup>27</sup> International Standards Organization (1978), pp. 64-65.
- <sup>28</sup> SCC, CAN-SP-2 (1977).
- <sup>29</sup> Ibid., "Synopsis". The CSA points out that safety codes are well coordinated across Canada, via the CSA.
- <sup>30</sup> Standards Council of Canada CAN-P-5, (1976), p. 6.
- <sup>31</sup> Ibid., p. 7.
- <sup>32</sup> This two-way categorization differs from that usually used which categorizes standards in terms of type: fundamental standards (time, numbers, language and weights and measures), standards of terminology, definition, dimension, safety, quality, practice, test procedures, specifications, information disclosure, uniformity, interchangeability, etc. See Hemenway (1975), Chapter 1.
- <sup>33</sup> The Consumers Association of Canada, however, expressed their support and satisfaction with the current NSS and the consensus process. Peter Dawes of the Canadian Importers Association expressed some dissatisfaction at one standard that was written over the objections of the CIA.
- <sup>34</sup> Of course, the volunteers receive salaries from their regular employers. In some cases, consumer representatives receive small grants to offset their expenses and allow their participation.
- <sup>35</sup> Some interested parties had complaints about and suggestions for improvements to specific aspects of the system, as described below.
- <sup>36</sup> Unfortunately the term "bureaucratic" has negative connotations; yet it is more accurate than "industrial standard", as suggested by one reviewer (since bureaucratic standards are more general) and more descriptive than "non-consensus standard".

- 37 Leland (1979) concluded on theoretical grounds that whenever a minimum quality standard is developed by a profession (or industry), there is an incentive to set the standard too high in order to exclude entrants. In general, economists have traditionally viewed standards as impediments to pure competition and hence have considered them of little benefit and potentially of much harm if one interest group seizes the standard. (See Moore, 1961, Friedman, 1962, Stagler (1971) and Posner, 1974.) This conclusion is correct if all the many conditions for a competitive market are present. The conditions of a competitive market are not present in many industries, i.e., there is market failure, for four reasons: 1) asymmetry of information between buyers and sellers, (see Leland, 1979, and Akerlof, 1970, for the theoretical expositions of this problem); 2) externalities of production and consumption; 3) the "public good" nature of some standards; and 4) risk and the lack of conditional contracts. These points will be explored further in the paper in the section on the demand and supply of standards.
- <sup>38</sup> See Brock in Caves and Roberts (1975) for an excellent analysis of IBM's competitive strategy in using standards and the costs they imposed on computer users.
- <sup>39</sup> Preston's (1979) compilation of standards referenced in Federal Acts and Regulations shows that standards are referenced 791 times in 919 Acts and Regulations.
- <sup>40</sup> The word "amended" can cause problems since standards are often rewritten entirely rather than "amended".
- <sup>41</sup> Harter (1979) has analyzed this problem in the U.S. context.
- <sup>42</sup> "Balanced" representation "means that no single category of membership on the committee can dominate in the voting procedure of the committee". (Standards Council of Canada, CAN-P-2B).
- <sup>43</sup> One of the SWOs noted that standards "cannot be 'kept' under the current consensus system of standards development in Canada".
- <sup>44</sup> The representative of one SWO noted that the balanced committee used by SWOs to develop standards is more likely to be attuned to the public interest than a government bureaucrat.
- <sup>45</sup> A representative of a SWO wrote that SWOs currently do act in this way, but some government regulators feel that the SWOs do not react quickly enough for the purposes of government.
- <sup>46</sup> See Economic Commission for Europe, page 1.
- <sup>47</sup> The implications of the undertakings of the signatories of the Tokyo Round of the GATT have received considerable attention among those involved with standards in the United States. (See Chapman, 1979.) Less attention has been devoted to the subject in Canada. For a good description of the Standards Code see Middleton (1980).

- <sup>48</sup> Some organizations within the NSS believe government's role should be restricted to #1 and #2 and that it should never act outside the consensus process.
- <sup>49</sup> Consumer goods are those products sold to consumers as final products and not used as inputs to produce other products. Producer goods are goods sold to producers as inputs to produce other products.
- <sup>50</sup> The use of the SWOs in Canada's NSS of the consensus process by balanced committees had been designed to eliminate this problem.
- <sup>51</sup> The SCC noted that the Canadian Federation of Independent Business gave a negative response to an SCC approach in 1979.
- <sup>52</sup> The CSA demurred and stated it seeks only "cost recovery", not profits.
- <sup>53</sup> The CSA noted: "the incentives to produce good standards are there regardless." The problem is in the definition and interpretation of the word "good".
- <sup>54</sup> The CSA stated: "Certification <u>actually</u> results in <u>simplified</u> standards in the sense of proven testing procedures!"
- <sup>55</sup> As illustrated in the case of Structural Steel Shapes when the purchaser is knowledgeable and when there is a continuous relationship between buyer and sellers, self-certification is possible.
- <sup>56</sup> Standards organizations in other developed countries, especially Japan, have also engaged in training activities of this nature. They have realized that if their standards were accepted abroad, their exports will have an advantage in export markets.
- <sup>57</sup> One of the great strengths of the consensus process by a balanced committee for developing standards is the extensive technical knowledge and expertise and experience the committee can bring to bear to take account of these costs in developing a standard.
- <sup>58</sup> The Japanese government has recognized these effects and has laid particular emphasis on standards for rationalization, compatibility, and interchangeability in their drive for efficiency and exports.
- <sup>59</sup> The "free rider" problem that is associated with most "public goods" remains, however, so that there still probably is an undemand for standards, even for producer goods.
- <sup>60</sup> Here poor performance is defined as supra-normal prices and profits, inefficient production, low technological innovation, etc.
- <sup>61</sup> A representative of the SWO responsible for this standard doubted the merit of these statements.

- <sup>62</sup> A representative of one SWO noted that this is an advantage of consensus committees over bureaucratic standards and government purchasing specifications that (he felt) tended to cement standards in place too soon.
- <sup>63</sup> Users of steel in British Columbia were not enthusiastic about the standard for quality of structural steel since, due to the relatively mild climate in B.C., steel softer than that permitted by the standard was suitable for their purposes.
- <sup>64</sup> As described above, standards can also facilitate new entry and permit small firms to exist in the industry by increasing technical efficiency through rationalization, and by increasing the acceptance of their products in the market.
- <sup>65</sup> One reviewer noted, "We do not see how we in Canada can reach agreement on the 'economic, social and political needs of Canada' let alone a framework for relating SCC global goals to the needs. The thought of a stakeholder's meeting boggles the mind. It would be a monster. We don't believe Recommendation 1 [see below] is practical."
- <sup>66</sup> See footnote 68. In addition, a representative of a SWO noted, "But the SCC can accomplish this now, if they so wish!" A representative from the SCC (not the one quoted in the previous footnote) noted, "The SCC itself meets these parameters."
- <sup>67</sup> A representative from the CSA noted, "Not so in the CSA's case."
- <sup>68</sup> A representative of a SWO suggested a fourth reason, "They prefer to use their own trained staff, where available, rather than reduce their staff through using external resources."
- <sup>69</sup> These economies of scale arise from better utilization of lumpy investment in equipment, and better utilization of manpower and expertise, across the wide range of products and standards that fall within the responsibility of each SWO. Evidence of these economies of scale is found in the less-than-proportionate increase in costs as the standards work has increased within the SWOs.



## BIBLIOGRAPHY

- Aaker, D.A., <u>Multivariate Analysis in Marketing: Theory and Applica-</u> tion, Belmont, California: Wadsworth Publishing Co., 1971.
- Aerospace Industries Association of America, National Aerospace Standards Committee, <u>Standardization Savings</u>, <u>Identification and Calcu-</u> <u>lation</u>, Washington, D.C.: National Aerospace Industries Association of America, 1968, as revised 1970 and 1971.
- Akerlof, George A., "The Market for 'Lemons', Quality Uncertainty and the Market Mechanism." <u>Quarterly Journal of Economics</u>, August 1970.
- Alsberg, Carl L., "Economic Aspects of Adulteration and Imitation", Quarterly Journal of Economics, November 1931.
- American National Standards Institute. Voluntary (Private Sector) Standards Programs and the GATT Code, New York: ANSI, 1975.
- American Society for Testing and Materials, <u>The Economic Significance</u> of Specifications for Materials, ASTM, Proceedings, 1931.
- American Society for Testing and Materials, <u>The Voluntary Standards</u> System of the United States of America, Philadelphia, ASTM, 1975.
- American Society for Testing and Materials, <u>The Voluntary Standards</u> System of the United States of America, Philadelphia: ASTM, 1976.
- Bailey, A.R., "Deregulation and the Consensus Process", mimeo, presented at the <u>Sixth Annual Meeting of the CGSB Review Board</u>, Ottawa: October 1978.
- Becker, Gary, "Crime and Punishment: An Economic Approach", in G. Becker and W. Landes (eds.), Essays in the Economics of Crime and Punishment, New York: Columbia University Press, 1974.
- Beitz, Reducing Design and Manufacturing Cost by Using Existing Parts and Assemblies", paper presented at the International Federation for Application of Standards (IFAN) conference, 1977.
- Black, J.W., "New Directions Federal Government Referencing", A workshop Paper in Conjunction with the 52nd Annual Meeting of the Canadian Standards Association, Montreal, P.Q.: June 1979.
- Borrie, Gordon, and Aubrey L. Diamond, <u>The Consumer, Society and</u> the Law, London: Penguin Paper, 1973.
- Brock, Gerald, "Competition, Standards and Self-Regulation in the Computer Industry", in R. Caves, M. Roberts (eds.) <u>Regulating</u> the Product, Cambridge, Mass.: Ballinger Publishing Co., 1975.

- Bureau de Normalisation du Quebec, <u>Catalogue des Normes</u>, Gouvernement du Quebec, Ministere de l'Industrie et du Commerce, 1979.
- Bureau de Normalisation du Quebec, "Le BNQ 'C'est Quoi?", Gouvernement du Quebec, Ministere de l'Industrie et du Commerce, Quebec: 1976.
- Burstein, M.L., "A Theory of Full-Line Forcing", Northwestern University Law Review, March 1960.
- Brady, Robert A., Organization, Automation and Society, Berkeley: University of California Press, 1961.
- Calabresi, Guido, The Costs of Accidents, New Haven: Yale University Press, 1970.
- Canadian Government Specifications Board, "Standard for: Manufacture, Control and Distribution of Drugs", 74-GP-le, Ottawa: 1975.
- Canadian Government Specifications Board, "Terms of Reference for the CGSB Policy Board," mimeo, Ottawa: 1978.
- Canadian Government Specifications Board, <u>The Year in Review</u>, Ottawa, various issues.
- Canadian Gas Association, ANNUAL, Don Mills, Ontario: various issues.
- Canadian Gas Association, "Approvals and Standards", Don Mills, Ontario: 1976.
- Canadian Gas Association, "Standards Directory 1980 for Gas Fired Appliances and Equipment", Don Mills, Ontario: 1980.

Canadian Standards Association, Annual Report, Toronto: various issues.

- Canadian Standards Association, <u>By-Laws to Govern the Organization</u> and Activities of the Canadian Standards Association. Effective July 1975, Toronto: 1976.
- Canadian Standards Association, <u>Quality Assurance Program Requirements</u>, C.S.A. Standard Z299.1-1978, Toronto: March 1978.

Canadian Standards Association, Standards Catalogue, Toronto: 1980.

- Caves, Richard E., and Mark Roberts (eds.), Regulating the Product Quality and Variety, Cambridge, Mass.: Ballinger Pub. Co., 1975.
- Caves, Richard E., Michael E. Porter, A. Michael Spence, and John T. Scott, <u>Competition in the Open Economy</u>, Cambridge, Mass.: Harvard University Press, 1980.

- Chapman, Carol, "Antitrust Consequences of Standards: A Literature Survey", mimeo, Washington: U.S. Department of Commerce, National Bureau of Standards, 1979.
- Chapman, Carol, "Bibliography on the Voluntary Standards System and Product Certification," Washington: U.S. Department of Commerce, October 1979.
  - , "Economics of Design vs. Performance Standards: A Start", mimeo, Washington: U.S. Department of Commerce, National Bureau of Standards, 1979.
    - \_\_\_\_\_, "NBS's Standards Impact Analysis Project", mimeo, Washington: National Bureau of Standards, May 1979.
  - , "Regulatory Use of Standards: The Implications for Standards Writers (Summary)," mimeo, Washington: U.S. Department of Commerce, National Bureau of Standards, 1979.
- Chumas, S.J., (ed.), <u>Directory of United States Standardization Activi-</u> <u>ties</u>, Washington: National Bureau of Standards, NBS Special Publication 417, 1975.
- Coles, Jessie V., <u>Standards and Labels for Consumers goods</u>, New York: Ronald Press, 1949.
- Darby, M., and E. Karni, "Free Competition and the Optimal Amount of Fraud", Journal of Law and Economics, April 1973.
- Dordis, Rachel, "Cost Benefit Analysis of Consumer Product Safety Standards," The Journal of Consumer Affairs, Summer 1977.
- Dickson, Reck, (ed.), <u>National Standards in a Modern Economy</u>, New York: Harper & Bro., 1956.
- Dixon, Robert G., <u>Standards Development in the Private Sector:</u> <u>Thoughts on Interest Representation and Procedural Fairness</u>, Report to the National Fire Protection Association, Boston: NFPA, 1978.
- Douglas, H.C., "Standards in International Trade", Mimeo, Ottawa: Public Service Commission Seminar, February 1979.
- Economic Commission for Europe, "Recommendations on Standardization Policies", meetings of Government Officials Responsible for Standardization Policies, United Nations, Geneva: 1977.

The Economist, "Nuclear Safety," March 22-28, 1980, p. 92.

Epple, D., and A. Raviv, "Product Safety: Liability Rules, Market Structure and Imperfect Information," <u>American Economic Review</u>, March 1978.

- Federal Interagency Task Force on Product Liability, "Product Liability: Industry Study," Washington: U.S. Department of Commerce, 1977.
- Federal Register, <u>Rules and Regulations</u>, Washington, D.C.: Vol. 44, No. 4, January 1979.
- Federal Trade Commission, "Preliminary Staff Study on Self Regulation," Washington, D.C.: 1972.
- Federal Trade Commission, "Standards and Certification", Washington, Bureau of Consumer Protection, December 1978.
- Ferguson, James M., "Trying Arrangements and Reciprocity: An Economic Analysis," Law and Contemporary Problems, Summer 1965.
- Foldesi, Tamas, Economic Effects of Standardization, Geneva: International Organization for Standardization, 1975.
- Frais, S.J., "The Electric Lamp Monopoly and the Life of Electric Lamps," Journal of Industrial Economics, December 1974.
- Gaillard, J., Industrial Standardization: Its Principles and Applications, New York: H.W. Willson, 1934.
- Gisevius, W.D., "Reducing Costs by Planned Introduction of Standardization into Industrial Processes", IFAN, 1977.
- Hamilton, Robert W., "The Role of Non-Governmental Standards in the Development of Mandatory Federal Standards Affecting Safety or Health," Texas Law Review, November 1978.
- Harriman, Norman F., Standards and Standardization, New York: McGraw-Hill, 1928.
- Harter, Philip J., "Antitrust Implications of Industry Standards Requiring Intermanufacturer Capability," in Battelle Columbus Laboratories, Study of Strategies for Market Aggregation, Washington: National Bureau of Standards, 1973.
  - Standards," Fire Journal, November 1977.
    - , Regulatory Use of Standards: The Implications for Standards Writers, prepared for National Bureau of Standards Office of Engineering Standards, Washington, D.C.: NBS GCR 79-11-171, forthcoming.
- Hartle, Douglas C., Public Policy Decision Making and Regulation, Institute for Research on Public Policy, Toronto: Butterworth & Co. (Canada) Ltd., 1979.

Hartman, Joan E., Directory of United States Standardization Activities, Washington, D.C.: U.S. Department of Commerce, National Bureau of Standards, 1967.

- Heal, Geoffrey M., "Do Bad Products Drive Out Good?", Quarterly Journal of Economics, August 1976.
- Hemenway, David, <u>Industrywide Voluntary Products Standards</u>, Cambridge: Ballinger, 1975.

, "Standard Systems in Canada, the U.K., West Germany and Denmark: An Overview," Washington: Office of Standards Information, Analysis and Development, National Bureau of Standards, U.S. Department of Commerce, April 1979.

, "Voluntary Standards and the Fire Problem," Harvard School of Public Health Faculty Discussion Paper, 1977.

- Hennessy, R.L., "Canada's Participation in International Standards Work," mimeo, presented to Public Service Commission Seminar, Touraine, Quebec: February 1979.
- Hirshhorn, Ronald, <u>A Case Study: Energy Consumption Labelling</u> <u>Requirements for Refrigerators</u>, Ottawa: Policy Coordination Branch, Consumer and Corporate Affairs, Supply and Services Canada, 1979.
  - , "A Case Study of the Proposals for Energy Consumption Labelling of Refrigerators," Working Paper No. 1, <u>Economic Council</u> of Canada, October 1978.
- Hirshleifer, Jack, "The Private and Social Value of Information and the Reward for Innovative Activity," <u>American Economic Review</u>, September 1971.
- Interdepartmental Committee for Metric Conversion, "Report on Federal Government Acts and Regulations Containing References to Standards by the ICMC Secretariat," mimeo, Ottawa, Department of Industry, Trade and Commerce, 1974.
- International Standards Organization, <u>The Aims and Principles of Stan</u>dardization, Geneva: ISO, 1975.
- Japan International Cooperation Agency, "Export Inspection System and Technical Standards," Tokyo: Japanese Standards Association, 1978.
- Japan International Cooperation Agency, "Standardization at International Level," mimeo, Tokyo: Japanese Standards Association, undated.

Japanese Government, Industrial Standardization Law, June 1, 1949.

- Japanese Industrial Standards Committee, Leather Shoes, Japanese Industrial Standard, JIS S 5050 - 1975, Tokyo, 1975.
- Japanese Industrial Standards Committee, "Industrial Standardization in Japan," Tokyo: Japanese Standards Association, 1978.
- Japanese Industrial Standards Committee, "Industrial Standardization in Japan," Tokyo: Japanese Standards Association, 1979.
- Japanese Industrial Standards Committee, "Standards for Consumer Protection," Tokyo: Japanese Standards Association, July 1976.
- Japanese Standards Association, "Basic Information of Standardization and Quality Control Implemented in Japan," Tokyo: Japanese Standards Association, 1975.
- Japanese Standards Association, "Guide to the Works," Tokyo: undated.
- Japanese Standards Association, "Introduction to the Works of JSA," Tokyo: undated.
- Kean, John E., "Benefits and Efficiencies of Standardization," special Seminar Sponsored by the Standards Council of Canada to mark World Standards Day, Halifax, Nova Scotia: October 1975.
  - \_\_\_\_\_\_, "Certification in Canada," Seminar of the British Standards Institute, London: May 1975.
- La Que Report, "Report of the Panel on Engineering and Commodity Standards of the Commerce Technical Advisory Board to the Assistant Secretary for Science and Technology, U.S. Department of Commerce," Washington: February, 1965, PB 166 812.
- Leggett, Robert F., <u>Standards in Canada</u>, Ottawa: Information Canada, 1971.
- Leone, Robert, and John Jackson, "The Political Economy of Federal Regulatory Activity," Working Paper HBS 79-6, Harvard Business School, 1978.
- Leland, Hayne, "Minimum Quality Standards and Licensing in Markets with Asymmetric Information," in S. Rottenberg (ed.), Occupational Licensure, Washington: American Enterprise Institute, 1979.
- , "Quacks, Lemons and Licensing: A Theory of Minimum Quality Standards," Journal of Political Economy, Vol. 87, No. 61, 1979.
- Manaker, Ralph, "The Legal Defense of Compliance with Standards," ASTM Standardization News, September 1977.
- Martinez, I.M., "Standardization in France," Washington, D.C.: U.S. Department of Commerce, 1980.

Mason, John C., "Using Standards to Improve Shipbuilding Productivity," ASTM News, June 1979.

- McCabe, Lee, <u>Government Evaluation of Regulations: The United States</u> <u>Experience</u>, Consumer Research Branch, Consumer and Corporate Affairs, Ottawa: Supply and Services Canada, 1978.
- McConnaughey, John S., Jr., "An Economic Analysis of Building Code Impacts: A Suggested Approach," Washington: U.S. Department of Commerce, October 1978.
- McConnaughey, John S., Jr., "Economic Impact of Building Codes," in Patrick Cooke (ed.), <u>Research and Innovation in the Building</u> <u>Regulatory Process</u>, Washington: National Bureau of Standards, 1977.
- Middleton, R.W., "The GATT Standards Code," Journal of World Trade Law, January/February 1980, Vol. 14, No. 1.
- Miller, Samuel P., "Standardization in Navy Ships," <u>ASTM Standardiza-</u> tion News, June 1979.
- Montador, Bruce, "A Case Study: Proposed Insulation Requirements for Ceilings and Opaque Walls," Planning Branch, Treasury Board Canada, Ottawa: Supply & Services Canada, 1979.
- Moore, T., "The Purpose of Licensing," Journal of Law and Economics, October 1961.
- National Industrial Conference Board, Industrial Standardization, New York: National Industrial Conference Board, Inc., 1929.
- National Standards Policy Advisory Committee (NSPAC), "National Policy on Standards for the United States and a Recommended Implementation Plan," mimeo, Washington, D.C.: December 1978.
- Nelson, Phillip, "Information and Consumer Behaviour," Journal of Political Economy, April 1970.
- Oi, Walter Y., "The Economics of Product Safety," <u>Bell Journal of Eco-n</u> nomics, Spring 1973.
- Opala, Marian P., "The Anatomy of Private Standards-Making Process: The Operating Procedures of the USA Standards Institute," Oklahoma Law Review, February 1969.
- Oster, Sharon and John Quigley, "Regulatory Barriers to the Diffusion of Innovation. Some Evidence from Building Codes," in Patrick Cooke, (ed.), <u>Research and Innovation in the Building Regulatory</u> Process, Washington: National Bureau of Standsrda, 1977.
- Ozga, S.A., "Imperfect Markets Through Lack of Knowledge," Quarterly Journal of Economics, February 1960.

- Parkinson, Thomas, "The Role of Seals and Certifications of Approval in Consumer Decision-Making," Journal of Consumer Affairs, Summer 1975.
- Perry, John, The Story of Standards, New York: Funk and Wagnalls, 1955.
- Poulson, Barry (ed.), Economic Analysis of the Nationl Measurement System, Washington: National Bureau of Standards, September 1977.
- Preston, P., Directory of Standards Referenced in Canadian Federal Legislation, Ottawa: Standards Council of Canada, 1979.
- Preston, P., <u>Standardization is Good Business</u>, Ottawa: Standards Council of Canada, October 1977.
  - \_\_\_\_\_, "The World of Standards an Overview," mimeo, Ottawa: undated.
- Proulx, Michel, "A Case Study: Petroleum Refinery Effluent Regulations and Guidelines under the Fisheries Act," Planning Branch, Treasury Board of Canada, Ottawa: Supply & Services Canada, 1979.
  - Proulx, Michel and Andre Morin, "A Case Study: Proposed School Bus Safety Standards under the Canadian Motor Vehicle Safety Act," Planning Branch, Treasury Board Canada, Ottawa: Ministry of Supply & Services Canada, 1978.
  - Quail, F.J., "Brief of Canadian Standards Association on Bill 70, Province of Ontario Ministry of Labour, Occupational Health and Safety Act Proposed Regulations," mimeo, Toronto: CSA, 1978.
  - Quelch, John, "Imposed Choice Purchases of Energy Using Equipment in the Residential Sector," mimeo, The University of Western Ontario, 1978.
  - Rawie, Carol Chapman, "A Guide to Papers Citing Antitrust Cases Involving Standards or Certification," Washington: U.S. Department of Commerce, December 1979.
  - Reck, Dickson (ed.), <u>National Standards in a Modern Economy</u>, New York: Harper and Row, 1956.

Royal Commission on Price Spreads, Ottawa: King's Printer, 1935.

- Rosenwald, A., "Shirtsleeves Standards, How to Evaluate Savings," Standards Engineering, September 1962.
- Sanders, T.R.B. (ed.), <u>The Aims and Principles of Standardization</u>, Geneva: International Organization for Standardization, October 1972.

Schultze, Charles, <u>The Public Use of Private Interest</u>, Washington, D.C.: Brookings Institution, 1977.

Science Policy Research Division Congressional Research Service, Library of Congress, "Voluntary Industrial Standards in the United States: An Overview of Their Evolution and Significance for the Congress," Report to the Subcommittee on Science, Research and Development of the Committee on Science and Astronautics, U.S. House of Representatives, Washington: July, 1974.

Sellye, E., Specifications and Costs, New York: John Wyly, 1957.

- Settle, Russell and Burton Weisbrod, "Governmentally-Imposed Standards: Some Normative and Positive Aspects," mimeo, University of Wisconsin, 1977.
- Spence, A.M., "Consumer Misperceptions, Product Failure, and Producer Liability," Memorandum No. 158 Center Research Economic Growth, Stanford University, November 1973.

\_\_\_\_\_, "Monopoly, Quality, and Regulation," <u>Bell Journal of</u> Economics, Autumn 1975.

Standards Council of Canada, Annual Report, Ottawa: various issues.

Standards Council of Canada, Consensus, Ottawa: various issues.

- Standards Council of Canada, Improved Productivity of Standards Development, CAN-P-501, Ottawa: July 1975.
- Standards Council of Canada, National Standards System: Accreditation of Certification Organizations, CAN-P-504, Ottawa: October 1975.
- Standards Council of Canada, <u>National Standards System: Assignment of</u> Subject Areas to Standards-Writing Organizations, Ottawa: 1975.
- Standards Council of Canada, <u>National Standards System: Conversion of</u> <u>Standards: Expression of Measurement, Identification of SI Stand-</u> <u>ards, and Continued Availability of Yard/Pound Standards</u>, CAN-P-1002, Ottawa, August 1976.
- Standards Council of Canada, <u>Criteria and Procedures for the Prepara-</u> tion and Approval of National Standards of Canada, Ottawa: February 1977.
- Standards Council of Canada, <u>National Standards System: Criteria and</u> <u>Procedures for Accreditation of Certification Organizations</u>, <u>CAN-P-</u> <u>3</u>, Ottawa: October 1977.
- Standards Council of Canada, <u>National Standards System: Criteria and</u> <u>Procedures for Accreditation of Testing Organizations</u>, <u>CAN-P-4</u>, Ottawa, June 1978.

Standards Council of Canada, <u>National Standards System: Criteria for</u> <u>Canadian Voting on Draft International Standards</u>, CAN-P-6, Ottawa, June 1977.

Standards Council of Canada, The National Standards System of Canada-

Current Concept, CAN-P-500, Ottawa, April 1975.

- Standards Council of Canada, The National Standards System of Canada, The Second Five Years, 1976/1980, CAN-P-5, Ottawa, 1976.
- Standards Council of Canada, <u>National Standards System: Survey of</u> <u>Provincial and Municipal Government Standards Activity</u>, CAN-SP-2, Ottawa, March 1977.
- Standards Department, Agency of Industrial Science and Technology, "Industrial Standardization System in Japan," mimeo, <u>Japanese</u> <u>Standards Association</u>, May 1979.
- Stigler, George J., "The Economics of Information," Journal of Political Economy, June 1961.
- Task Force of the International Standards Subcommittee of the Interagency Committee on Standards Policy, "A Report on the Implementation of the GATT Standards Code in Federal Agencies," mimeo, Washington, D.C.: April 1978.
- Till, Derek, David Gleicher, and Michael Michaelis, <u>The Role of the</u> <u>Voluntary Standards System in Relation to Mandatory Standards</u>, (Report by Arthur D. Little, Inc., to ASTM), 1973.
- Timberlake, E. Compton, "Standardization and Simplification Under the Antitrust Laws," Cornell Law Quarterly, March 1944.
- Toth, Robert B., "The Economics of Standards Credits vs. Debits," Martin Marietta Corp., Orlando, Florida: undated.
- U.S. Congress, House Committee on Small Business, <u>The Effect Upon</u> <u>Small Businesses of Voluntary Industrial Standards</u>. <u>A Report</u>, 90th Congress, 2nd Session, 1968.
- U.S. Federal Trade Commission, Preliminary Staff Study (Precis), <u>Self-Regulation Product Standardization</u>, Certification and Seals of Approval, Washington, 1972.
- Underwriters' Laboratories of Canada, <u>Fire Detection in the Home</u>, Scarborough, Ontario: ULC, 1979.
- Verman, Lal, <u>Standardization: A New Discipline</u>, Hamden, Conn.: The Shoe String Press, 1973.
- Viscusi, W. Kipp, "The Impact of Occupational Safety and Health Regulations," <u>Bell Journal of Economics</u>, Spring 1979.

- Viscusi, W. Kipp and Richard J. Zeckhauser, "Optimal Standards with Incomplete Enforcement," Public Policy, Fall 1979.
- Wachtel, H. Richard, "Production Standards and Certification Programs," Antitrust Bulletin, Spring 1968.
- Warner, Sir Frederick, <u>Standards and Specifications in the Engineering</u> <u>Industries</u>, London: National Economics Development Office, February 1977.
- Webb, P.R.W., "Reference to Standards in the Canadian Federal Government," mimeo, Standards Engineers Society, Annual Conference, Syracuse, N.Y.: 1975.
- Williams, Jack, "Trade-Offs in Mandatory Standards," <u>Standards</u> Engineering, February 1979.
- Wilson, J. Tuzo, "Report of the Commission of Inquiry on Aluminum Wiring," Toronto: Queen's Printer, 1978.
- Woodward, Douglas, "The Story of Standards," <u>BSI News</u>, December 1976.



### APPENDIX A

# CASE STUDIES OF NINE STANDARDS

These nine short, case studies were written by representatives for the standards involved and subsequently modified based on additional information obtained from the writers, members of the standards writing committees, and users of the standards. The purpose of the studies was not to give a full blown cost-benefit analysis but simply to describe the factors that led to the creation of the standards, the composition of the implementation and usage of the standard. (See Proulx (1979), Hirshhorn (1979), Montador (1979), and Proulx and Morin (1978), for a more detailed cost-benefit analysis of selected standards).

Although generalizations from such a limited sample should be viewed with extreme caution some points emerge:

- 1. In all cases, the impetus for the development of the standard came from outside the SWO, usually from industry or government.
- 2. The SWO then canvassed potential stakeholders in the standard to determine if a standard was needed. One measure, but not the only measure, of need was that the SWOs costs in developing the standard would be covered.
- 3. The SWO assembled a "balanced" voluntary standards committee from the stakeholders. Independent importers (i.e., not major retail stores) were not on these balanced committees, in general.
- 4. Standards in other countries or the ISO/IEC were not often formally considered or were dismissed as inadequate or not appropriate for conditions in Canada. (The phrase "No known relationship to any ISO standard" is used quite frequently.)
- 5. When a member (or members) of the Committee had had experience with standards outside Canada, the effects of differential Canadian standards were recognized explicitly and the Canadian standard both reflected international inputs and was more easily understood and accepted outside Canada. (See Standard on Structural Steel Shapes.)
- 6. No formal or informal cost benefit analysis was carried out on the proposed standard either in comparison to having no standard at all or to other specifications of the standard.
- 7. In general, the CSA desires to develop standards that have a certification program (administered by CSA), but it will develop standards in accordance with the needs expressed by regulatory authorities and users. (Less than 1/3 of CSA standards involve certification.)

# CSA STANDARD B137.1-1970

#### POLYETHYLENE PIPE FOR COLD WATER SERVICES

## Preliminary Remarks

The Canadian Standards Association program of standardization of plastic pipe began in 1961 and has been evolving ever since, so that now there are 17 published standards in 4 series as follows:

#### **Pressure** Pipe

B137.0-1973, Definitions, General Requirements and Methods of Testing for Thermoplastic Piping

B137.1-1970, Polyethylene Pipe for Cold Water Services

B137.3-1972, Rigid Poly (Vinyl Chloride) (PVC) pipe for Pressure Applications

B137.4-M1977, Polytheylene Piping Systems for Gas Service

B137.6-1971, Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Piping for Hot and Cold Water Distribution Systems

B137.7-1976, Polybutylene Pipe for Cold Water Usage

B137.8-M1977, Polybutylene (PB) Piping for Hot and Cold Water Distribution Systems

Drain, Waste and Vent

B181.1-1973, Acrylonitrile-Butadiene-Styrene Drain, Waste and Vent (ABS-DWV) Pipe and Pipe Fittings

B181.2-1973, Poly (Vinyl Chloride) Drain, Waste and Vent Pipe and Pipe Fittings

B181.3-1971, Polyolefin Laboratory Drainage Systems

B181.4-1976, Polyethylene (PE) Drain, Waste and Vent Pipe and Pipe Fittings

B181.11-1967, Recommended Practice for the Installation of ABS Drain, Waste and Vent Pipe and Pipe Fittings

B181.12-1967, Recommended Practice for the Installation of PVC Drain, Waste and Vent Pipe and Pipe Fittings

## Drain and Sewer

B182.1-M1977, Plastic Drain and Sewer Pipe and Pipe Fittings

B182.11-1967, Recommended Practice for the Installation of Plastic Drain and Sewer Pipe and Pipe Fittings

## Ducting

B196.1-1972, Plastic Underground Power Cable Ducting

B196.3-1975, PVC Underground Telecommunication Cable Ducting

For the purpose of this report, CSA Standard B137.1-1970 will be used although many of the remarks are equally applicable to most of the standards in these four series.

### Request for the Standard

The Standard was originally requested by the Society of the Plastics Industry of Canada. With the advent of plastics materials for piping to be used in plumbing systems, there was a demand for a Standard to which manufacturers could produce, and by which users and plumbing inspection officials could be assured, not only of a quality product meeting a recognized Standard, but also one which would compare favourably with piping made of more traditional materials such as cast iron, steel and copper. The Standard was conceived as a vehicle to provide a set of minimum requirements for quality, particularly the ability to withstand specified internal pressures, to provide a measure of environmental crack resistance and to minimize lowtemperature embrittlement. The Standard was also intended to standardize dimensions to ensure interchangeability of products used to ensure compatibility with other parts of a piping system.

From the beginning, it was agreed that The Society for the Plastics Industry of Canada would try to be a catalyst in the CSA standards program to provide manufacturer nominees for membership in the standards-writing committee, and to assist in any developmental work to provide data needed by the committee in arriving at suitable test requirements and procedures. Upon receipt of the request from SPI, a survey of known interests was conducted and there was general agreement that a Standard was needed. It was recognized that the American Society for Testing and Materials (ASTM) was very active in the plastics field and that its applicable test methods could be referenced in the CSA Standard. This referencing afforded some coordination between U.S. and Canadian Standards.

#### Decision to Begin the Standard

One stated objective of the program was to provide uniformity of the product with respect to dimensions and chemical composition. Not only would manufacturers be on a "fairer" basis competitively by producing to the one Standard, but also users would be assured of a specified minimum quality and plumbing inspection authorities would be able to recognize a "standard" product from a "non-standard" product. Form the start, it was agreed that the Standard would be used as a basis for CSA certification, and that CSA would offer a certification program. Consumers, plumbing contractors and inspection authorities could then readily ascertain, by checking the marking on the piping, whether or not the piping was certified and to what Standard.

## Process for Developing the Standard

The Committee has evolved with many changes in composition and membership, but from the beginning, has maintained an equal balance between manufacturers and users. The Chairman and Vice-Chairman have always represented different categories of membership. In addition, each of the principal product areas outlined in the Preliminary Remarks are the responsibility of separate sub-committees and each of them follows the same principles in membership. At the present time, the matrix of the main technical Committee provides for six manufacturers, six users and regulatory authorities, and two general interest members.

The Standard first appeared in 1962 as Tentative CSA Standard B137-T, with a term of six months. The Standard could not be completed in the usual way because some of the requirements had to be proven by putting them to trial use. The Standard was then completed and published as B137-1963. About this time, however, it became apparent that similar standards were needed for other plastics pipe products made of various plastics materials such as polyethylene, polybutylene, rigid poly (vinyl chloride), and acrylonitrile-butadienestyrene (ABS). These materials were also considered acceptable for use as piping in different parts of a plumbing system. Since little was known of possible problems in use, it was considered wise to cover them in a series of standards. During this developmental period therefore, many other standards in the series were drafted and published and B137-1963 was revised. A new edition appeared in 1970, redesignated as B137.1, to be part of an overall series on plastic pressure pipe.

Although there have been problems of a technical nature to be solved since the inception of the program, they are too numerous to list. Experience with the product in the field and experience gained through certification testing have solved most such problems and this standard and others in these four series have been continuously monitored and updated.

The standard is of the certification-type. Many provincial plumbing codes and the Canadian Plumbing Code reference many of the standards in these series. There is, however, no uniformity among these codes. Some Codes have a complete listing of these plastics pipe standards; others have only a partial listing. Some Codes call for the use of products certified to these standards, but most do not. In general, all provincial plumbing inspection authorities recognize these standards.

The Standard is a general consensus standard published by CSA; it is not a National Standard of Canada. There is no known relationship to any ISO Standard, but there is dependence upon ASTM for some of its test methods for testing plastics materials.

### Implementation and Usage

Lead time for manufacturers to implement changes in order to conform to revisions or to new editions of the standard is usually one year. This time may vary depending upon difficulties the industry may have with such problems as product re-design and market demand. As mentioned previously, the Canadian Plumbing Code and many provincial plumbing codes reference the standard and therefore in certain jurisdictions, products must conform to the standard. Only in a few jurisdictions is CSA certification to the Standard made mandatory. All producers, users, and plumbing inspection officials, however, are affected by the standard and by certification. It is not known what percentage of users/producers follow the standard. It is the prerogative of the provincial or local plumbing inspection officer to accept for use, in his jurisdiction, products that do not comply with the standard and that are not CSA certified. In general, the standard and CSA certification are recognized across the country but there can be instances where exceptions may be made.

#### Cost of Developing and Updating Standard

Total cost of developing the standard since 1972-73 was \$6,365.00. Accounting figures are not available prior to that date. There is no known estimate of the cost of any external studies. It is doubted that any committee member has every kept account of the cost of his participation such as time, travel, or out-of-pocket expenses incurred during travel to committee meetings.

## Overall Benefits/Costs

The major benefit to producer is production to a recognized standard that not only reflects current technology, but also is revised from time to time to keep pace with changes in technology, production methods and market demands. Economies can be achieved by producing to standard sizes and specified minimum standards of quality. There is no estimate of the dollar value of such economies as opposed to the cost with no standard available. The user benefits by knowing that he can buy a product that is made to a recognized standard, that there are standard sizes and that there is some produce inter-changeability. Again, there is no estimate of the dollar value of such benefits.

# CSA STANDARD C22.2 NO. 36

#### HAIRDRESSING EQUIPMENT

## Request for the Standard

On August 31, 1979 Canadian Standards Association published the fourth edition of No. 36 of a series of Standards issued by the Association under Part II of the Canadian Electrical Code, Safety Standards for Electrical Equipment. Today there are nearly 200 individual Standards comprising Part II of the CE Code. The fourth edition of Standard C22.2 No. 36 superseded previous editions published in 1936, 1954 and 1972. The provincial electrical inspection authorities working under mandate of the provincial governments requested that this Standard be written. Consumer input was sought and the Consumer's Association of Canada was represented on the main Technical Committee (CSA Committee on CE Code, Part II).

The Standard was initiated to provide a safety standard for electrical hairdressing equipment to satisfy the responsibilities of the provincial authorities. In particular, the Standard was to provide adequate provision for the safety of persons and property from the hazards of fire and electric shock, so that with proper handling, such equipment would be expected to give safe service for a reasonable length of time.

Due to the long history of this Standard, CSA does not retain records of meetings and correspondence from the early years. It can be safely assumed that supporting data were presented to highlight the need for the 1936 edition since more recent improvements to the Standard were justified on the existence of failure reports from various sources, viz. electrical inspection authorities, governments, users and manufacturers.

The prime purpose of the Standard is to provide safety requirements for electrical products sold in the Canadian marketplace; the requirements are also coordinated with North American practice. International standards do not adequately represent nominal system supply voltages provided by Canadian electrical utilities but, in so far as it is practicable and safe, co-ordination is pursued.

#### Decision to Begin the Standard

The main objective of writing this Standard was to provide, for the user, an adequate level of protection from fire and electrical shock during the normal life of the equipment. While this Standard is a voluntary Standard, it serves as the basis of CSA's certification program for electrical hairdressing equipment.

#### Process for Developing the Standard

Each edition of the Standard was formulated by a working group called the Subcommittee for CSA Standard C22.2 No. 36 made up of

manufacturers, regulatory authorities, certification agency representatives and consumers, where such participation could be obtained. Acceptance of the requirements was on a consensus basis (not a numerical vote). Final approval of the Standard was by formal approval by a Technical Committee (CSA Committee on CE Code, Part II) having the following matrix:

Chairman (from CSA Standards Division )	1
Electrical Inspection	6
Manufacturers	
Electrical and Electronic Manufacturers	
Association of Canada	7
General Interests	
CSA Certification Division	1
National Research Council	1
Federal Department of Consumer and Corporate Affairs	1
Federal Department of Industry, Trade and Commerce	1
Canadian Electrical Contractors Association	1
Consumers Association of Canada	1
Canadian Electrical Association	1
Committee on CE Code, Part V	1
TOTAL	22

Non-Voting Associate Members were also recognized as listed below:

Retail Organizations	1						
Fire Marshals and Fire Commissioners 1							
Federal Department of Public Works	1						
Federal Department of National Health and Welfare	1						
American National Standards Institute	1						
Underwriters' Laboratories of Canada	1						
BSI/CSA Agency	1						

Final approval required an approval vote from two-thirds of the voting membership of the Committee. Formal rules of procedure, based upon the CSA Rules Governing Standardization, were applied. It should be noted that the Standards Steering Committee is the CSA Committee on CE Code, Part I. This Committee is responsible for all standards-writing activity related to safety standards for electrical equipment of the CE Code, Part II. The Committee on CE Code, Part I consists of 38 members representing the following organizations:

## Non-Industrial Group

#### Inspection

Provincial Electrical Inspection Department or Other Provincial	
Representatives	10
Municipal Electrical Inspection Departments	3
Yukon Territory	1
Northwest Territories	1

# Miscellaneous

Fire and Casualty Underwriters	1
Fire Marshals	1
Association of Consulting Engineers of Canada	1
Public Works Canada	1
CSA Committee on CE Code, Part II	1
Provincial Mines Inspectors and CSA Committee on	
CE Code, Part V	1
National Research Council	1
National Research Council Division of Building Research	1
Canadian Electrical Contractors Association	1
Organized Labour	1
Canadian Standards Association	1
	'
ndustrial Group	
Electrical Manufacturers	
Electrical and Electropic Manufacturers Association of	
Capada	Λ
Miccollapoouc	-+
Fleetnicel Deven Utilities	4
	4
Rallways	2
Canadian relecommunications Carriers Association	-
TOTAL	38

In the formulation of the Standard, throughout its evolution over some 45 years, failure, accident, fire, medical and research reports were used. Such reports originated from CSA's audits and investigations programs, from electrical inspection authorities, users, governments, manufacturers, insurance companies - virtually every conceivable source. North American and international standards were consulted to provide coordination where possible. This Standard evolved over the years to meet the ever-changing safety requirements of the marketplace. New products entered into common usage in almost every household across the nation. With the widespread use came new hazards that demanded new solutions.

New technologies introduced the need for new constructional and test requirements. An example was the development of the positive temperature coefficient resistance heater element. The safe introduction of these devices to hairdressing equipment made it no longer necessary to have a separate overtemperature protective device in many hair dryers and curling irons. In this case the result was equal or improved safety at lower cost to the consumer over the long run.

The Standard is a general consensus Standard published by CSA for certification purposes. It has not been adopted as a National Standard of Canada nor is there a direct relationship to an ISO/IEC Standard. There are numerous parallels between this Standard and Underwriters' Laboratories Standard 859, Personal Electric Grooming Appliances, but the standards are not identical.

# Implementation and Usage

The time frame for implementation appears as an "effective date" printed in the Standard. In the last edition it was 18 months from date of publication. In general, lead time for manufacturers to implement changes in order to conform to new editions of the standard or revisions to existing editions is usually 1 to 2 years. This time may vary depending upon difficulties the industry may experience with product redesign and market demand.

Since the Standard is used in a CSA certification program, the target group for implementation is the manufacturer who has voluntarily signed an "agreement" with the CSA Certification Division signifying that as of a specific date he will apply the CSA mark only to products which report for the product. All producers certified by CSA follow the Standard. It is not necessary to be certified by CSA to manufacture the product, but in order to market the product, almost without exception, the electrical inspection authorities demand that the product be CSA certified.

# Costs of Developing and Updating the Standard

Since the beginning of the fiscal year 1973-74, the total development cost for C22.2 No. 36 borne by CSA was \$23,000. Accounting figures are not available prior to that date. There is no known estimate of the cost of any external studies. It is doubted that any committee member has every kept account of the cost of his participation such as time, travel, or out-of-pocket expenses incurred during travel to committee meetings.

#### Overall Benefits-Costs

There is no known estimate of the benefits and costs of the Standard compared with no standard versus mandatory standard.

# COMMITTEE ON C22.2 NO. 36

# HAIR DRESSING EQUIPMENT

Mr. K.R. Dunphy <u>(CHAIRMAN)</u> Manager, Codes & Approvals Canadian General Electric Co. Ltd. 940 Lansdowne Avenue Toronto, Ontario M6H 3Z4

Mr. B.A. MacEwen (SECRETARY) Canadian Standards Association

Mr. H. Bam Manager, Technical Services Canadian General Electric Co. Ltd. P.O. Box 500, 30 Bradford Street Barrie, Ontario L4M 4V7

Mr. H.E. Bettini Department Manager Helene Curtis Industries, Inc. 3123 North Pulaski Road Chicago, Illinois 60641 U.S.A.

Mr. N. Bilek Dannyco Trading Co. Ltd. 183 Bates Road, Ste. 202 Montreal, Quebec H3A 1A2

Mr. A.L. Burley Vice-President & General Manager Venus Electric Ltd. 85 Progress Avenue Scarborough, Ontario M1P 2Y7

Mr. C.M. Butler Chief Electrical Inspector Department of Labour & Manpower Govt. of Newfoundland & Labrador Electrical Inspection, Occupational Health & Safety Div. Confederation Building St. John's, Newfoundland A1C 5T7 Mr. R. Dey President Canadian Certification Services 2465 Dunwin Drive, Unit #11 Mississauga, Ontario L5L 1T1

Mr. R.C. DuPont Manager, Product Engineering Sunbeam Corporation (Canada) Ltd. 1040 Islington Avenue Toronto, Ontario M8Z 4R5

Mr. G.E. Fisher Ontario Hydro 700 University Avenue Toronto, Ontario M5G 1X6

Mr. J. McGaw President Appliance Design Probe, Inc. 192 Shorting Road Scarborough, Ontario M1S 3S7

Mr. J. Millward President Windmill Electric Products Ltd. 15 Brougham Crescent Weston, Ontario M9R 1J3

Mr. J.B. Neeson Engineering Manager McGraw-Edison Limited Brevel Motor Division 1370 Birchmount Road Scarborough, Ontario M1P 2E5

Mr. J.A.B. Nixon J. Nixon & Associates Ltd. 887 Avenue Road Toronto, Ontario M5P 2K7 Mr. C. Rowas Micro Devices Corporation P.O. Box 51, Far Hill Station Dayton, Ohio 45419 U.S.A.

Mr. R.V. Sindall Reliability Engineering George W. Endress Co. Ltd. P.O. Box 673 268 Grand River Avenue Brantford, Ontario N3T 5P9

Mr. M. Steinz Gillett Canada Ltd./Ltee 5450 Cote De Liesse Road Montreal, Quebec H4P 1A7

Mr. S.G. Summers Vienna Beauty Imports 1982 Avenue Road Toronto, Ontario M5M 4A4

Mr. I. Svekis
Engineering Manager
Torcan Manufacturing Co.
Division of Rotor Electric Co. Ltd.
151 Snidercroft Road
Concord, Ontario
L4K 1B6

Mr. J. Swenson Swenson & Son Limited 80 Orfus Road Toronto, Ontario M6A 1M1 Mr. V. Toews Chief Electrical Inspector Department of Local Government Government of the Yukon Territory Box 2703 Whitehorse, Yukon Y1A 2C6

Mr. J. Wise Radiant Beauty Supplies Ltd. 92 Oakdale Road Downsview, Ontario M3N 1V9

Mr. C.S. Yee Senior Engineer, Heating & Laundry Section Canadian Standards Association

# FOR FURTHER INFORMATION

Hair Dressing Equipment (C22.2 No. 36)

# Technical Committee Chairman:

Mr. K.R. Dunphy Canadian General Electric Co. Ltd. 940 Lansdowne Avenue Toronto, Ontario M6H 3Z4

# Other Contact:

Mr. Reg Stopps EEMAC One Yonge Street, #1608 Toronto, Ontario M5E 1R1 (416) 862-7152

Group Manager

Don Manson (416) 744-4113

Committee List (Attached)

# Standards Steering Committee Chairman:

Don Manson Canadian Standards Association (416) 744-4113

# CSA STANDARD STRUCTURAL STEEL SHAPES

## Request for the Standard

The initial request for the standard came from the association representing the structural steel users, the Canadian Institute of Steel Construction. The users thought that there was overproliferation of structural steel shapes and sizes that had led to high costs and lack of availability, due to loss of economies of scale, and the necessity of carrying high inventories.

### Decision to Begin the Standard

After some initial hesitation on the part of producers, it was agreed that a standard would be beneficial to the industry.

# Process of Developing the Standard

A voluntary consensus standard committee was formed of essentially the same members as for the standard on Structural Steel Quality. Due to the high degree of interaction between the Canadian and U.S. steel industry and the extensive involvement of the Chairman of the committee with international standards activity there was a high degree of interaction and coordination between international standards bodies and producers. Initially there was considerable resistance to reducing the number of sizes and shapes by large producers since they considered that their competitive advantage over some smaller producers lay in their ability to produce a wide range of products. Eventually all the producers (except one large one in the U.S.) agreed with the standard. The standard reduced sizes in unequal leg shapes by 30% and in equal leg shapes by 20%. The shapes themselves were also improved.

### Implementation and Usage

Since buyers tend to be large and sophisticated this standard is not a certification standard and its use is not mandatory. In general, the producer certifies to the user that his products meet the standard. There is also a market for non-standard products for some uses.

## STRUCTURAL STEEL QUALITY

CSA	Standard:	G40.20-M1978		General Requirements for Rolled or	
				Welded Quality Steel	
		G40.21-M1978	-	Structural Quality Steel	

#### Request for the Standard

The standard for structural steel quality was initiated by the basic steel and fabrication industry to rationalize and provide better quality steel grades at economic costs so that quality grades could be identified in a manner easy for users. It was based on research results and statistics regarding use of grades previously utilized and developed through a consensus Committee structure. Groups concerned with the use of the Standard were contacted and agreement was obtained that such a Standard was needed since a mature country should have its own standards and Canadian requirements for structural steel quality differed from those in other countries.

It should be noted that the G40.20 and G40.21 Standards follow the pattern established by Technical Committee 17 of ISO. The Chairman of the G40 Committee at the time when the G40.20 and G40.21 Standards were initiated was also Chairman of the CAC/TC 17. He was also an active member of ASTM A1 which is concerned with steel. The present Chairman of the G40 Committee is also actively involved in ASTM Committee A1 and ISO/TC 17, thus ensuring coordination between International, North American and Canadian Standards. Consumers of steel products, as well as producers, are represented on the Committee. No importers were represented on the committee.

### Decision to Begin the Standard

Standards for steel products have been an essential part of the structural steel industry for many years, and are essential for both the producers and users of these steel products. The standard was modified in 1976, 1979 and a metric standard was produced in 1979. The standard was under modification in 1980. The G40.20 and G40.21 Standards are the latest in a line of Standards the need for which has been firmly established over the years. In addition, from time to time, low quality foreign steel has been dumped in Canada resulting in unfair competition and dissatisfaction among users who cannot distinguish low quality steel without extensive testing.

#### Process for Developing the Standard

A copy of current Committee membership is attached.

Information used for developing the standard was research data, statistics, presentations by affected groups and other Standards. There was no unresolved issue in the development of the Standard. As new technological developments occur, these are considered and, when desirable, revisions are made to improve the Standard. While these Standards are similar in intent and general character to ISO recommendation 630, the Canadian Standards make provision for the different grades of steel required for Canada's environment and also recognize the advanced technological status of the Canadian steel mill. Canada's cold weather conditions require tougher, but more easily weldable steel. As such, they do not provide a trade barrier but satisfy the needs of Canadian users. Steels meeting requirements of the G40.20 and G40.21 Standards are imported from countries such as UK, Japan, Germany and others. Users in B.C. were not very enthusiastic about the standard since their requirements were not the same as in most of Canada; B.C. imports a significant amount of steel from Japan, and steel conforming to the standard was more expensive.

Presently the standard is not a National Standard, but application will be made for the next issue.

#### Implementation and Usage

Conformity with the standard is voluntary, except in building codes, (G40) depending on requirements of the User. The standard has been adopted 100% nationally by producers. Internationally, suppliers of steel to Canadian users usually must certify that their product conforms to the standard.

CSA man-hour costs over 3 years for the preparation and maintenance of the Standards are as follows:

1977-78	1978-79	1979-80 to Date	
\$6,759.	\$5,391.	\$4,313.	

External costs incurred are voluntary contributions of producers and users represented on the Committee.

#### Overall Benefits

The Canadian construction industry and Canadian steel producers cannot operate efficiently and economically without voluntary consensus Standards of the type prepared by CSA. These Standards become mandatory when specified for specific projects and this form of mandatory Standards is acceptable and desirable.

# FOR FURTHER INFORMATION

# Structural Steel Shapes (G40.20 and .21

# Technical Committee Chairman

Mr. H.A. Krentz President Canadian Institute of Steel Construction 201 Consumers Road Willowdale, Ontario M2J 4G8 (416) 491-4552

# Other Contacts:

Mr. Walt Kimball 660-3rd Line, East Sault Ste. Marie, Ontario P6A 5K9 (705) 253-0340

CSA Group Manager:

Mr. Zain Shah (416) 744-4368

Technical Committee List (Attached)

# Standards Steering Committee Chairman:

Mr. J.W. Craven Chief Metallurgist Dominion Foundries & Steel Limited P.O. Box 460 Hamilton, Ontario L8N 3J5
## TECHNICAL COMMITTEE ON STRUCTURAL STEEL

Mr. H.A. Krentz (CHAIRMAN) President Canadian Institute of Steel Construction Riverside Drive 201 Consumers Road Willowdale, Ontario M2J 4G8

Mr. L. Pagnano (SECRETARY) Canadian Standards Association

Mr. C.W. Alexander Metallurgist, Specifications Lukens Steel Company Coatesville, Penn. 19320 U.S.A.

Mr. W.W. Baigent Manager of Engineering, Eastern Structures Division Canron Limited 100 Disco Road Rexdale, Ontario M9W 1M1

Mr. G.A. Beaudoin The Steel Co. of Canada Ltd. Stelco Tower 100 King Street, West Hamilton, Ontario L8N 3T1

Mr. W.H. Brokenshire (ASSOCIATE Manager, Iron & Steel MEMBER) Inco Limited P.O. Box 44 1 First Canadian Place Toronto, Ontario M5X 1C4

Mr. J.P. Clair Canadian Heat Treaters Limited P.O. Box 447 Richmond Hill, Ontario L4C 4Y8

Mr. A. Crozier The Algoma Steel Corp. Limited Sault Ste. Marie, Ontario P6A 5P2

Dr. J.H. Davison Public Works Canada Ottawa, Ontario K2A 0M2

Mr. L.F. Dixon Alberta Transportation Bridge Branch, Highways Building 9630-106th Street Edmonton, Alberta T5K 2B8

Mr. M. Erdstein c/o SNC Group 1 Complex du Jardin P.O. Box 10 Montreal, Quebec H5B 1C8

Mr. P.M. Gardiner Chief Metallurgist Canadian National Railways 3950 Hickmore Avenue Montreal, Quebec H4T 1K2

Dr. D.S.R. Gupta Hawker-Siddeley Canada Ltd. Canada Bridge Division Box 2157 Walkerville P.O. Windsor, Ontario N8Y 4R8

Mr. W.C. Kimball (ALTERNATE 660-3rd Line, East MEMBER) Sault Ste. Marie, Ontario P6A 5K9

Mr. R.F. Knight Department of Energy, Mines & Resources 568 Booth Street Ottawa, Ontario K1A 0G1

Mr. D.M. McCallum Horton CBL Limited P.O. Box 401 Fort Erie, Ontario L2A 5N4

Mr. D. Miller Senior Metallurgist Lake Ontario Steel Co. Ltd. Hopkins Street, South Whitby, Ontario L1N 5T1

Mr. P.J. Mudry Works Metallurgist Sidbec/Dosco Usine de Montreal 5870 St. Patrick Street P.O. Box 67 Montreal, Quebec H3C 2R4

Mr. A. Radkowski Structure Office West Building, Ministry Division Dept. of Transportation & Communications 1201 Wilson Avenue Downsview, Ontario M3M 1J8

Mr. J. Schneider Dominion Bridge Co. Limited P.O. Box 3246, Station 'C' Ottawa, Ontario K1Y 4J5

Mr. H. Shimizu Divisional Metallurgist Manitoba Rolling Mills P.O. Box 2500 Selkirk, Manitoba R1A 2B4

Mr. G.R. Sinclair (ALTERNATE MEMBER) Canron Limited 100 Disco Road Rexdale, Ontario M9W 1M1

Mr. J.W. Watson Dominion Foundries & Steel Ltd. P.O. Box 460 Hamilton, Ontario L8N 3J5

Mr. J. Wong <u>(ALTERNATE MEMBER)</u> Canadian Heat Treaters Limited P.O. Box 447 Richmond Hill, Ontario L4C 4Y8

### CSA STANDARD B45.3-1977

### PORCELAIN ENAMELLED STEEL PLUMBING FIXTURES

### Preliminary Remarks

The Canadian Standards Association program of standardization of plumbing fixtures began in 1958 and has been evolving ever since. There are now seven published standards as follow:

B45.1-1973, Vitreous China Plumbing Fixtures
B45.2-1975, Enamelled Cast-Iron Plumbing Fixtures
B45.3-1977, Porcelain Enamelled Steel Plumbing Fixtures
B45.4-1975, Stainless Steel Plumbing Fixtures
B45.5-1976, Plastic Plumbing Fixtures
B45.6-1973, Non-Recirculating Toilets and Waste Holding Tanks for Use in Recreational Vehicles
B45.7-1972, Self-Contained, Recirculating, Chemically Controlled Toilets for Use in Recreational Vehicles

While these standards cover a variety of plumbing fixtures made of different materials, only three, specifically, include <u>bathtubs</u> in their scopes. These are - B45.2, B45.3 and B45.5. The most common material used in <u>Bathtub</u> construction today is porcelain enamelled steel; therefore, this report discusses that standard specifically although many remarks are equally applicable to the others. No standards exist for bathtubs made of plastic. A producer of plastic bathtubs would have either to have his product evaluated under existing standards or act to have a new standard created (as was done for plastic plumbing fixtures).

#### Request for the Standard

The CSA program for standards for plumbing fixtures began early in 1958. CSA had received a number of enquiries concerning the development of specifications. The enquiries prompted CSA to conduct a survey of various associations, agencies, and manufacturers. The results of the survey established that specifications were both justified and desired. By 1958, CSA had already begun a program on plumbing fittings (or plumbing brass goods as they were known then) and an extension into the field of fixtures was natural. Authorization was then given to organize a committee to prepare product standards for fixtures made of vitreous china, enamelled cast-iron, porcelain enamelled steel, and stainless steel. Each standard was intended to cover products commonly made of these materials, but it was recognized that each standard could be expanded to cover new products and materials on the market. In fact, in later years, plastics materials began to be used and the increasing popularity of recreational vehicles prompted the development of B45.5, B45.6 and B45.7.

The main purpose of this standard (and others in the B45 series) was to provide a measure of performance and quality and to assure that

fixtures would meet the requirements of the provincial plumbing codes (mandatory standards). At present, there are different standards in the plumbing codes across provinces and between regions within provinces. Newfoundland and Nova Scotia have no plumbing code. The Canadian Plumbing Code does not cover products as such, just procedures. It does, however, reference CSA standards. The National Building Code adopts the Plumbing Code completely.

Another purpose was to standardize some dimensions to provide compatibility with standard plumbing <u>fittings</u> and to provide interchangeability among fixtures from different manufacturers. This would be of benefit to both manufacturers and installers since the standard would help producers rationalize their products and achieve economies of scale.

The pattern established in formulating <u>B45.1</u> on vitreous china plumbing fixtures paved the way for establishing the requirments and format of <u>B45.3</u>. In the former, extensive use was made of a "Commercial Standard" published by the United States Department of Commerce and a "Federal Specification" also issued by the U.S. Government. In the initial phases, all known types of interest were contacted as to need and practicality of the project. Users represented included plumbing contractors (installers), plumbing inspection authorities (both provincial and municipal), and the Central Mortgage and Housing Corporation. Large purchasers for federal installations such as the Department of National Defence were also included among the users. The standard was not written to form a barrier to trade.

### Decision to Begin the Standard

The beneficiaries were considered to be:

- (a) Manufacturers who could be placed in a better competitive position with all other manufacturers meeting the same standard, and who could find ready acceptance of their products in the marketplace.
- (b) Users who could be assured of a quality product meeting defined criteria and marked to show that the product had been tested for compliance to a recognized standard. Provincial and municipal plumbing inspection authorities would also be considered as "users" in this context.

From the beginning of this program, all standards were considered as certification-type standards and CSA offered a certification service.

### Process for Developing the Standard

The first committee that was organized in 1958 to prepare the entire B45 Series was relatively small but representative of the field at that time. Four sub-committees were also organized and were composed of people with a specific interest in certain product lines. The Committee has evolved over the years and the matrix (composition) now provides for six manufacturers, three regulatory authorities, three users, and four general interest members. There is no immediately available information on the difficulties or unresolved issues that may have surfaced during development of the standard. The Committee and its subcommittees have remained active in monitoring their published standards in order to revise them where necessary to reflect technological improvements and new products. This monitoring affords the committee the opportunity to resolve any previously unresolved issues.

CSA Standard B45.3 is a general consensus standard published by CSA; it is not a National Standard of Canada. It has no known relationship to any ISO standard, although some committee members may be familiar with standards outside Canada.

#### Implementation and Usage

Lead time for manufacturers to implement changes in order to conform to new editions of the standard or revisions to existing editions was usually one year. Time may vary depending upon difficulties the industry may have with such problems as product re-design and market demand. Producers, importers and users, including installers and plumbing inspection authorities, are all "targets" for implementation of standard's requirements and certification thereto.

It is not known what percentage of users/producers follow the standard. The standard, however, is referenced by the Canadian Plumbing Code and by a number of provincial Plumbing Codes. Compliance with it is mandatory in some parts of the country but certification to the standard is not made mandatory in most of those cases. The standard affects foreign products imported into Canada as well as the Canadian products.

Total development cost of the standard since 1972-73 was \$4,650.00. Costs figures prior to this date are not available. An estimate of the cost of any external studies is not known. It is doubted that any committee member has ever kept account of the cost of his participation such as time, travel, or out-of-pocket expenses during travel to committee meetings. There is no known estimate comparing the benefits-costs of the standard as compared with having no standard at all.

### FOR FURTHER INFORMATION

Bathtubs (B45.3)

Technical Committee Chairman:

Mr. R.K. Beach 1968 Oakdale Crescent Ottawa, Ontario K1J 6H3

Other Contact:

Technical Manager Canadian Institute of Plumbing & Heating 785 Phymouth Street, Suite 305 Montreal, Quebec H3H 1W9 (514) 342-9854

CSA Group Manager:

John Watson (416) 744-4102

Technical Committee List (Attached)

Standards Steering Committee Chairman:

Mr. J.E. Stott Secretary/Manager Soil Pipe Division Canadian Foundry Association Cast-Iron Soil Pipe Division R.R. #1 Wyevale, Ontario LOL 2T0

# TECHNICAL COMMITTEE ON PLUMBING FIXTURES

Mr. R.K. Beach (CHAIRMAN) 1963 Oakdale Crescent Ottawa, Ontario K1J 6H3

Mr. B.C. Allan President BMP Assessors Ltd. 1431 Cavendish Road Ottawa, Ontario K1H 6C1

Mr. J. Chisholm (ALTERNATE Powers-Fiat Corporation MEMBER 300 Lawton Avenue Box 437 Monroe, Ohio 45050 U.S.A.

Mr. J. Cooper Vice-President of Operations Waltec Enterprises P.O. Box 190 1000 Kindred Road Midland, Ontario L4R 4K9

Mr. J. Carnegie (SECRETARY) Canadian Standards Association

Mr. F.R. McKeon (VICE-CHAIRMAN)Mr. G. Sinkovic **Division Manager** Wessan Plumbing Manufacturing Ltd.80 Ward Street 8032 Torbram Road Bramalea, Ontario M6H 4A7 L6T 3T2

Mr. H.G. Gillis Executive Vice-President Mechanical Contractors Assoc. of Can. 116 Albert Street, Suite 408 Ottawa, Ontario K1P 5G3

Mr. F. Holland Department of Labour & Manpower P.O. Box 6000, Centennial Bldg. Fredericton, New Brunswick E3B 5H1

Mr. F.D. Ledgett H.H. Angus & Associates Ltd. Consulting Engineers 1127 Leslie Street Don Mills, Ontario

J.B. Morley Canadian Standards Association

Mr. J.C. Neave (ASSOCIATE Administrator MEMBER Mechanical Contractors Assoc. OF B.C. #230-4259 Canada Way Burnaby, British Columbia V5G 1H1

Mr. G.H. Peterson Crane Canada Ltd. 5800 Cote de Liesse Road Montreal, Quebec H4T 1B4

Mr. F. Penfold Plumbing Inspector R.R. #3 Gregory Road St. Catharines, Ontario L2R 6P9

American-Standard Toronto, Ontario

Mr. K. Weldon Plant Engineer Powers-Fiat Products of Canada Ltd. P.O. Box 1999 Orillia, Ontario L3V 6L1

Mr. T. Wright Spiroco Limited 1292 Plank Road Sarnia, Ontario

### CSA STANDARD Z195-1970

### SAFETY FOOTWEAR

### Request for the Standard

The Mines Accident Prevention Association of Ontario requested the CSA to develop a standard on safety footwear in mid-1964. This request was later supplemented by a request from a safety supervisor of a distillery firm for information on applicable safety shoe specifications. The inquiry does not appear to have been accompanied by statistical evidence that the products on the market at that time did not afford adequate foot protection, or conversely that accidents and injuries sustained warranted better or even different kinds of protection. The CSA, however, conducted a survey into the need for and practicability of developing a standard. Included in the survey were users, federal and provincial Departments of Labour, provincial Workmen's Compensation Boards, safety footwear manufacturers, and safety associations, both national and provincial. There was almost unanimous support for the development of a standard.

At this time, there was in existence an American standard on safety footwear but it was already very old and considered to be of little value as a basis for a CSA standard.

### Decision to Begin the Standard

The initial objectives of the program were to:

- (a) Develop standard requirements for safety footwear, coupled with suitable test methods;
- (b) Promote better knowledge among employers and employees in the proper selection, use and care of safety footwear;
- (c) Encourage the adoption of the standard by provincial legislators to ensure the <u>mandatory</u> use of standardized safety footwear by the labour force and others working from time to time in those occupational environments where there would be a likelihood of foot injuries. Too many workers did not realize the value of wearing protective footwear.

From the beginning, it was considered that the standard would be of the certification type and that CSA would offer a certification program. The principal beneficiaries of the program were considered to be members of the labour force and others who would normally wear safety footwear from time to time. They would have a greater measure of assurance that their footwear met a recognized standard and had been tested for compliance to that standard.

### Process for Developing the Standard

The Technical Committee has evolved with many changes in composition and membership and now provides for ten (10) producers, twelve (12) users, five (5) general interests and eight (8) regulatory authorities (and no independent importers or the CIA). The consumers include representatives of organized labour, industries employing large labour forces and safety associations. Many large companies have ruled that their employees must wear safety footwear in certain occupations or work locations and have provided financial incentives for those employees to wear this safety footwear. That is why this type of organization has been included among "users" in the CSA committee matrix.

There was little information in the way of printed standards from other sources that the CSA committee could use as a basis for discussion. In 1970, however, the Construction Safety Association of Ontario conducted a foot-accident survey that comprised a study of some 700 accidents. The survey indicated that approximately one-third of all accidents occurred to the sole of the foot, one-sixth to the toe, one-sixth to the metatarsal area, and one-third to the ankle area. This survey also revealed that a majority of those injured had not been wearing safety footwear of any type.

The committee first addressed the questions of sole and toe protection. It was agreed in those early stages that metatarsal protection would not be included because there was little market demand for footwear having this kind of protection. It was also recognized that some sort of research testing would have to be carried out for problems such as slip-resistance. Too little information on such problems was available to formulate sound test requirements and procedures.

It was also recognized that education of the employer and employee could be a major factor in achieving success with the standard certification program. The employee must be convinced that the wearing of good quality safety footwear was in his own best interests and the employer must be convinced that it must be a company rule to wear such footwear. Such a program would be enhanced if safety legislation were passed to make the use of safety footwear "on the job" mandatory.

The standard is a general consensus standard published by CSA; it is not a National Standard of Canada. There is no known relationship to any ISO standard or to standards in other countries since the ISO material was not advanced and the committee was not interested in other work in other countries.

#### Implementation and Usage

The lead time for manufacturers to implement changes in order to conform to new editions of the standard or revisions to existing editions is usually one year. This time varied depending upon difficulties the industry had with such problems as product re-design and market demand. All producers and users of safety footwear are affected by the standard and the related certification program. Certification, however, is still voluntary. Recent studies have indicated a need for re-assessing the many classifications of footwear that are covered in the existing edition of the standard and experience in the marketplace has shown that a decrease in the number of variations in footwear is not only possible but desirable. There is now a renewed effort to provide meaningful requirements for metatarsal protection but this effort will entail a fairly costly program of research-type testing. Concern has been expressed about what is considered to be a high cost for certification and the continuance of a certification program has been questioned on grounds of cost alone.

It is not known what percentage of users/producers follow the standard.

### Costs of Developing and Updating Standards

Since the beginning of the fiscal year 1972-73, the total development cost for Z195 has been \$17,490.00. Accounting figures are not available prior to that date. In order to evaluate the effectiveness of existing footwear, CSA instituted a national survey in response to manufacturers' requests to do so and in preparation for a Conference on Protective Equipment held in January, 1978. The survey covered the types and severity of injuries being sustained and the types of footwear being worn by those who were injured. CSA costs with respect to this survey totalled approximately \$28,000. There is no known estimate of the cost of any external studies. It is doubted that any committee member has ever kept account of the cost of his participation such as time, travel, or out-of-pocket expenses incurred during travel to committee meetings.

#### **Overall Benefits-Costs**

There is no known estimate of the benefits and costs of the standard compared with no standard versus voluntary or mandatory standards.

### FOR FURTHER INFORMATION

Safety Footwear (Z195)

### Technical Committee Chairman:

Mr. R.A. Norman Industrial Safety Equipment Co. Ltd. 5895 Ambler Drive Mississauga, Ontario L4W 2N7

### Other Contact:

Mr. Bob Litster Manager, Research Construction Safety Association of Ontario 74 Victoria Street Toronto, Ontario (416) 366-1501

### CSA Group Manager:

John Watson (416) 744-4102

Technical Committee List (Attached)

Standards Steering Committee Chairman:

Mr. R.W.A. Yeates Director, Buildings Standards Branch Department of Labour P.O. Box 6000 Fredericton, N.B. E3B 5H1

### COMMITTEE ON SAFETY FOOTWEAR

R.A. Norman <u>(CHAIRMAN)</u> Industrial Safety Equipment Co. Ltd. 5895 Ambler Drive Mississauga, Ontario L4W 2N4

A. Aleven President Terra Nova Shoes Ltd. Water Street P.O. Box 250 Harbour Grace, Newfoundland

D. Aleven (ALTERNATE MEMBER) Terra Nova Footwear Ltd. P.O. Box 436 Markdale, Ontario NOC 1H0

W.H. Bechtel Production & Technical Superintendent Kaufman Footwear Industries Ltd. Kitchener, Ontario N2G 1C3

F. Bell Ontario Hydro 5760 Yonge Street Willowdale, Ontario M2M 3T7

W. Brown Deputy Fire Chief Corporation of the City of Cambridge 1625 Bishop Street Cambridge, Ontario N1R 554

G. Campbell
Electric Utilities Safety Association of Ontario
81 Kelfield Street, Unit 1
Rexdale, Ontario
M9W 5A3

Mr. R. Hawthorn Industrial Accident Prevention Assoc. 2 Bloor Street, East Toronto, Ontario M4W 3C2 A. Gillespie Safety Supply Company 214 King Street, East Toronto, Ontario M5A 1J8

B.E. Gray (ASSOCIATE MEMBER) Consulting Engineering Service 7701 Forsyth Boulevard St. Louis, Missouri 63105 U.S.A.

D. Grenville Texasgulf Canada Limited Timmins, Ontario

J. Harrower International Association of Bridge, Structural & Ornamental Ironworkers Ironworkers Union, Local 700 523 First Avenue London, Ontario N5V 1Z4

P. Hang Engineering Superientedent Workers' Compensation Board Accident Prevention Department 5255 Heather Street Vancouver, British Columbia V5Z 3L8

W. Jamieson The Steel Co. of Canada Ltd. Hilton Works Hamilton, Ontario L8N 3T1

C. Jose Senior Engineer, Safety Mines, Accident Prevention of Ontario 290 Second Avenue, West North Bay, Ontario P1B 3K0

R. Litster Construction Safegy Association of Ontario 74 Victoria Street Toronto, Ontario M5C 2A5 E. Loevenmark Canadian Standards Association

Dr. E.J. Macfarlane The Workmen's Compensation Board 2 Bloor Street, East Toronto, Ontario M4W 3C3

F. McFarlane Greb Shoes Limited 51 Ardelt Avenue Kitchener, Ontario N2C 2E1

E. Mitchell Research Co-ordinator Ministry of Labour Mining Health & Safety Branch 10th Floor, 400 University Avenue Toronto, Ontario M7A 1T7

L. Oliver Simpson-Sears Limited Dept. 667, 7th Floor 222 Jarvis Street Toronto, Ontario M5B 2E1

W. Pipe Ellis-Don Limited 2045 Oxford Street Box 5093, Terminal 'A' London, Ontario N6A 4M6

D. Popplewell Manager Satra North America c/o Ontario Research Foundation Sheridan Park Mississauga, Ontario L5K 1B3

V.J. Pedulla Willo H.H. Brown Shoe Co. (Canada) Ltd.M2M 6C3 Richmond, Quebec J0B 2H0

W. Rees (ALTERNATE MEMBER) Instructor, Education
Construction Safety Association of Ontario
74 Victoria Street
Toronto, Ontario
M5C 2A5

J. Reid (ASSOCIATE MEMBER) Canada West Shoe Company 1673 Vaughan Drive Caledon, Ontario LON 1C0

J.G. Rickaby Safety Engineer Safety Department INCO Limited Copper Cliff, Ontario POM 1N0

T. Rowe Sisman's of Canada Box 490 Aurora, Ontario L4G 3L6

A.V. Shipman Alec V. Shipman of Canada Ltd. P.O. Box 32, Station 'S' Toronto, Ontario M5M 4L6

M. Svacina General Manager Emille Shoes Limited 2394 Fairview Avenue Burlington, Ontario L7R 2E4

C. Weaver Safety Consultant Regional Safety Office Canada Dept. of Labour 4900 Yonge Street Willowdale, Ontario

### CSA STANDARD Z262.1-1975

### HOCKEY HELMETS

Canadian Amateur Hockey Association (CAHA) requested the development of this Standard in 1969. CAHA were concerned about the number of head injuries, some resulting in death, experienced by young amateur hockey players. CAHA considered that the preparation of a nationally recognized consensus Standard on hockey helmets, backed up by a program of testing and certification to the standard, would afford reasonable protection for these players and reduce injuries. CAHA had previously made it mandatory that all players in CAHA league games wear hockey helmets. CAHA therefore considered that the <u>mandatory</u> use of helmets certified to a recognized National Standard would further strengthen their hand in requiring all players to wear helmets. CAHA had available <u>some</u> accident statistics to support their contention that a Standard was needed during the formative stages of the Standard.

A survey of known interests was conducted. The survey included manufacturers of helmets and twenty-four other organizations in the user, regulatory authority and general interests categories. There was strong support from all these sectors and agreement to participate in Standards development.

### Decision to Begin the Standard

Principal beneficiaries of the Standard were to be the young amateur hockey players who would be required to wear, during league games, helmets certified to the Standard. Therefore, it was considered from the start that the Standard should be suited for certification and that CSA would offer a certification program. Following promulgation of the Standard, CAHA ruled that all players in CAHA league games must wear CSA certified hockey helmets. Later, a change in the Hazardous Products Act promulgated by the federal Department of Consumer and Corporate Affairs made it illegal to sell or offer for sale, in Canada, a hockey helmet that did not conform to this Standard.

During the development of the Standard, it was considered essential that some medical research to be carried out, particularly with respect to the tolerance of the human head to impact. Testing of a research nature was therefore carried out before making final decisions as to test requirements and procedures to be used in the Standard. Some delays were experienced due to difficulties in soliciting the required research funds (approximately \$4,000.).

#### Process for Developing the Standard

The standards Committee has evolved with many changes in composition and membership, and currently provides for four producers, two retailers, eight consumers and four general interests. The consumers include representatives of hockey and lacrosse players and coaches, and general interests members include representatives of the Canadian Medical Association and universities that have programs in sports medicine. In formulating the standard, the committee was able to draw on some of the technical and field experiences gained by other committees preparing standards for industrial protective headwear and motorcycle helmets. The committee needed and obtained other information through special research programs.

The standard is a general consensus standard published by CSA; it is not a National Standard of Canada. There is no known relationship to any ISO standard or to standards in other countries. Canada is in an unique position in this particular subject area because of its strong national involvement with hockey.

#### Implementation and Usage

Lead time for manufacturers to implement changes in order to conform to either new or revised editions of the standard was usually one year. Time may vary depending upon difficulties the industry may have with such problems as product redesign, market demand and replenishing the "retail pipeline". Producers, users and importers are all affected by implementation of this standard. All producers who wish to sell, or offer for sale, hockey helmets in Canada must conform to the standard and these products must be certified by CSA. Control is mandated by the Hazardous Products Act promulgated by the federal Department of Consumer and Corporate Affairs, and by the ruling of the CAHA. What percentage of total world production or potential users is affected by this ruling is unknown.

Total staff development costs since inception are approximately \$17,275. Reference "this cost does not include volunteers"). An estimate of the cost of any external studies is not known. It is doubted that any committee member has ever kept account of the cost of his participation such as time, travel, or out-of-pocket expenses, during travel to committee meetings. No costs to producers to comply were collected.

Mandatory use of certified helmets by amateur hockey players seems justified by reported decreases in the number of head injuries to those players (i.e., the Amateur Hockey Association in B.C.) although no accurate figures are available. There is no estimate of any decrease in accident or injury costs. From the manufacturers' point of view, there is no estimate as to whether or not enforced compliance to the standard has resulted in any decrease or increase in production costs as compared to the costs they would have incurred had there been no standard or a different standard. The following is a list of members of the Technical and Subcommittees -

CSA TECHNICAL COMMITTEE ON PROTECTIVE EQUIPMENT FOR HOCKEY AND LACROSSE PLAYERS

Dr. T.J. Pashby (CHAIRMAN) One Medical Place 20 Wynford Drive Don Mills, Ontario M3C 1J4

Dr. P.J. Bishop Assistant Professor University of Waterloo Dept. of Kinesiology Waterloo, Ontario N2L 3G1

D.A. Diederich President Northanland Group, Inc. 124 Columbia Court Chaska, Minnesota U.S.A. 55318

P.M. Donnelly Hudson's Bay Company 2 loor Street, East Toronto, Ontairo M4W 3H7

G.G. Emmerson General Manager St. Lawrence Steel & Wire Co. Ltd. 81 Mill Street Gananoque, Ontario K7G 2L5

G. Hannah Maple Leaf Gardens 60 Carlton Street Toronto, Ontario M5B 1L1

Dr. E.F. Hoerner (ASSOCIATE 70 Rykert Cres. MEMBER) Chairman Ahaus Safety & Protection EquipmentToronto, Ontario M4G 2S9 Committee 168 Frankline Street Braintree, Massachusetts 2008 Bathurst Street U.S.A. 02184

D. Jenkins Cooper Canada Limited 501 Alliance Avenue Toronto, Ontario M6N 2J3

E. Loevenmark Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario M9W 1R3

Dr. W. Morrison University of Ottawa Dept. of Kinanthropology Facultyof Health Services Ottawa, Ontario K1N 6N5

R. W. Oliver Executive Director Canadian Lacrosse Association 333 River Road Vanier City, Ontario K1L 8B9

T. Parker 3 Norby Cres. Weston, Ontario M9P 1L7

G. Parsons Vice-President Canada Cycle and Motor Co. Ltd. Market Development 2015 Lawrence Avenue, West Weston, Ontario M9N 1H6

Dr. R.C. Pashby (ALTERNATE MEMBER)

Dr. F. Pulver (ALTERNATE MEMBER) Toronto, Ontario M5P 3K6

A. Watkins 563 Arndon Avenue Peterborough, Ontario K9J 4A9

Dr. A. Wood 1533 Randor Drive Mississauga, Ontario L5J 3C6

For additional information, please contact the Chairman, Dr. T.J. Pashby, r. J. Black, Department of Consumer and Corporate Affairs, Ottawa, or the Secretary of the Committee, Mr. J.B. Watson, Canadian Standards Association.

### CSA STANDARD Z262.2-M78

### FACE PROTECTORS FOR ICE HOCKEY AND BOX LACROSSE PLAYERS

### Request for the Standard

The Canadian Amateur Hockey Association (CAHA) requested the development of this Standard in 1973. The CSA Technical Committee on Protective Equipment for Hockey and Lacrosse Players began discussions on this Standard during the final stages of developing CSA Standard Z262.1-1975, Hockey Helmets. It was recognized that protection for the eyes and teeth of amateur hockey players was needed as much as protection for their heads. The production of the new Standard was considered to be a natural extension of the work of the committee that produced the head protection Standard (Z262.1).

All groups of interests represented on the Technical Committee on Protective Equipment for Hockey and Lacrosse Players and the Steering Committee on Sports and Recreational Equipment to whom the Technical Committee reports, supported the development of this new Standard as a natural extension of their work. Since both groups were considered quite representative of the major interests, there was no survey on the need for and practicability of the new standard beyond these groups.

### Decision to Begin the Standard

Principal beneficiaries of the Standard were considered to be young amateur hockey forwards and defencemen who would be required to wear certified eye and teeth protectors as well as certified helmets during league games. It was considered from the start that the Standard would be of the certification type and that CSA would offer a certification program. CAHA subsequently ruled that all forwards and defencemen playing in league games must wear CSA certified eye and teeth protectors. The Committee also recognized that the Standard could not hope to eliminate occasional injury to other parts of the face; therefore, they did not originally address the problem of face protection per se. In addition, the original Standard did not cover goaltenders' masks.

The Committee felt that the Standard should initially be published as a preliminary Standard, since further investigation of test methods and some field experience were necessary to substantiate the requirements that had been established.

### Process for Developing the Standard

The development process was similar to that of CSA Standard Z262.1-1975.

### FOR FURTHER INFORMATION

Hockey Helmets & Face Masks (Z262.1 & .2)

### Technical Committee Chairman:

Dr. T.J. Pashby One Medical Place 20 Wynford Drive Don Mills, Ontario M3C 1J4

Other Contact:

Mr. Tom Lawson Canadian Amateur Hockey Association 333 River Road Vanier, Ontario K1L 8B9 (613) 746-0238

CSA Group Manager:

John Watson (416) 744-4102

Technical Committee List (Attached)

Standards Steering Committee Chairman:

None

### MANUFACTURE, CONTROL AND DISTRIBUTION OF DRUGS

### CANADIAN GOVERNMENT SPECIFICATIONS BOARD: CGSB STANDARD 74-GP-1

### Formulation of Standard

Serious problems experienced by the Department of National Defence (DND) in the procurement of drugs of reliable quality led to a proposal by the department in 1960 for the development of a listing of acceptable suppliers as the basis for future purchasing. (Appendix A) This proposal was discussed with the Department of National Health and Welfare whose Food and Drug Directorate was engaged in the inspection and evaluation of drug suppliers in Canada. It was agreed to establish a listing program based on the Food and Drug inspection system and supported by a Standard that would set out criteria for the manufacture, control and distribution of drugs. The CGSB was requested in September 1970 to develop the Standard. A representative committee of federal departments, producers and testing laboratories met in April 1961, considered the need for a Standard in the light of information presented by DND, and decided unanimously to proceed with the project. There was no indication of other available Standards on the subject. The committee began its work with a first draft Standard prepared by Health and Welfare, with the objective of establishing criteria for good manufacturing practices for drugs.

Since the primary purpose of the Standard was to serve as the basis for evaluation and selection of acceptable suppliers of drugs to the federal government, the main expected beneficiaries, in terms of a more reliable supply of drug products, were the affected federal departments (National Defence, Veterans Affairs). Secondary beneficiaries, however, were the consuming public and other large institutional and provincial buyers, since it was recognized that implementation of the evaluation and listing program should inevitably have a beneficial effect on drug supply in general.

Although no specific formal studies were carried out for data generation, useful, relevant information was available from committee participants such as DND (see Appendix A) and Health and Welfare, based on their experience in drug usage and inspection, the need for the Standard, and details of the criteria to be covered by the Standard. It was recognized that the Standard might increase costs to the users due to stricter controls on procedures.

The format for development of the Standard was that of the normal committee-consensus method. The Standards committee membership began as largely representative of the major affected federal departments and the Canadian suppliers, and has developed through the intervening years to the present listing which embraces a broader, national representation that includes the provinces and consumer interests. The qualifications of members cover a broad range, but membership includes medical doctors, pharmacists, purchasing

specialists, and laboratory personnel. There is no indication of consultation with other Standards organizations since there were no known other Standards on the subject. Useful reference was made, however, to Regulations of the U.S. Food and Drug Administration, entitled Drugs; Current Good Manufacturing Practice in Manufacture, Processing, Packing or Holding. No Standards for drug <u>composition</u> are developed in Canada. Almost all of the Standards are drawn from the U.S. or British Pharmacopeias. Where no Standard exists for a drug, the manufacturer writes his own Standard. This Standard must be forwarded to Health & Welfare, but does not seem to be scrutinized by any formal authority unless a problem arises.

The first issue of the Standard was promulgated in September 1961, as a voluntary Standard, after having been accepted in a letterballot vote of the Standards committee, with no record of unresolved problems and no negative votes. It was published as a regular CGSB Standard under the designation 74-GP-1.

#### Implementation and Usage

The existence and availability of the new Standard were made known through the membership of the standards committee and by way of distribution of copies to the national mailing list maintained by CGSB. Implementation of the Standard for federal procurement purposes began within about one year, with the establishment in January 1963 of a Canadian Government Advisory Board on Drug This Board comprised representation from five major Procurement. federal departments and was charged with the task of: (1) establishing and maintaining a list of drug suppliers deemed to be in conformity with the Standard; (2) distributing the list both with and outside the federal government to make the benefits of the list available to a broad range of users; and (3) requesting later modifications to the standard as deemed appropriate by experience gained in the program. Conformity to the Standard was determined through facility inspections carried out by the Food and Drug Directorate of National Health and Welfare, Such inspections were carried out on an annual, unannounced basis through visits to each of the firms wishing to participate in the program. An indication of the extent of participation is given by the fact that the Directory of Complying Firms for April 1972 lists about 100 firms judged to be in compliance with the Standard.

In 1974, the operations of the Advisory Board were terminated in favour of the Quality Assessment of Drugs (QUAD) program of National Health and Welfare. This program, launched in 1971, had developed to include a facilities inspection arrangement of the same nature as that carried out for the Advisory Board. The results of its endeavours appear in the form of technical evaluation reports based on inspections according to 74-GP-1, that are made available to, and are used by, all federal and provincial authorities. A QUAD/Provinces Liaison by Committee meets regularly to discuss and exchange information on the program and its results. As a consequence of the federal-provincial coverage of this program, its influence in the drug supply operations in the country is powerful. It is safe to say that virtually all users and purchasers, producers and importers are subject to the program and therefore to the provisions of the standard. In 1978, 50,000 tests of 2,000 items uncovered 35 "problems", half in labelling and half with the actual contents.

Standard 74-GP-1 has been subjected to many changes since its first issue in 1961. It is now in its sixth issue and a seventh version is now in preparation by the Standards committee. Changes to the Standard are developed by exactly the same means and procedures as those followed in production of the initial issue, as outlined earlier.

#### Cost Benefit Analysis

The possibility of identifying and assigning reliable total relevant costs of development and implementation of the Standard, in terms of the programs that it has supported and continues to support, is so remote as to render such an exercise in estimation virtually meaningless. The exercise of quantitative cost-benefit analysis has been attempted on many occasions by many Standards organizations and users as a means of offering justification for the costs of Standards development, but these attempts almost inevitably flounder or tender misleading information, because of the virtual impossibility of acquiring reliable, comparable "before and after" statistical data. It is considered more forthright and useful to address the question in terms of general qualitative considerations that reflect the inherent advantages of the voluntary Standards approach to problem-solving.

It is axiomatic that Standards that represent the joint views of the general community of interest will enjoy the respect of that community and will have the best possible chance of wide acceptance in use. In the particular case of Standard 74-GP-1, the viewpoint of the pharmaceutical industry is revealing. This industry, as represented by the Proprietary Association of Canada, the Pharmaceutical Manufacturers Association of Canada, and L'Association des Fabricants du Quebec de Produits Pharmaceutiques, has expressed its satisfaction with the record of 74-GP-1 as a practical, effective instrument for ensuring quality control in the manufacture and distribution of drugs. Evaluation programs based on the Standard have impinged on practically all of the manufacturers, distributors, and packagers of drugs in the country and have resulted in a general facility upgrading such that virtually all are now in compliance with the Standard. In quantitative terms, it was reported by the Food and Drug Directorate that, of 135 inspections carried out in fiscal year 1978-79, only one company was found not to be in conformity. The industry has made clear as well its appreciation of the opportunity provided by the consensus process for cooperative participation and commitment by all interests in development and maintenance of the Standard, as opposed to the adversary approach that is usually characteristic of the regulatory process. The major complaints of industry or inspections were: the inspectors are too demanding; they didn't like comments by inspectors while on the plant site; there are inconsistencies between the regulations and the standards and changing technology.

Dr. Leclerc-Chevalier, Director, Plant Inspection, Health & Welfare Canada, stated that these inspections have eliminated the "poor" companies in the drug industry. Whether they have improved or dropped out is unclear.

In mid-1979, Health & Welfare Canada began a review of its use of the Standard and the Standard itself. The Department had used the Standard to guide its officers in plant inspections, but the Standard was neither referenced in the regulations nor written into them. Lawyers within the Department felt that this situation was unsatisfactory and that a Standard, but not necessarily the CGSB Standard, should be written into the regulations. Since there have been some complaints regarding the CGSB Standard, as of early 1980, an Advisory Committee has been formed to provide technical information regarding the specifications of the Standard.

### ANNEX A

### PROPOSAL TO THE MINISTERS OF NATIONAL HEALTH AUG. 9, 1960 AND WELFARE AND NATIONAL DEFENCE CONCERNING POLICY FOR PROCUREMENT OF CERTAIN MEDICAL SUPPLIES

### 1. Proposal

1.1 It is proposed that certain medical and pharmaceutical supplies for DND should be purchased not on the basis of open tenders but from a restricted list of suppliers, namely those judged by competent authority to be capable of supplying the necessary quality and quantity for the special needs of the Department. Details as to the proposal, the products involved and the procedure to be observed are given below.

#### 2. Products Concerned

2.1 This proposal applies to pharmaceutical products in general, that is, compounds, syrups, elixirs, solutions, ointments, pastes and powder mixes, tablets and capsules, with or without special functional containers such as applicators, needles, atomizers, tubes, etc.

2.1.1 Pure chemicals in bulk form are generally not to be included.

### 3. Inspection Methods in DND

3.1 In this field of materials all submitted production lots are sampled by Inspection Services representatives and subjected to laboratory test and physical examination, both the materials themselves and their containers and packaging. When all is found in order in accordance with the contract, Inspection Services representatives release for shipment and sign appropriate documents for notice to the consignee and to the paying authorities. The basis of inspection is the contract drawn by DDP, which usually refers to a specification or purchase description prepared by DND technical officers. Since the contracts are awarded to suppliers submitting the lowest tenders, inspection before release is very important, and specifications must be so drawn as to enable inspectors to reject material which will be unsatisfactory in use.

#### 4. Problems of Drug Purchasing

4.1 Difficulty of preparing specifications which cover all aspects of quality and workmanship with sufficient legal force to support the decisions of inspection. There are elements of quality which can only be assured by the skill and integrity of the manufacturer.

4.2 Difficulty of devising analytical and test procedures which will be conclusive as to the identity and purity of highly complex

chemical substances, especially after these have been compounded with a variety of other substances. It is well known that minor differences in the inner structure of many chemical substances are distinguished only by elaborate analytical researches, yet may be highly critical in clinical use.

4.3 Difficulty of assessing stability and storage life of materials in the short time allowable for inspection.

4.4 High cost of the type of inspection needed to ensure uniformity in large quantities of such products.

4.5 Successful tenderers often prove to be firms or individuals who have no real knowledge of the costs or the technology of the operation they propose to carry out, and no real assurance that they can perform within the required time. Often such firms accept contracts with full knowledge that they cannot complete them exactly as written but with the hope that they may persuade the Department to relax some of the conditions after the contract is accepted.

4.5.1 Appendix A contains an outline of experience in some 221 contracts (8 Contract Demands chosen at random from 15) during the fiscal year 1959-60, showing the number of rejections, contract terminations, delays in delivery and complaints from users. Previous years show similar features with various defaulting firms moving in and out of the picture. It is clear that there is a class of supplier who is prepared to experiment with unfamiliar production at the expense and at the risk of DND, which Department has been providing at no charge a valuable control and development service which a supplier should properly provide for himself.

4.5.2 It might be argued that this problem could be solved by striking off the tender lists those with this type of history. This course would not prevent these or other yet unfamiliar suppliers from undertaking at least one contract without appropriate ability and with all the risks which have been described.

4.6 Many products are imported from abroad, for which production and control cannot be verified. It is known that even products of some well-known and highly regarded foreign manufacturers have contained admixtures of low quality material or material accompanied by no verification of quality. Only where the importer has full analytical control and uses it continuously can safety be assured.

### 5. Critical Nature of Problem

5.1 The products concerned are purchased for issue to the following:

5.1.2 Civil Defence stockpiles.

5.1.3 Other Canadian Government agencies.

5.1.4 Foreign emergency authorities.

5.2 Special DND conditions of use:

5.2.1 Long-term storage.

5.2.2 Shipment to remote places, hence replacement difficult, and in extreme climatic conditions.

5.2.3 Necessary use by untrained people and in emergency conditions.

5.3 On many occasions, due either to delays in delivery or unsatisfactory material (from above-described causes) it becomes necessary for users to purchase their supplementary needs in the public market at highest cost.

5.4 The quality of the products and their adaptability to the Department's conditions of shipping, storage and use are vital considerations on which depend illness, injury or death for a large number of people. It is not too much to suppose that some pharmaceuticals might at some time produce disastrous effects among these users because of some departure from identity or quality which could not readily be detected in the routines of inspection.

5.5 Concentration of effective ingredients in many modern drugs is critical because it determines dosage.

5.6 It is known that all the defects herein described are encountered in drug purchasing by the Department of Veterans Affairs and the Department of National Health and Welfare, and the present proposal should be of practical interest to those Departments.

### 6. The Details of the Proposal

6.1 The Food and Drug Directorate of the Department of National Health and Welfare has for some years been conducting a continuing inspection of all pharmaceutical suppliers in Canada, including basic manufacturers, compounders, repackers, rebranders and importers, by means of examination of the establishment of each and periodic analysis of its products. Each supplier has been rated on a scale of proficiency, the rating based on quality (but not size) of the firm's facilities and accommodation, staff and qualifications, management of production, control methods, housekeeping and attitude towards government standards and policy. The rating is revised annually, with further regard to the results of analysis of products. The firms are, as far as possible, afforded the results of analysis of products. The firms are, as far as possible, afforded advice and assistance as to reasons for low ratings and means of improvement.

6.2 It is proposed that DND purchases should be limited to those suppliers who have been rated with a figure 1 to 3 by the Food and Drug Directorate.

#### 6.3 Procedure

6.3.1 When DDP is about to issue invitations to tender respecting any DND purchases of the affected items, that Department will receive, on request, from the Food and Drug Directorate a list of those suppliers currently enjoying the appropriate ratings. Only these will be asked to tender.

6.3.2 When the successful bidder submits his product it will be inspected by DND in the normal manner (with laboratory tests as applicable). Acceptance or rejection will continue to be the prerogative of the inspecting agency.

6.3.3 DND experience as to defects in quality or performance of any aspect of a contract will be communicated to the Food and Drug Directorate for the latter to file with its own data for use as it sees fit in revising its ratings of the firms concerned.

6.3.4 DDP will continue to revise its own tender lists on the basis of this experience in addition to its procedure for consulting the Food and Drug Directorate.

#### 7. Possible Objections

7.1 That nothing should be permitted to violate the principle of open tender for government purchases.

7.1.1 While this principle is generally recognized as sound, the following violations of it have already been permitted:

7.1.2 Use of qualified products lists. This is done in such areas as paints, petroleum products and some others. It permits evaluation of a product by long and elaborate tests which cannot be undertaken at time of procurement. Once evaluation is completed and the product "qualified", regular purchases are subjected to normal inspection provided the manufacturer certifies he has made no change in the product.

7.1.3 Poor record of performance. Where a firm has been shown by experience with supply contracts or by an inspection of its establishment to be incapable of performing satisfactorily on a supply contract, it has in many cases been deleted from the source list for tendering purposes. This is acceptable on the ground that the firm could not produce satisfactorily or in sufficient quantity to meet the time schedule required by the user, or to keep inspection costs to a reasonable minimum. As an instance of the latter difficulty, a paint manufacturer capable of producing paint in no greater quantities than 50 gallons at a time should not undertake a contract for 10,000 gallons, since 200 inspections would be required.

7.2 If the public may still buy products of any pharmaceutical supplier in Canada, the same sources should be satisfactory to DND.

7.2.1 This suggests that the Department of National Health and Welfare should compel firms to cease operations if their standards are not good enough for the public or for DND. This is not necessarily true. Public purchasing and DND purchasing differs in the following respects:

7.2.2 DND purchases in large quantities a wide range of products which may be stored for long periods in extreme conditions, shipped great distances and used in emergency situations without benefit of professional supervision.

7.2.3 DND cannot request the choice of a preferred brand or make of material, whereas the private consumer has full choice among all brands available.

7.2.4 Many DND purchases concern items not chosen normally by private consumers but by physicians on prescriptions. In the Armed Forces the medical officer does not have this choice but must use the materials found in the military stores. Where these officers are dissatisfied with a branded article found in stores, or when stocks are unduly depleted because of slow deliveries, they purchase supplementary amounts of chosen brands at the much higher public prices.

7.3 Governments should not be permitted to restrict the operation of private business.

7.3.1 That this is not a true principle is exemplified by the restrictions placed on plants manufacturing dairy products, meat and other food items. In particular the production of milk is controlled so that limitation is placed on the outlets for the product of establishments which do not meet certain standards.

7.4 If a restricted source list must be observed for these products it should be a "qualified products list" rather than an "approved firms list".

7.4.1 In the field of paint and some other commodities this is an acceptable objection. In pharmaceuticals the number and variety of both firms and products is so great and the appearance of newly developed products is so frequent that it would not be possible or practical for a qualifying authority to keep abreast of the need. Furthermore, the existing inspection system operated by the Food and Drug Directorate takes into account all the many aspects of a supplier's operation which relate to his ability to supply satisfactory products. That Directorate is the most competent in government to perform this function. A similar or modified effort on the part of DND would be an unnecessary and less satisfactory duplication.

7.5 A principle observed in the qualification procedures of DND is that manufacturers must be made aware of all the conditions entailed in obtaining qualified status. Is this principle observed in the Food and Drug rating list?

7.5.1 The manner in which inspection of drug suppliers is conducted is made plain to those under inspection, and the inspectors are prepared to assist these firms to improve their ratings. There is no mysterious or secret requirement entering into the rating.

7.6 The proposal would give the advantage in DND purchases to the large organizations.

7.6.1 The Food and Drug Directorate has no equation in its inspection for size of establishment. It is not even necessary that the supplier should himself be the possessor of a laboratory or other control facilities as long as these are available to him and are adequately used. He is not rated on his production or storage capacity, the size of his staff, his capital value or his general reputation.

7.7 On what ground is it proposed that purchases for DND should be made only from those rated 1 to 3 on the list?

7.7.1 Generally speaking the record of experience is good for firms within the bracket proposed. For the other firms the number of rejections, cancellations, delays and complaints has been substantially greater.

7.8 Could not the problem be solved by asking DDP to strike off tender list firms giving poor results?

7.8.1 This would be less fair to all than the proposal. Also other unsuitable tenderers would appear, and the hazards would recur with each new contractor until he has proven trustworthy or not.

#### 8. Limitations of the Proposed Procedure

8.1 It is recognized that the implementation of this proposal will not solve all the existing problems in purchasing these materials. Experience has shown that even some of the best-rated firms are capable of errors in production, control, cleanliness, scheduling and other aspects of performance on a contract. 8.2 It is true that the highest-rated firms may sometimes import materials from abroad, subject to the hazards described above. It is also possible that this proposal will increase the cost of pharmaceutical preparations to the Department. It is further possible that a well-established firm with excellent technological background may undertake the production of some item new to itself with unsatisfactory results.

8.3 While the above hazards are fully recognized, it is firmly believed that the probability of such difficulties will be drastically lowered by the adoption of this proposal. If costs are increased it is believed that the additional expense will be compensated by a reduction in the administrative work necessitated by rejections, delays, adjustments and complaints, as well as by the greater satisfaction and effectiveness of the materials purchased. In addition, it is believed that the reputation of Government is at stake when it is permissible for any individual, regardless of how inadequate his means, how fragmentary his knowledge, or how honourable his intentions, to attempt to produce on Government contract materials of this critical nature.

# RECORD OF FIRMS' PERFORMANCE CONTRACTS FOR MEDICAL ITEMS FISCAL YEAR 1959-60

	Late Sub-				Contract
Firms	missions	Rejections	Terminations	Complaints	Items
Abbott Labs. Ltd.	1				7
American Hospital Supply Cor	p				1
Anachemia Chemicals Ltd.	3				2
Ayerst, McKenna & Harrison	Ltd.				1
Baxter Laboratories					5
Bell-Craig Ltd.	6	2	2	2	22
Bristol Labs. of Canada	1	H-	2	L	1
British Drug Houses					1
Burroughs Wellcome & Co.					5
W.J. Bush & Co.	1				1
Ciba Co. Ltd.					1
Colgate-Palmolive Co.					4
Cyanamid of Canada Ltd.					5
Dominion Pharmacal Co.	4		4		Л
Eli Lilly & Co.					2
Elliott-Marion Co. Ltd.					1
Fine Chemicals Ltd.					2
Geigy Pharmaceuticals					1
Gilbert & Co.	16	8	7	4	29
Glaxo-Allenburys					3
W.R. Grace					1
J.F. Hartz Co.					1
Hoffman-Laroche Ltd.					4
F.W. Horner Ltd.					1
H.S. Hunnisett Ltd.	1				1
Ingram & Bell	1				1
Intra Medical Products	1				4
Johnson & Johnson					1
Laurentian Agencies					1
Laurentian Laboratories					3
Lehn & Fink					1
Lymans Ltd.	1				2

Firms	Late Sub- missions	Rejections	Terminations	Complaints	Contract Items
Mallinckrodt Chemicals					1
May & Baker					1
Earl E. Maynard	1				5
Merck & Co.	2				6
Merck, Sharp & Dohme					2
Wm. S. Merrell					1
T. Milburn & Co.	2		1	1	13
Mowatt & Moore					5
Nadeau Laboratories	1				24
Parke, Davis & Co.	1			1	3
Pfizer (Canada) Ltd.					1
Pitman-Moore					2
Prescott & Co. Reg.					1
Professional Sales	1				2
R.P. Scherer Ltd.					5
Schering Corp.	1				2
G.D. Searle & Co.					1
Smith, Kline & French					4
Wm. Sofin & Co.					1
J. Stevens & Son					1
Taylor Soap					1
Upjohn Co.					2
K.H. Wampole					1
West Chemical Products					1
White Laboratories	1				2
White Oak Pharmaceuticals	1				2
Winley-Morris Co.	1				2
Winthrop Laboratories	1				2
John Wyeth & Bro.					1

.....

### APPENDIX B

### THE INDUSTRIAL STANDARDS SYSTEM IN JAPAN

A short analysis and description of the Japanese Standards System (JSS) is useful for the purposes of this study for two reasons: 1) the goals of the system differ in several respects from those in other countries including Canada; 2) the administration of the standards system also differs from that in most other countries. The costs and benefits of the Japanese system can serve to highlight and contrast the goals and administrative mechanisms of the Canadian system and, perhaps, show how it might be improved by adopting some of the features of the Japanese Standards System.

The Japanese Standards System has historically had four interrelated goals: 1) to increase the efficiency and technological progress of Japanese industry via interchangeability and rationalization, simplification, and upgrading of products and processes; 2) quality control; 3) protection of the domestic market from imports and both export promotion and the prevention of destructive competition between Japanese exporters of similar products; 4) protection of the health and safety of workers and consumers, environmental protection, and materials and energy economy. The emphasis on these four goals has changed over time. The first three objectives of the JSS are a consequence of Japan's internal and external economic environment as Japan has developed into a major industrialized country. In order for Japan to industrialize and compete on the world market it had to modernize its often small, inefficient, industrial establishments that produced goods without a domestic natural resource Since the beginning of this century, in order to compete and base. progress from its initial low level of development, the Japanese government has actively promoted rationalization of production between establishments, simplification of the variety of products within one product group and interchangeability and compatibility of products. This strategy enabled Japanese firms to achieve the efficiency of economies of the scale of high volume even though they have often remained small at the establishment level compared to their competitors abroad. The government used the JSS as a major tool to achieve these goals. Until recently, Japan has been dependent on imported technology for advances in product and process technology. It has needed a comprehensive standards system so that its industrial processes and products would be compatible with those in other more industrialized countries in order to facilitate the transfer of technology from other more industrialized countries to Japan.

The second thrust of the JSS toward standards was to insure high quality output. It arose out of Japan's drive for manufactured exports during the pre-and post-war years. Initially, Japan exported lowquality, labour-intensive, inexpensive manufactured products. Japanese firms competed with each other on world markets with unbranded, cheap, but often shoddy merchandise. "Made in Japan" became an international symbol for low-quality goods. After the war, economic planners in Japan realized that this image abroad and the often severe price competition between Japanese firms in overseas markets (which the government has labelled "dumping" or "excessive competition") was not in Japan's best interests. Japan realized that a quality for Japanese products was a "public good" that benefited Japanese producers in all industries. Export inspection which had been instituted during the 1920s and 1930s for a few products (braid, soap, canned foods, matches, glass products, enamelled ironware, knitwear, celluloid goods, pencils, and cotton, silk, woollen, and rayon fabrics) was expanded and tightened in the late 1940s and 1950s. Initially, inspection was by private organizations, but, finally, under the Export Inspection Act of 1957, the government took control either directly or through government designated, independent public inspection corporations. This last act was instituted as the direct result of a rapid growth of Japan's export trade and fierce competition between Japanese exporters which led to falling prices for exports, degradation of quality and increased output of cheap and inferior goods. (See Japanese Standards Association, 1978, p.4.) The Export Inspection System served two purposes: it ensured that goods exported from Japan met rigid quality standards and it was used as a coordination and control mechanism

to reduce competition among Japanese firms, especially if that competition led to price competition and quality debasement. The Japanese government realized that, as with standards for rationalization, interchangeability and compatibility, quality standards represent a "public good" and that since private firms had <u>not</u> developed the optimal level and scope of standards, external government intervention was necessary.

The third thrust of the JSS was to protect the domestic market from imports, i.e., the JSS has served as a powerful non-tariff barrier (NTB) to trade. This goal is not explicitly stated in the official literature on the JSS, but is implicit in the system. The major mechanism for using standards as a NTB was the Japanese Industrial Standard (JIS). The Industrial Standardization Law, Article 26 states:

Whenever the State or any local public body intends to decide on technical standards with respect to the mineral and manufacturing industry or on specifications of mineral or industrial products to be purchased or in carrying out other business in connection with the determination of certain standards set forth in each item of Article 2 shall carry them out by having respect for the Japanese Industrial Standards. (Emphasis added.)

In practice this article required all levels of the Japanese government to purchase goods that conformed to the JIS standard and carried the JIS mark if such goods were available. Only goods produced in Japan, however, could be certified to conform to a JIS standard and carry the JIS mark. Even goods produced by Japanese-owned firms in their overseas subsidiaries could not bear the JIS mark. In this way the government has been prevented by law from purchasing foreignproduced goods if equivalent Japanese products were available and carried the JIS mark. The JIS have been set and administered through the Japanese Industrial Standards Committee which is directly affiliated with the Ministry of International Trade and Industry through the Standards Department of the Agency of Industrial Science and Technology. (Japanese Agricultural Standards administered by the Ministry of Agriculture, Forestry, and Fisheries cover agricultural, fishery, and forest products.)

The role of the Japanese Standards Association, a non-profit organization, is to propogate the JIS standards and increase public awareness of the JIS mark. It does not write standards, test products to standard, or certify products to standard. According to polls of the public, there is a very high recognition and acceptance of the JIS mark by Japanese consumers.<sup>1</sup> Even when a product could potentially have been sold without the JIS mark to private consumers, products without the mark have faced consumer resistance and distributors would not stock them. In 1978 there were 7,744 JIS standards. 1,400 standards have been referenced in law in a cumulative total of 2,900 cases of which 250 were "not compulsory". Each standard is reviewed every three years, with 400-500 revised every year to bring them up to date.

This highly restrictive and discriminatory system may loosen somewhat in the future. One of the undertakings of all the signatories of the Tokyo Round of the MTN under the GATT was to make their standards and the administration of their standards systems nondiscriminatory between domestic and foreign-produced goods. The Japanese government is currently "studying" how this agreement affects the JIS mark and eventually some changes will have to be made in the administration of the JIS mark under the JSS.

More recently, in response to public pressure, a fourth goal for the JSS has been added to the original three:

In recent years, however, accompanying rapid changes in social conditions not only rationalization of production, but also new demands from viewpoints of environmental protection, securing of safety, consumer protection, economy of natural resources and energy have come to be made on standardization.

For this purpose, as a basic policy of industrial standardization in fiscal 1978, we are going to actively respond to these social needs. (Outline of Standardization Plan in Fiscal 1978, p. 1.)

1. The JIS mark is a symbolic geometric form and does not include any representation of the letters JIS. Hence the widespread recognition the mark received is all the more remarkable.
Since 1956 the Japanese Industrial Standards Committee has carried out four five-year plans to give direction to the JSS, as Japan's internal and external economic, social, political and technological environment have changed over time. These plans set both concrete goals for the JSS and provide the institutional mechanisms within the JSS to achieve these goals. The long range plan for the period 1974-79, for example, laid particular emphasis on the cultural and social dimensions of standards.

The three salient features of the JSS are:

1) A clearly articulated, cohesive set of goals for the JSS that are designed to facilitate Japan's industrial strategy at home and abroad.

2) The JSS is centralized under the control and direction of the government.

3) The JSS works via consensus, but the consensus is reached at the direction, supervision and final approval of the government to ensure that the standards promote the goals of the system itself and Japan as a whole.

In contrast, the goals of the Canadian NSS are not well defined and are often overly general and non-operational. The NSS is decentralized so that sometimes the goals of the component organizations in the NSS may be contrary to the goals of the system as a whole. Although the SWOs in the NSS have a firm commitment to consensus standards, both federal and provincial governments sometimes feel that the consensus standards developed under the NSS do not reflect the public interest (as perceived by government) and hence government feels it must sometimes intervene directly outside the consensus process. JUL 2 3 1991

3

.

7

HC/111/.E35/n.23 Lecraw, Donald J Voluntary standards as a regulatory dijg c.1 tor mai