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A Canadian Resource Guide for

High Performance Manufacturing

Find the tools, people
and resources to improve
manufacturing performance.

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A Canadian Resource Guide for High Performance Manufacturing

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***Manufacturing Industries Branch
Industry Canada***

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Introduction

To compete globally with the world's best manufacturing companies, there is an unprecedented need for Canadian manufacturers to understand and adopt productivity-enhancing manufacturing techniques. This guide is designed to provide a relevant and up-to-date source of information to assist Canadian manufacturers in finding the tools, people and resources they need to improve their manufacturing performance.

High Performance Manufacturing (HPM) is an inclusive term incorporating many existing theories and approaches on productivity and waste reduction (e.g. Lean Manufacturing, Theory of Constraints, Total Quality Management, Value Stream Mapping, Kaizen). Generally, HPM is an approach based on a commitment to continuous improvement and enhanced competitiveness. It includes:

- an unrelenting focus on customer success
- total quality in all aspects of business
- systematic continuous improvement and elimination of non-value adding activities
- employee involvement, training and empowerment
- trust-based partnerships, networks and relationships

It should be noted that this resource guide is neither exclusive nor complete. Canadian manufacturers are urged to use it as an initial step in a process that will guide them toward sources of information and expertise that will help them increase their productivity, competitiveness and success.

Comments and feedback on this guide are welcome at manprotech.strategis@ic.gc.ca

NOTE: Some of the information in this document has been provided by external sources. Although every effort has been made to ensure the accuracy, currency and reliability of the content, Industry Canada accepts no responsibility in that regard.

1. Canadian Consortia/Forums/Networks

Typically, the consortia listed below are non-profit alliances of companies that organize shared learning and peer discussions to help each other work toward world class performance. Most have mailing lists or Web sites that detail upcoming high performance manufacturing workshops and seminars. Often, these events are open to non-consortia members. Please contact a consortium in your area to determine the resources that are available.

- ▶ **BC Consortium for Manufacturing Excellence (CME)**
A Vancouver-based consortium of manufacturers working toward World Class Performance. A service of the Canadian Manufacturers & Exporters (BC Division).
(David Chao at 604-736-2400)
- ▶ **Calgary Manufacturing Consortium**
A Calgary-based consortium of manufacturers working toward World Class Performance. A service of the Canadian Manufacturers & Exporters (Alberta Division).
(Chuck Harrison at 403-284-8247)
- ▶ **Excellence-in-Manufacturing Consortium (EMC) (www.excellence-in-manufacturing.org)**
Based in "small-town Ontario," EMC's 89 members take a grass-roots approach of working together to optimize learning, expertise and resources, and utilizing leading-edge manufacturing methodology in their journey toward World Class. (Al Diggins at 519-376-9470)
- ▶ **High Performance Manufacturing Consortium (HPM) (www.hpmconsortium.com)**
Based in southwestern Ontario, HPM's members participate as a leveraged learning network to accelerate the journey to World Class. Weekly *HPM Newsletter* promotes Lean concepts and training opportunities to members and non-members. (Dave Hogg at 519-893-6260)
- ▶ **Innovators Alliance (www.innovators.org)**
A network of CEOs of Ontario's high growth firms to facilitate the exchange of ideas, including via on-line "CEO Solutions." (Dave Killins at 877-799-5001 or 905-332-0340)
- ▶ **Le Réseau C.M.Q. Inc.**
Quebec City-based consortium with 25 company members focussed on World Class Performance.
(Jean-Guy Bouthot at 418-527-0225)
- ▶ **Manitoba Consortium for Manufacturing Excellence (MCME)**
A Winnipeg-based consortium of 11 manufacturers dedicated to working toward World Class Performance. Members work together to leverage resources, share training and exchange ideas.
(Don Breakey at 204-949-1454)
- ▶ **Newfoundland Manufacturing Consortium (not yet established)**
c/o Canadian Manufacturers & Exporters (Sean McCarthy at 709-772-3682)
- ▶ **Ottawa-Carleton Manufacturing Network (OCMN) (www.ocmn.org)**
An Ottawa area-based consortium of business professionals and companies committed to excellence in global competitiveness who share knowledge and experiences. A weekly newsletter, *OCMN News*, promotes best practices and training opportunities. (Carole Champion at 613-860-0983)

2. Canadian Associations/Associations with Canadian Chapters

Association for Manufacturing Excellence (AME) – Canadian Region (www.ame.org)

A not-for-profit association of 6000 operations leaders working to improve their corporate performance. Web site includes links to “Lean manufacturing” discussion groups. AME Canada, located in Ontario, delivers Kaizen Blitz events and Lean training across Canada. (Barb Jacklin at 905-681-6039).

Canadian Manufacturers & Exporters (CME) (www.cme-mec.ca)

Canada’s leading business network committed to improving the competitiveness of Canadian industry and to expanding export business through its services and partnership programs:

- PROBE** – In partnership with IBM, Probe is an international benchmarking tool that can be used to assess manufacturing performance (800-268-9684, ext. 225).
- Technology Visits Program & Innovation Insights** (www.tvp-ii.org) – A partnership with National Research Council to provide Canadian firms the opportunity to visit high-performing workplaces and to see manufacturing best practices in action.

▶ Educational Society for Resource Management - APICS (www.apics.org)

A not-for-profit international educational organization specializing in material and resource management. Over 10 chapters in Canada deliver seminars, workshops and certification programs, including operations management, supply chain management and inventory control.

Lean Enterprise Institute Canada (www.lean1.org)

The Institute’s mission is to be a leading educator for society in maximizing value and minimizing waste. To accomplish this goal, the organization develops and advances lean principles, tools and techniques designed to enable positive change. (Larry Cote at 613-821-4545).

National Quality Institute (NQI) (www.nqi.ca)

Based in Toronto, NQI is dedicated to making Canadians more competitive in the global marketplace by promoting, encouraging and supporting the understanding of total quality principles and practices in all sectors. Recognizes outstanding achievement through the *Canada Awards for Excellence Program* (416-251-7600 or 800-263-9648).

Society of Automotive Engineers (SAE) (www.sae.org)

The SAE is a one-stop resource for technical standards, educational information and expertise on mobility technology. Professional development activities, such as seminars, workshops, networking events and continuing education programs, are offered through local sections. The SAE Web site offers a monthly “learning to think lean” column. Several sections are active throughout Canada:

- Lean Standard:** Issued SAE J4000 “Identification and Measurement of Best Practice in Implementation of Lean Operation”
- Lean Standard:** Issued SAE J4001 “Implementation of Lean Operation User Manual” – instruction for evaluating levels of compliance to SAE J4000.

Society of Manufacturing Engineers (SME) (www.sme.org)

Offers publications, expositions, professional development, technical resources and member programs, including extensive video and published resources on manufacturing practices such as Lean implementation. Several Canadian chapters host “best practices” tours of local manufacturers.

3. U.S. and Other International Associations/Forums

- ▶ **American Productivity & Quality Center's (APQC) International Benchmarking Clearinghouse** (www.apqc.org)
The International Benchmarking Clearinghouse provides access to a broad base of best practice and benchmarking data and techniques. Newsletter and links to resources available (713-681-4020 or 800-776-9676).
- ▶ **American Society for Quality (ASQ)** (www.asq.org)
The ASQ is dedicated to the ongoing development, advancement and promotion of quality concepts, principles and techniques. Provides a wide range of quality-related resources (800-248-1946).
- ▶ **Automotive Industry Action Group (AIAG)** (www.aiag.org)
A not-for-profit trade association of vehicle manufacturers and suppliers. Over 1600 member companies tackle industry issues in supply, manufacturing, engineering, quality and finance (248-358-3003).
- ▶ **Best Manufacturing Practices** (www.bmpcoe.org)
The Best Manufacturing Practices Center of Excellence is funded by the United States Office of Naval Research to share best practice case studies (including some Canadian cases). By fostering the sharing of information across industry lines, BMP has become a resource in helping companies identify their weak areas and examine how other companies have improved similar situations (815-654-5515).
- ▶ **Institute of Operations Management (IOM)** (www.iomnet.org.uk)
IOM addresses the key disciplines that support operations management, including supply chain management and project management. It runs short courses on Lean topics.
- ▶ **Lean Aerospace Initiative** (www.lean.mit.edu/public/index.html)
This MIT-based consortium focusses on active collaboration and focussed team research in various aspects of Lean implementation among aerospace companies.
- ▶ **Lean Enterprise Institute** (www.lean.org)
The Institute is a leader in developing and promoting Lean principles, tools and techniques. Provides an annual Lean Manufacturing Summit, books, links to valuable Lean resources and training initiatives.
- ▶ **Michigan Manufacturing Technology Centre** (www.mmtc.org)
A not-for-profit organization that provides training and assistance to help companies improve performance. Offers training, seminars, consulting and project management services to apply Lean manufacturing strategies and techniques.
- ▶ **National Association of Manufacturers (NAM)** (www.nam.org)
NAM represents 14 000 U.S. members and 350 member associations serving manufacturers and employees in every industrial sector. A leading voice for manufacturers in the United States.
 - **NAM Virtual University** (www.namvu.com) – Offers courses on supply chain management and general and Lean manufacturing.
- ▶ **National Center for Manufacturing Sciences (NCMS)** (www.ncms.org)
Based in Ann Arbor, Michigan, NCMS is the largest cross-industry, not-for-profit collaborative research consortium in North America. Working with U.S. and Canadian manufacturers, the NCMS has an annual R&D project portfolio exceeding \$80 million.

National Institute of Standards and Technology (NIST) (www.nist.gov)

An agency of the U.S. Department of Commerce, NIST works with industry to develop and apply technology, measurements and standards through a portfolio of four major programs: Measurements and Standards Laboratories, Advanced Technology Program, Manufacturing Extension Partnership and Baldrige National Quality Award.

- Manufacturing Extension Partnership (MEP) (www.mep.nist.gov)** – A nationwide network of over 400 not-for-profit centres that provides assistance to small and medium-sized manufacturers. Each centre offers diagnostic, training and technical services, as well as seminars and workshops on Lean techniques, quality and e-commerce.

The Benchmarking Exchange (TBE) (www.benchnet.com)

California-based TBE's Benchnet is a comprehensive resource for benchmarking and process improvement. Over 2500 member companies have access to self-assessment tools and a newsletter and are invited to participate in daily benchmarking surveys (800-662-9800).

The Center for Manufacturing Improvement (CMI) (www.svsu.edu/oce/cmi)

Based in Michigan, CMI brings a combination of resources to assist manufacturers with decisions and projects affecting their productivity and profitability (517-790-5615).

▶ **The Northwest Lean Manufacturing Network (www.nwlean.net)**

This network of U.S. companies shares knowledge and experience in areas such as Lean production and manufacturing, total productive maintenance, Just-in-Time (JIT) activities, Kanban implementations and SMED techniques. The Network hosts company tours and best practice presentations for member organizations.

4. Canadian Federal/Provincial Resources

▶ **Business Development Bank of Canada (BDC) (www.bdc.ca)**

BDC offers a wide range of financial and consulting services that address the unique needs of today's small and medium-sized enterprises (SMEs), including:

- Consulting Services** – Customized solutions related to quality, process improvement, benchmarking and ISO.
- Innovation Loans** – Loans created to help innovative businesses position themselves to take advantage of new markets and new technologies available to today's global players.
- Productivity Plus Loan** – Loans designed for manufacturing and processing companies that want to increase their productivity but need financial support to acquire equipment.

▶ **Groupement des chefs d'entreprise du Québec (www.groupement.qc.ca)**

A Quebec-based network of business leaders in the manufacturing and distribution industries. Over 120 club locations across the province offer conferences, conventions and a wide network of business contacts.

- ▶ **Industry Canada (www.ic.gc.ca)**
A federal government department with a mandate to help make Canadians more productive and competitive in the knowledge-based economy. Resources include:
 - **Business Diagnostic and Benchmarking Tool** (www.strategis.ic.gc.ca/sc_mangb/strategy/engdoc/welcome.html) – A database listing Canadian and international business diagnostic tools, benchmarking methodologies, sources of training and related material.
 - **Manufacturing Industries Branch (www.strategis.gc.ca/mib)** – A branch within Industry Canada with a strong focus in the areas of advanced manufacturing and materials, along with extensive manufacturing links.
 - **Solutions for Advanced Manufacturing (SAM)** – An Industry Canada Web site showcasing industrial automation products and services offered by over 400 Canadian-based suppliers (www.strategis.gc.ca/sam).
 - **Strategis (www.strategis.gc.ca)** – Industry Canada's business information Web site. Provides strategic business information and tools to assist Canadian industry.

- ▶ **Manufacturing Technology Centre (MTC) – (Newfoundland) (http://mtc.engr.mun.ca/)**
A result of a collaboration between the Canadian Manufacturers & Exporters, Memorial University and College of the North Atlantic, the MTC creates a simplified path for Newfoundland manufacturers to access the combined capabilities of the post-secondary education sector.

- ▶ **National Research Council Canada (NRC) (www.nrc.ca)**
The NRC is a leader in scientific and technical research, the diffusion of technology and the dissemination of scientific and technical information.
 - **Canada Institute for Science and Technology Information (CISTI) (www.nrc.ca/cisti)**
A leading library/source for information in all areas of science, technology, engineering and medicine, including referrals to experts and relevant literature.
 - **Canadian Technology Network (CTN) (www.nrc.ca/ctn)**
The CTN provides SMEs access to a wide range of technology and related business assistance through a cross-country network of organizations and advisors.
 - **Industrial Research Assistance Program (IRAP) (www.nrc.ca/irap)**
IRAP assists SMEs create and adopt innovative technologies and processes. Over 260 Industrial Technology Advisors (ITAs) work throughout Canada and offer direct technical assistance, expertise, facilities and resources, as well as cost-shared financing of innovative technical projects.
 - The NRC has three institutes in its Manufacturing Technology Group:
 - **Industrial Materials Institute (www.imi.nrc.ca)** (Boucherville, Quebec)
 - **Institute for Chemical Process and Environmental Technologies (www.nrc.ca/icpet)** (Ottawa, Ontario)
 - **Integrated Manufacturing Technologies Institute (IMTI) (www.nrc.ca/imti)** (London, Ontario)

- ▶ **Saskatoon Regional Economic Development Authority (SREDA) (www.sreda.com)**
Encourages growth and diversification in the economy of the Saskatoon region. Supports networking and training opportunities on latest industry trends, including Lean.

While not dealing specifically with High Performance Manufacturing, there are a number of institutions that deal with *research in* new technologies, materials and manufacturing. These institutions include:

- Composite Materials Center (CMC) of St-Jerome** (www.citenet.net/cmc)
- Industrial Research & Development Institute (IRDI)** (www.irdi.on.ca)
- Materials & Manufacturing Ontario (MMO)** (www.mmo.on.ca)

A more complete list of Canadian manufacturing research institutions can be found on Industry Canada's Solutions for Advanced Manufacturing at www.strategis.gc.ca/sam under "Other AMT Sites."

5. Learning Material

Specialty Suppliers of High Performance Manufacturing Resources

- ▶ **Achieving Enterprise Excellence** – A self-assessment benchmark. A team-based self-diagnostic that measures performance against indicators of World Class. Licencees in Canada include **High Performance Manufacturing Consortium** (*Dave Hogg* 519-893-6260) and **HPM Consulting Inc.** (*Lloyd Phillips* 905-639-4000).
- ▶ **Gardiner Nielsen Associates Inc.** – Services to manufacturers, specializing in the implementation of Lean manufacturing methodologies, such as 5S Basic Manufacturing Disciplines, Quick Setup Change, Flow Process, Visual Factory and implementation engineering services (www.gardinernielsen.com) (905-838-1830).
Download – *5S training manual* and *5S assessment form* – from (www.gardinernielsen.com).
- ▶ **OCAPT Business Books** – Ontario-based supplier of business books, videos and learning products on world class manufacturing techniques. Extensive inventory of products on Lean manufacturing from Canada, the United States and the United Kingdom (www.ocapt.com) (888-579-3013 or 905-735-2967). Canadian distributor for the Lean Enterprise Institute's material (store.lean.org).
- ▶ **Productivity Press** – Oregon-based provider of learning tools, access to consultants and training programs on various facets of business and Lean manufacturing. Some titles – *Becoming Lean: Inside Stories of U.S. Manufacturers*; *Corporate Diagnosis: Setting the Global Standard for Excellence*; *Fast Track to Waste-free Manufacturing: Straight Talk from a Plant Manager*; *5 Pillars of the Visual Workplace: The Sourcebook for 5S Implementation*; *Implementing a Lean Management System*; *JIT Factory Revolution: A Pictorial Guide to Factory Design of the Future*; *JIT Implementation Manual: The Complete Guide to Just-in-Time* (www.productivityinc.com) (800-394-6868).

Books/Learning Tools

- ▶ **A World-class Production System: Lessons of 20 Years in Pursuit of World Class** by John R. Black. Crisp Publications, c1998. ISBN: 1560524871.
- ▶ **All I Need to Know About Manufacturing I Learned in Joe's Garage: World Class Manufacturing Made Simple** by William B. Miller, Vicki L. Schenk. Bayrock Press, 1993. ISBN: 0963043935.
- ▶ **Breaking the Cost Barrier: Managing and Implementing Lean Manufacturing Methods** by Stephen A. Ruffa, Michael J. Perozziello. John Wiley & Sons, 2000. ISBN: 0471381365.

- ▶ **Cause and Effect JIT: The Essentials of Lean Manufacturing** by John Bicheno. Picsie Books, 1994. ISBN: 0951382950.
- ▶ **Concurrent Engineering Effectiveness: Integrating Product Development Across Organizations** by Mitchell Fleischer, Jeffrey K. Liker. Hanser Gardner Publications, 1997. ISBN: 1569902313.
- ▶ **Gemba Kaizen: A Commonsense Low-cost Approach to Management** by Masaaki Imai. McGraw-Hill, c1997. ISBN: 0070314462.
- ▶ **Instant Access Guide: World Class Manufacturing** edited by Thomas F. Wallace, Steven J. Bennett. John Wiley & Sons Canada, 1995. ISBN: 0471131822.
- ▶ **It's Not Luck** by Eliyahu M. Goldratt. North River Press, 1994. ISBN: 0884271153 and 0884271137.
- ▶ **Kaizen (ky'zen): The Key to Japan's Competitive Success** by Masaaki Imai. Random House Business Division, c1986. ISBN: 007554332X and 0394551869.
- ▶ **Lean Thinking: Banish Waste and Create Wealth in Your Corporation** by James P. Womack, Daniel T. Jones. Simon & Schuster, c1996. ISBN: 0684810352.
- ▶ **Lean Transformation: How to Change Your Business into a Lean Enterprise** edited by Bruce A. Henderson, Jorge L. Larco, Stephen H. Martin. Oaklea Press, 1999. ISBN: 0964660121.
- ▶ **Learning to See: Value Stream Mapping to Add Value and Eliminate Muda (version 1.2)** by Mike Rother, John Shook. Lean Manufacturing Institute (www.Leanbookstore.com/lts_en.htm). ISBN: 0966784308.
- ▶ **Managing Quality Fads: How American Business Learned to Play the Quality Game** by Robert E. Cole. Oxford University Press, 1999. ISBN: 0195122607.
- ▶ **Out of the Crisis** by W. Edwards Deming. Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1989. ISBN: 0911379010.
- ▶ **The 5S's: Five Keys to a Total Quality Environment** by Takashi Osada. Asian Productivity Organization; distributed by Quality Resources, 1991. ISBN: 9283311167.
- ▶ **The Design of the Factory with a Future** by J.T. Black. McGraw-Hill, c1991. ISBN: 0070055505 and 0070055513.
- ▶ **The Goal** by Eliyahu M. Goldratt, Jeff Cox. North River Press, 1992. ISBN: 0884270610.
- ▶ **The Kaizen Blitz: Accelerating Breakthroughs in Productivity and Performance** by Anthony C. Laraja, Patricia E. Moody, Robert W. Hall. John Wiley & Sons, c1999. ISBN: 0471246484.
- ▶ **The Lean Toolbox** (second edition) by J. Bicheno. Picsie Books, 2000. ISBN: 0951382993.
- ▶ **The Machine that Changed the World** by James P. Womack, Daniel T. Jones, Daniel Roos. Rawson Associates, c1990. ISBN: 0892563508.
- ▶ **The New Manufacturing Challenge: Techniques for Continuous Improvement** by Kiyoshi Suzuki. Free Press, c1987. ISBN: 0029320402.
- ▶ **World-class Quality and Productivity: Fifteen Strategies for Improving Performance** by William F. Christopher, Carl G. Thor. Crisp Publications, c1998. ISBN: 1560524707.

Lean Discussion Groups/Newsletters

- ▶ **American Productivity & Quality Center's (APQC) International Benchmarking Clearinghouse** (www.apqc.org)
The International Benchmarking Clearinghouse provides access to a broad base of best practice and benchmarking data and techniques. Newsletter and links to resources available (713-681-4020 or 800-776-9676).
- ▶ **Association for Manufacturing Excellence (AME)** (www.ame.org)
A not-for-profit association of 6000 operations leaders working to improve their corporate performance. Web site includes links to Lean manufacturing discussion groups.
- ▶ **High Performance Manufacturing Consortium (HPM)** (www.hpmconsortium.com)
Based in southwestern Ontario, HPM's 16 members participate as a leveraged learning network to accelerate the journey to World Class. Weekly *HPM Newsletter* promotes Lean concepts and training opportunities to members and non-members. (*Dave Hogg* at 519-893-6260).

- ▶ **Learning to See: Value Stream Mapping to Add Value and Eliminate Muda (version 1.2)**, Mike Rother et John Shook, Lean Manufacturing Institute (www.Leanbookstore.com/lts_en.htm). ISBN : 0966784308.
- ▶ **Managing Quality Fads: How American Business Learned to Play the Quality Game**, Robert E. Cole, Oxford University Press, 1999. ISBN : 0195122607.
- ▶ **Out of the Crisis**, W. Edwards Deming, Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1989. ISBN : 0911379010.
- ▶ **The 5S's: Five Keys to a Total Quality Environment**, Takashi Osada, Asian Productivity Organization; distribué par Quality Resources, 1991. ISBN: 9283311167.
(Traduction : **Les 5 S**, Takashi Osada, Dunod, Paris, 1993. ISBN : 2100019376)
- ▶ **The Design of the Factory with a Future**, J.T. Black, McGraw-Hill, c1991. ISBN : 0070055505 et 0070055513.
- ▶ **The Goal**, Eliyahu M. Goldratt et Jeff Cox, North River Press, 1992. ISBN: 0884270610.
- ▶ **The Kaizen Blitz: Accelerating Breakthroughs in Productivity and Performance**, Anthony C. Laraia, Patricia E. Moody et Robert W. Hall, John Wiley & Sons, c1999. ISBN : 0471246484.
- ▶ **The Lean Toolbox** (second edition), J. Bicheno, Picsie Books, 2000. ISBN : 0951382993.
- ▶ **The Machine That Changed the World**, James Womack, Daniel T. Jones et Daniel Roos, Rawson Associates, c 1990. ISBN: 0892563508.
(Traduction : **Le système qui va changer le monde**, James P. Womack, Daniel T. Jones et Daniel Roos, Dunod, Paris, 1992. ISBN : 2100011804)
- ▶ **The New Manufacturing Challenge: Techniques for Continuous Improvement**, Kiyoshi Suzuki, Free Press, c1987. ISBN : 0029320402.
(Traduction : **Le nouveau défi industriel**, Kiyoshi Suzuki, InterÉditions, Paris, 1991. ISBN : 229603069)
- ▶ **World-class Quality and Productivity: Fifteen Strategies for Improving Performance**, William F. Christopher et Carl G. Thor, Crisp Publications, c1998. ISBN : 1560524707.

Groupes de discussion sur l'élimination du gaspillage et bulletins

- ▶ **American Productivity & Quality Center's (APQC) International Benchmarking Clearinghouse** (www.apqc.org)
International Benchmarking Clearinghouse offre l'accès à un large éventail de données et de techniques liées aux meilleures pratiques et à l'analyse comparative. Elle offre aussi des bulletins et des liens avec d'autres ressources (713 681-4020 ou 800 776-9676).
- ▶ **Association for Manufacturing Excellence (AME) – Canada** (www.ame.org)
Association sans but lucratif de 6 000 cadres cherchant à améliorer le rendement de leur entreprise. Le site Web comprend des liens avec des groupes de discussion sur la fabrication sans gaspillage.
- ▶ **High Performance Manufacturing Consortium (HPM)** (www.hpmconsortium.com)
Installés dans le sud-ouest de l'Ontario, les 16 membres de HPM participent à un réseau de formation afin d'accélérer la réalisation d'un rendement de calibre mondial. Le bulletin hebdomadaire *HPM Newsletter* fait la promotion de l'élimination du gaspillage et offre de la formation aux membres et aux non-membres (*Dave Hogg* au 519 893-6260).
- ▶ **Manufacturers Digest: The Quarterly Guide to Lean Manufacturing** (www.lesasearch.com/digest.html)
Publié par une entreprise de recherche, ce guide contient des récits au sujet d'entreprises qui ont adopté la fabrication sans gaspillage, ainsi que des comptes rendus de chroniques, de livres et de sites Web. Le document contient aussi une liste d'événements liés à la fabrication sans gaspillage et de nominations de cadres supérieurs dans le milieu de la fabrication sans gaspillage.

- ▶ **Manufacturing.net** (www.manufacturing.net)
Tribune électronique sur la fabrication, qui propose un moteur de recherche, des bulletins et des « groupes de fabricants » afin de diffuser de l'information sur les programmes de fabrication sans gaspillage. Comprend de l'information à jour sur les produits, des statistiques économiques, des nouvelles et des rapports de recherche liés à l'industrie.
- ▶ **Manufacturing Resources Group of Companies (MRGC)** (www.mrgc.org)
Un réseau d'entreprises partenaires regroupées pour fournir de l'information pratique, de la formation ainsi que la conception et l'exécution de programmes visant à aider ses clients à éliminer le gaspillage dans leur processus d'affaires et à améliorer le milieu de travail pour tous les associés. *Inside Manufacturing* – une publication – est produite plusieurs fois par année, faxée aux abonnés et disponible à (www.mrgc.org/newsletter.htm).
- ▶ **Ottawa-Carleton Manufacturing Network (OCMN)** (www.ocmn.org)
Consortium installé dans la région d'Ottawa, regroupant des gens d'affaires et des entreprises qui cherchent à exceller sur les marchés mondiaux et qui échangent leurs diverses compétences et expériences. Un bulletin hebdomadaire, *OCMN News*, fait la promotion des programmes de formation sur les meilleures pratiques (network_coordinator@ocmn.org au 613 860-0983).
- ▶ **Productivity: The Lean Manufacturing Advisor** (www.productivityinc.com)
Bulletin mensuel contenant des articles sur la mise en œuvre de la fabrication sans gaspillage et de l'amélioration continue.
- ▶ **Society of Manufacturing Engineers** (www.sme.org)
Source d'information technique et de possibilités de réseautage pour les professionnels de la fabrication. *Lean Directions* est le bulletin électronique sur la fabrication sans gaspillage. Présentant cinq articles très spécialisés, chaque numéro mensuel fournit un moyen rapide et facile de se tenir au courant en ce qui concerne l'un des sujets les plus actuels – la fabrication sans gaspillage (www.sme.org/leandirections).
- ▶ **Superfactory** (www.superfactory.com)
Production d'un climat d'excellence dans le milieu de la fabrication; ressources pour les utilisateurs inscrits et non inscrits, notamment sur la fabrication sans gaspillage. Groupe électronique (salon passerelle vers la fabrication sans gaspillage) de discussion et bibliographies présentées par sujet.
- ▶ **The Benchmarking Exchange (TBE)** (www.benchnet.com)
Installé en Californie, le Benchnet de TBE est une source intégrée de données sur l'analyse comparative et l'amélioration des procédés. Plus de 2 500 entreprises membres ont accès aux outils d'auto-évaluation et à un bulletin, et sont invitées à participer à des sondages quotidiens servant à l'analyse comparative (800 662-9800).
- ▶ **The Northwest Lean Manufacturing Network** (www.nwlean.net)
Ce réseau d'entreprises américaines sert à l'échange des connaissances et des expériences dans des domaines comme la production et la fabrication sans gaspillage, la maintenance intégrée et la production juste à temps, ainsi que les techniques Kanban et le système d'interaction à la minute. Le réseau organise des visites d'entreprises et des exposés sur les meilleures pratiques à l'intention de ses membres.

- ▶ Womack, James P. and Daniel T. Jones, "From lean production to the lean enterprises," *Harvard Business Review*, March/April 1994, p. 93.
- ▶ Womack, James P. and Daniel T. Jones, "Beyond Toyota: how to root out waste and pursue perfection," *Harvard Business Review*, September/October 1996, p. 140.

6. Internet Resources

Boeing's Lean Enterprise (www.boeing.com/commercial/initiatives/index.html)

Highlights the key elements, principles and implementation issues dealt with by Boeing to meet its internal goals to reduce costs, cycle time and defects and deliver more value to its customers.

Employers Online (<http://employers.gc.ca>)

A clearinghouse of information for employers looking at all aspects of human resource management, including best practices in high performance workplaces.

Manufacturing and Industrial Resource Center (www.rec-communications.com)

The Center is a compilation of Web resources that every business, industry and manufacturer needs. Areas include quality, Lean manufacturing, safety, environmental controls, material handling, engineering, tooling and equipment.

Manufacturing.net (www.manufacturing.net)

A manufacturing e-marketplace that features a search engine, newsletters and manufacturing "communities" to keep abreast of Lean initiatives. Includes up-to-date product information, economic statistics and industry-specific news and research.

- ▶ **Recent Advances in Manufacturing (RAM)** (www.ee.vl.ac.uk/ram/)

A U.K.-based database of bibliographic information for manufacturing and related areas covering items in well over 500 niche and mainstream journals and magazines as well as details of books, videos and conference proceedings.

SearchManufacturing.com (www.searchmanufacturing.com)

An enhanced search engine for and about manufacturing. It is dedicated to manufacturing and manufacturing support.

- ▶ **Shingo Prize for Excellence in Manufacturing** (www.shingoprize.com)

Established in 1988, the Shingo Prize for Excellence in Manufacturing promotes world class manufacturing and recognizes companies that achieve superior customer satisfaction and business results. The prize is open to manufacturers worldwide.

Superfactory (www.superfactory.com)

Creates community-supporting manufacturing excellence and provides resources for registered and unregistered users, including Lean Mfg. e-Group ("gateway2Lean" chat room), Lean manufacturing discussion Web and book listings by concept.

7. Educational Resources (Training Institutions)

Canadian

- ▶ **British Columbia Institute of Technology (BCIT)** (www.bcit.ca)
BCIT offers certificates in Operations Management.

- ▶ **McGill University** (www.mecheng.mcgill.ca/Grad/MMM/)
McGill's Master in Manufacturing Management (MMM) program emphasizes both manufacturing and management subjects and focusses not only on the issues facing manufacturing operations, but also on international management issues.
- ▶ **University of Western Ontario** (<http://hyperserver.engrg.uwo.ca/es492b/lectures.htm>)
Lectures on Lean manufacturing. Associated topics are available online from the Department of Mechanical and Materials Engineering.

Other

- ▶ **Business and Professional Advancement Center – Normandale Community College**
(www.normandale.mnscu.edu/Main/continuingeducation)
Based in Bloomington, Minnesota, the Center offers training courses in Lean manufacturing and Six Sigma, as well as APICS, CPIM and CIRM Certification Prep Courses.
- ▶ **Center for Competitive Change – University of Dayton** (<http://ud.udri.udayton.edu/CCC>)
Offers courses in areas such as Lean manufacturing, visual workplace, office production through Kaizen, supply chain and operations reliability. Provides a certificate in Lean studies and established programs in cooperation with manufacturing companies.
- ▶ **Industrial Extension Service – North Carolina State University**
(www.ies.ncsu.edu/conted/public/cfusion/CurrSched_subjlean.cfm)
Provides industries throughout North Carolina with technical and management assistance and supporting education. Offers courses on Lean manufacturing and Six Sigma.
 - **Forum for Competitive Advantage** – An industry/university partnership to serve the manufacturers of North Carolina. Members share things such as the best and latest manufacturing techniques, benchmarking and plant tours.
 - **Manufacturing Program** – This program brings together universities, community colleges and government to help the state's 12 000+ SMEs to identify and implement new technology and improve management practices and productivity.
- ▶ **Japan Technology Management Program – University of Michigan** (www.umich.edu/~umjtmp)
Established to assist Americans in learning from Japanese approaches to the management of technology through research, publications and education. See also the University of Michigan's Center for Professional Development (<http://cpd.engin.umich.edu>), which offers non-credit certificate programs in accelerated Six Sigma and Lean manufacturing.
- ▶ **Lean Enterprise Forum – University of Tennessee** (www.leanforum.bus.utk.edu)
Administers Lean Enterprise short program courses focussed at managers and technical people.
- ▶ **Lean Enterprise Research Centre – Cardiff Business School** (www.cf.ac.uk/uwcc/carbs/lerc)
The Centre brings together benchmarking and Lean production with supplier development and materials management. Involved in both research and education.
- ▶ **Production System Design (PSD) Laboratory – Massachusetts Institute of Technology**
(<http://psd.mit.edu/>)
An initiative within the MIT-based Laboratory for Manufacturing and Productivity that conducts research in the development of a comprehensive approach for the design and implementation of Lean production systems. PSD takes a holistic approach to designing manufacturing systems according to the principles of Lean production.
- ▶ **The Center for Collaborative Manufacturing – Purdue University** (www.ccm.ecn.purdue.edu/erc)
A cross-disciplinary organization dedicated to research and education in manufacturing.

The Center for Technology, Policy, and Industrial Development (CTPID) – Massachusetts Institute of Technology (MIT) (<http://web.mit.edu/org/c/ctpid/www/about.html>)
Builds productive partnerships between academia, government and industry to develop new knowledge, advanced technological strategies, and innovative partnerships that address global industrial and policy issues.

Worcester Polytechnic Institute (www.wpi.edu/Admin/CE/WCM)
Based in Massachusetts, the Institute offers practical seminars and workshops on World Class Manufacturing, including Lean and JIT.

8. People/Consultants

The following represents a list of consultants known to Industry Canada who have been involved in Lean manufacturing. The list should not be considered complete and can be updated based on further information. Industry Canada does not endorse any of the people or companies listed; rather, this list is provided for information purposes only.

Canadian

- ▶ **Cap Gemini Ernst & Young** (www.capgemini.com)
Provides manufacturing consulting services, Lean workshops – *Charlie Reid* (519-571-3333).
- ▶ **Grant Thornton LLP** (www.grantthornton.ca)
Provides consulting services in Lean – *Bill Cloke* (905-804-0905, ext. 252) (Mississauga office) or *Gail Petersen* (604-443-2172) (Vancouver office).
- ▶ **High Performance Solutions**
Provides consulting services and training workshops in Lean concepts. Canadian supplier of *The Lean Toolbox* – *Dave Hogg* (519-893-6260).
- ▶ **HPM Consulting Inc.**
Burlington, Ontario-based consultancy provides manufacturing consulting, Kaizen Blitz facilitation and Lean training – *Lloyd Phillips* (905-639-4000).
- ▶ **KPMG** (www.kpmg.ca)
Offers training programs and consulting assistance in Lean concepts – *Brian Bush* (Windsor-based) (519-747-8275).
- ▶ **La Société d'Experts-Conseils ProMainTech Inc.** (www.promaintech.ca)
Based in Quebec, offers training and consulting assistance in Lean concepts – *Yves Turcotte* (450-655-0033) (Boucherville office) or *Camil Villeneuve* (418-652-1100) (Ste-Foy office).
- ▶ **Lean Institute Canada** (www.lean.org)
Offers training programs and consulting in Lean concepts – *Larry Cote* (613-821-4545).
- ▶ **Next Step Business Education Ltd.**
Thornhill, Ontario-based consultancy offers courses such as “Visual Performance Indicators” – *Tom Bechtel* (905-889-6800).
- ▶ **Solutions Plus Inc.** (www.solutionplus.com)
Based in Ontario, Solutions Plus is an international Lean manufacturing and a team-building, training and development consultancy. Glen Tichbourne (888-990-9399) leads the team of senior consultants and trainers.

- ▶ **Synchronix Technologies Inc.**
BC-based Synchronix provides consulting services in Theory of Constraints – *Rod Gelhorn* (604-668-3253).
- ▶ **Tecresult QMT** (www.tecresult.com)
Headquartered in Montréal, with over 20 offices in Canada and around the world. Offers consulting and training services in productivity and quality improvement – *Yvon Beaudet* (514-287-8500, ext. 8676) (Montréal office).
- ▶ **TopTech Consulting Group** (www.toptech.qc.ca)
Ste-Foy, Quebec-based consultancy offers seminars and consulting assistance in Lean concepts – *Pierre Grenier* (888-658-6143).

Other

- ▶ **Anitech** (www.anitech.net)
Offers training in areas such as Lean manufacturing, Kaizen and benchmarking. Distributors of *The Lean Game*[®] board game (888-HOW-LEAN or 888-469-5326 for San Diego, California, office or 888-938-6488 for St. Clair Shores, Michigan, office).
- ▶ **Continental Design and Engineering**
Provides consulting in Lean manufacturing (800-875-4557 for Anderson, Indiana, office or 800-249-1675 for Troy, Michigan, office).
- ▶ **Cre8tive Training Solutions** (www.cre8tivetraining.com/index.html)
Consulting and training company that offers Lean manufacturing and Six Sigma training (888-893-FUND).
- ▶ **Juran Institute** (www.juran.com)
Provides a wide range of training and consulting services based on Six Sigma quality – *Madeleine I. Lamothe* (416-488-6828 or 800-413-7488).
- ▶ **Kathryn Grad & Associates, Inc.**
Maryland-based consultancy offers courses such as “Principles of Leadership and Coaching.” Company is developing a Canadian base in Ontario and already has a large Canadian clientele – *Kathy Grad* (410-531-0450).
- ▶ **Lean Enterprise Institute** (www.lean.org)
Dr. James P. Womack (617-713-2900), founder and president of the Lean Enterprise Institute, co-author of *The Machine that Changed the World: The Story of Lean Production*. In Canada, *Larry Cote*, Executive Vice-President, COO, Lean Enterprise Institute.
- ▶ **Optiprise Inc.** (www.optiprise.com)
Michigan-based firm offers consulting services based on Lean manufacturing methods – author *Jeffrey Liker* is a principal and senior consultant.

- ▶ **Quality Systems Consultants** (www.qsc.org)
Oregon-based consultancy provides consulting services in areas such as quality and operating manuals, ISO/D1-9000/AS-9000 (AQS) compliance, Lean manufacturing and Kaizen principles (503-658-4874).
- ▶ **RWD Technologies** (www.rwd.com)
Based in Maryland, with offices throughout the United States, the United Kingdom and Germany, offers consulting and training in areas such as Lean manufacturing.
- ▶ **Six Sigma Qualtec** (<http://sixsigmaqualtec.com>)
Arizona-based consultancy provides training and implementation services that drive Financially Measurable Results™. Curriculum includes Six Sigma and Lean manufacturing (800-247-9871).
- ▶ **Technical Change Associates** (www.technicalchange.com)
Utah-based group that specializes in World Class Manufacturing through JIT capabilities and applying TQM to the fabrication industry (801-621-8980).
- ▶ **The Rapid Learning Institute (RLI)** (www.rlearning.com)
RLI assists in the training and certification of Lean production techniques.
- ▶ **TPI Europe Limited** (www.tpi-europe.ltd.uk)
U.K.-based firm that offers *"total performance improvement by practical coaching."* Applies the rules of the Toyota Management practices, production system and product engineering philosophy.
- ▶ **XR Associates** (www.xr-associates.co.uk)
Based in Brentwood, U.K., XR offers training and consulting in Lean manufacturing, supplier development and quality systems.

APPENDIX A: CANADIAN CONSORTIA/FORUMS/NETWORKS

BC Consortium for Manufacturing Excellence
(CME)
David Chao
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Calgary Manufacturing Consortium
Chuck Harrison
Telephone: 403-284-8247
E-mail: chuck.harrison@nrc.ca

Canadian Manufacturing Agility Forum
Ron Shulman
Telephone: 416-922-7849
E-mail: shulmanr@planeteeer.com

Excellence-in-Manufacturing Consortium (EMC)
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manufacturing.org

High Performance Manufacturing Consortium
(HPM)
Dave Hogg
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E-mail: dhogg@highperformancesolutions.ca

Innovators Alliance
Dave Killins
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E-mail: info@innovators.org

Le Réseau C.M.Q. Inc.
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