Report on

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO THE PEOPLE'S REPUBLIC OF CHINA

October 5-23, 1975

Industry, Trade and Commerce
Industrie et Commerce

REPORT ON

[Canada.

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION

TO THE PEOPLE'S REPUBLIC OF CHINA]

October 5 - 23, 1975

CONTENTS

MISSION OBJECTIVES

The purposes of the Port, Harbour and Marine Terminal Technology Mission to China were:

(a) To obtain an overview of the state of development of Chinese ports through visits to a number of major ports and discussions with Chinese authorities.

(b) To provide Chinese officials with information on Canadian technology, engineering capability and equipment applicable to port development and improvement.

(c) To ascertain the potential for sales of Canadian technology, equipment and services to the Chinese in meeting their need for improved port, harbour and cargo handling facilities.

BACKGROUND

The Port, Harbour and Marine Terminal Technology Mission to China in the period October 5 - 23, 1975, originated as a part of the exchange mission program agreed at the annual meeting of the Canada/China Joint Trade Committee held in February, 1975. This Committee was established as a result of the agreement reached by the leaders of our two countries, Premier Chou-en-lai and Prime Minister, Right Hon. P.E. Trudeau, to facilitate the growth of bilateral trade and to promote the inter-change of persons, groups and delegations engaged in trade.

The mission was established as a result of the apparent need to improve ports and cargo handling facilities in China through the application of advanced technological methods and modern equipment. In recent years China's world trade has increased dramatically; in 1973 its world trade totalled $9.9 billion and in 1974, it rose to $13.7 billion. The urgent need to increase the capacity of China's ports has led to a number of port construction and extension projects aimed at eliminating the heavy costs and serious delays in vessel turn-around-time.

The Chinese have, therefore, launched a high priority program to modernize its seaports with particular concentration on Shanghai, Hsinkang, Dairen, Chinhaughtao, Whampoa, Tsingtao, Swatow, Kwangchow, Lienyun and Peihaibang. Details of the larger ports and commodities which they handle are given at Annex "C".

The industrial members of the mission were provided with information on China and its ports during the planning phase of the mission. Briefings were conducted in Vancouver on October 3rd prior to departure and each member of the mission was given a brochure containing background information on the People's Republic of China and economic and operational data on port handling facilities in China.

Mission members prepared presentations for use at various seminars scheduled both in Peking and the other ports to be visited. Brochures and audio visual aids were also used. The text of the seminar papers is summarized in this Report. Mission members also prepared reports of their visits and of seminar discussions. These reports have been used as the basis for the information provided herein.

It should be explained that, while the presentations did not attempt to cover, per se, a package or turnkey approach to port development, nevertheless, in the seminars this potential was emphasized. In addition to providing the Chinese officials with general information on the role and capabilities of engineering consultants in Canada, Mr. Leighton of the Swan Wooster Co. dealt with the significant advances made in Canadian port and harbour development. He emphasized the integrated and efficient approach which incorporates consulting, engineering, construction and installation of equipment for bulk and general cargo handling. The Chinese were told that Canadian companies with these differing responsibilities were prepared to work together to meet any total system needs of the Chinese in the development or improvement of their ports. In addition, to recognize the self-reliance stipulations of the Chinese, it was emphasized that Canadian companies would be prepared to work with Chinese engineers in the design, engineering and equipping of Chinese ports.

While it is difficult to gauge the Chinese response to this approach, nevertheless, the interest expressed by Chinese engineers and technicians from various ports at the concluding seminar in Peking would appear to underline interest in a systems approach to port development. It would also seem to modify somewhat the conclusions reached during an earlier mission of engineering consultants to China in 1974 that Chinese were not amenable to the use of consulting engineers.

ITINERARY AND PROGRAM

The itinerary was based on visits to Peking to meet officials of the Ministry of Communications, Water Transport Bureau, and to four major ports, namely, Dairen (Talien), Hsinkang, Shanghai, and Whampoa in the period October 6th to October 22nd inclusive.

The itinerary is attached at Annex "A" and represents a concentrated series of visits and travel arrangements to see ports and industries and carry out technical discussions.

In summary, the program included:

(a) Peking - Overview briefing on Chinese ports
- Technical discussions with officials of trading companies and Water Transport Bureau
- Seminars on completion of ports visits

(b) Ports - Briefing on port facilities and operations by Chinese authorities
- Visits to port and harbour facilities

- Comments on facilities and technical presentations by Canadian mission
- Brief visit to industries both engaged in production of port handling equipment and artisan products (glassware, carpets)
- Visit to industrial and Commodity Exhibits at Shanghai and Canton respectively.

GENERAL OBSERVATIONS

Considerable construction is being undertaken in all ports visited to improve handling facilities and to build new berths. At present, port inadequacies, lack of capacity and cargo handling capability are ascribed by the Port Directors to China's developing status and her recovery from the pre-revolutionary period. Under the leadership of Chairman Mao, China is overcoming former disasters through the application of the principal of self-reliance.

The Chinese ports visited were mainly shallow draft and situated near to the mouths of large rivers with the capacity of handling ships in the 10,000 to 15,000 ton range; these vessels are serviced at berths or through barging operations.

Container facilities are not now in operation, but construction is underway. Some of the equipment may initially be provided by the Japanese.

Although Chinese trade is increasing rapidly at an annual average of some 38 percent between 1969 and 1973, tonnages handled at various Chinese ports are still much below that of many Canadian ports. This situation, combined with the limited capacity of major ports to handle larger ships, leaves some doubt as to the immediate needs for quantities of bulk cargo handling equipment and container facilities similar to the larger capacity systems used in many major Canadian ports. In the near future with the development of deep water terminals and continued trade increases, China will no doubt need such facilities. As an indication, a modern salt loading facility and a large new grain unloading complex were noted in Hsinkang and Shanghai harbours respectively.

Based on the policy of self-reliance, the Chinese are developing a high technology heavy manufacturing industry which will no doubt in time be responsive to most of their needs for advanced port equipment. For example, during a visit to the Shanghai Harbour Machinery Factory, the mission viewed the manufacturing of 10 ton cranes (over 60) as well as front end loaders. In addition, at Hsinkang, a 250 ton overhead crane was being installed which was constructed locally. Illustrative also of this progress were the exhibits at the Shanghai Industries Exhibition which included displays on shipbuilding, heavy machinery, weaving and textiles, electronic instruments, vehicles of all classes, and many other items incorporating advanced technology.

China's present need to import modern cargo handling equipment will no doubt continue for some time. At the ports visited by the mission team, Hungarian, Italian, Japanese and British equipments were noted. Chinese methods of handling cargo, even in the light of some of the physical inadequacies of their ports, would appear to indicate a need for a systems approach in the management and operations of their ports and associated transportation. Although the Chinese profess to be disinterested in consulting engineering from foreign sources, port engineers and technicians displayed considerable interest in Canadian port design, accepting this probably as an essential element of a turnkey project.

Efforts to draw from the Port Directors some indication of their future needs were not productive. The general response was that, based on China's policy of self-reliance, it was their objective to make what they needed in China and only purchase abroad those items which were of advanced technology. China is, therefore, interested in finding out information on all developments and selecting those equipments which meet their needs based on price, delivery and performance. Quantity supply of equipment, if selected, will no doubt lead eventually to Chinese production.

CONCLUSIONS AND RECOMMENDATIONS

There is a specific and urgent requirement for China to upgrade its port facilities, and both construction projects and the purchase of foreign equipment, particularly from Japan, are underway. However, it is difficult to say categorically at this stage of market development whether there are definitive prospects for selling Canadian services and equipment to China. Nevertheless, there was considerable interest expressed in Canadian technology and equipment as described in the mission's presentations on major harbour, port and terminal facilities in Canada. In particular a proposal for an inland container terminal attracted a good deal of attention as well as the use of the self-contained propulsion equipment for barges.

There appears to be little doubt that opportunities exist for co-operative port ventures with the Chinese particularly for either total systems in bulk handling, general cargo and container facilities (engineering plus equipment) or for individual equipments. However, this will have to be confirmed by the Chinese, particularly if an invitation for a reciprocal visit is accepted.

Meanwhile, it is recommended that Canadian firms interested in investigating and penetrating the Chinese markets should provide complete documentation on company products and services - keeping in mind the need to protect company technology. If not already actioned, mission members should respond without delay to all questions raised and requests made by the Chinese officials in Peking and at the four ports of call.

It is also recommended that we continue to exchange similar missions with the People's Republic of China and follow-up with the Peking Post concerning opportunities to promote Canadian port equipment and engineering talent. Although there may be a somewhat modest market at the present time, China will, of necessity, expand in all sectors of port activity to accommodate the country's increasing trade.

ACKNOWLEDGEMENTS

Finally, this report would be remiss if it did not acknowledge the indebtedness of the mission to the Chinese officials and also to the members of the Canadian Embassy for their invaluable assistance, hospitality and arrangements. In particular, the Director and staff of the Water Transport Bureau, Ministry of Communications, together with the Directors at the various ports visited, contributed immensely to the success of the mission and at all times demonstrated their friendliness to Canada. This reception augurs well for the prospects of mutual co-operation between our countries in the development of Chinese ports.

D.J. Janigan
General Director

December 4, 1975

MISSION MEMBERSHIP

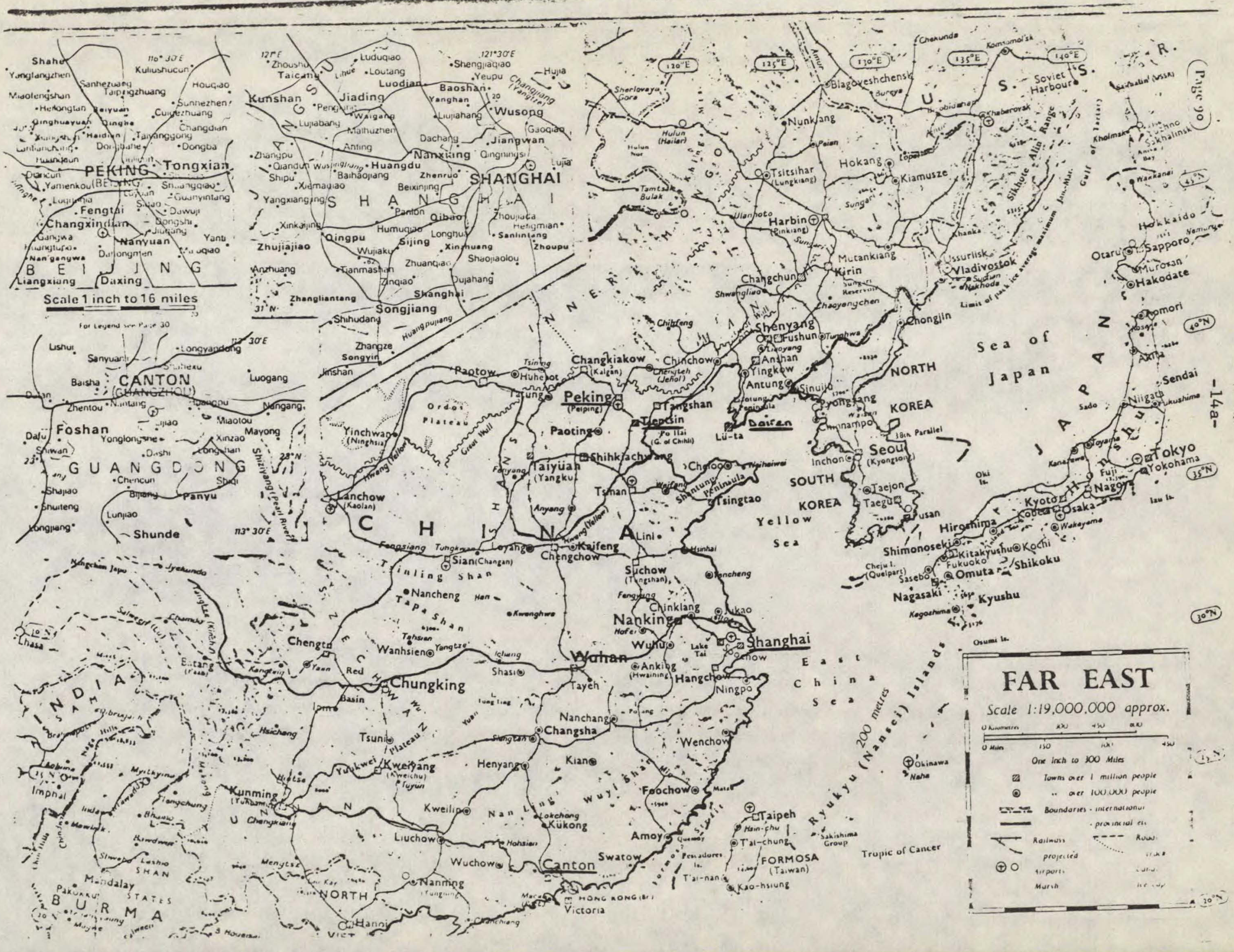
Representative	Company	Expertise
Mr. D.J. Janigan General Director Office of Export Programs & Service	Department of Industry, Trade and Commerce Ottawa, Ont.	Mission Leader
Mr. Frank C. Leighton Vice President Planning	Swan Wooster Engineering Co. Ltd. Vancouver, B.C.	Deputy Mission Leader Consultants in design engineering and construction supervision in port, harbour and marine terminal development
Mr. H. Roberts Chief, Marine & Rail Directorate	Transportation Industries Branch Ottawa, Ont.	Secretary Treasurer
Mr. Gabriel Alter President	Steadman Containers Ltd. Brampton, Ont.	Containers including container ports and associated specialized handling equipment
Mr. John W. Hay Vice President Contracts	Stephens-Adamson Belleville, Ont.	Design and manufacture of specialized bulk cargo handling and automatic ship loading and unloading systems
Mr. James H. Hopkinson Sales and Service Manager	Allis-Chalmers, Rumely, Ltd. Guelph, Ont.	Forklift trucks for multi-cargo handling applications
Mr. Terry P. Lewis International Marketing Manager	Thomas Equipment Ltd. Interimco Ltd. Ottawa, Ont.	Small front end loading equipment for use in vessel holds, at the dockside and in warehouses
Mr. Jeremy D. Shrive Managing Director	Maritime Industries Ltd. Burnaby, B.C.	Self-contained barge propulsion units
Mr. Douglas F. Soon Assistant Sales Manager	Canron Limited Western Bridge Division Vancouver, B.C.	Dockside cranes for loading and unloading containers
Mr. Michael Galbraith First Secretary (Commercial)	Canadian Embassy Peking	Accompanied the Mission Team

Standing Left to Right:

F.C. Leighton	Vice-President, Planning, Swan Wooster Engineering Co. Ltd.
A.N. Lever	Department of Industry, Trade & Commerce
T.P. Lewis	International Marketing Manager, Thomas Equipment Ltd.
W.W. Johnston	Department of Industry, Trade & Commerce
J.W. Hay	Vice-President, Contracts, Stephens-Adamson
J.H. Hopkinson	Sales & Service Manager, Allis Chalmers Rumely Ltd.

Sitting Left to Right:

G. Alter	President, Steadman Containers Ltd.
J.D. Shrive	Managing Director, Maritime Industries Ltd.
D.J. Janigan	Mission Leader, Department of Industry, Trade & Commerce
H. Roberts	Department of Industry, Trade & Commerce
D.F. Soon	Assistant Sales Manager, CANRON Limited


FAR EAST
Scale 1:19,000,000 approx.
One inch to 300 Miles
Towns over 1 million people
over 100,000 people
Boundaries - international
Railways
Airports
Page 90
Scale 1 inch to 16 miles
For Legend see Page 30
PEKING
BEIJING
Tongxian
Fengtai
Changxindian
Nanyuan
Daxing
SHANGHAI
JIANGSU
Kunshan
Jiading
Luodian
Baoshan
Wusong
Jiangwan
Nanxiang
Huangdu
Qingpu
Sijing
Songjiang
Zhujiajiao
CANTON
(GUANGZHOU)
GUANGDONG
Foshan
Shunde
Panyu
Luogang
Peking
Shanghai
Nanking
Wuhan
Chungking
Kunming
Canton
HONG KONG (Br.)
Victoria
Harbin
Mukden
Shenyang
Changchun
Dairen
Tientsin
Tsingtao
Sian
Kaifeng
Lanchow
Taiyuan
Changsha
Foochow
Amoy
Swatow
Hangchow
Ningpo
Wenchow
CHINA
Yellow Sea
East China Sea
Sea of Japan
NORTH KOREA
SOUTH KOREA
Seoul
Pusan
JAPAN
Tokyo
Yokohama
Osaka
Kyoto
Nagoya
Hiroshima
Nagasaki
Sapporo
Hakodate
Hokkaido
Honshu
Shikoku
Kyushu
Okinawa
Naha
Taipeh
FORMOSA
(Taiwan)
Kao-hsiung
Ryukyu (Nansei) Islands
Tropic of Cancer
U.S.S.R.
Vladivostok
Khabarovsk
Blagoveshchensk
INDIA
BURMA
Mandalay
Imphal
NORTH VIETNAM
Hanoi
Lhasa

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

BRIEFING ON CHINESE HARBOURS -- PEKING HOTEL -- OCTOBER 6, 1975

Given by Officials of the Water Transportation Bureau of the Ministry of Communication.

P.R.C. OFFICIALS PRESENT:

MR. CHANG CHI	Responsible person of the Department concerned of the Foreign Affairs Bureau
MR. NI YUN-HO	Responsible person of the International Shipping Division of Water Transport Bureau
MR. YEH MING-KAO	Deputy Chief Engineer
MR. LIU YUN-PEI	Engineer
MR. LI CHUN	Staff Member of Scientific Committee
MR. TU MAI-CHIH	Staff Member of Water Transport Bureau
MR. CHIANG JEN	Staff Member of the Foreign Affairs Bureau
MR. KUO LUNG-MING	Interpreter
MR. CHU CHIEN-HSIN	Interpreter
MISS PAO CHIEN-HSIN	Interpreter

CANADIAN PORT, HARBOUR AND MARINE
TERMINAL TECHNOLOGY MISSION TO CHINA
OCTOBER 5 - OCTOBER 23, 1975

BRIEFING ON CHINESE HARBOURS - PEKING HOTEL - October 6, 1975.

Mr. Chang extended a warm welcome and greetings to the Canadian Mission Members. He emphasized the need for increasing the friendly contact which will be of benefit to both countries. Mr. Chang added that his officials were very pleased to have the opportunity to discuss port and harbour technology, noting that the People's Republic is still developing its maritime capabilities. The exchange of information and experiences would be mutually beneficial. The Chinese officials were then introduced and Mr. Ni Yun-Ho of the International Shipping Division of the Water-Transport Bureau reviewed the ports and harbours which the Canadian Mission would visit.

Mr. Ni noted that China had a coast line of some 18,000 kilometers and its ports were extremely busy with heavy traffic at Dairen, Hsinkang, Shanghai and Whampoa.

Relics of past aggression and exploitation was still apparent at many ports; warehouses had been in very poor state of repair and in certain places wrecking of port and harbour facilities had taken place. Since liberation in 1949, a great effort had been made to restore PRC ports and increase the capacity so that vessel turn-around time could be greatly reduced. A 5-year plan was launched in 1953 to expand ports and harbours and to increase handling capability through greater mechanization.

At the present time, the People's Republic has 17 major ports receiving foreign vessels. Dairen handles general cargo and is a base for oil export. Hsinkang handles general cargo and exports coal, oil and other minerals. Shanghai is the largest port and Whampoa is concerned primarily with general cargo and packaged goods.

Mr. Ni said that significant improvements had been made during successive 5-year plans. At the same time he also noted that many vessels were still waiting in the roads and that PRC was alloting top priority to improving terminals, cargo handling equipment and developing new ports. The pace of development must be accelerated because present capacity is inadequate. Within the fifth 5-year plan, new construction will include special container terminals and larger oil wharves together with special ports for grain and ore. He commented on the new container terminal at Hsinkang, the grain handling terminal at Shanghai and stressed PRC's thrust toward self reliance. Mr. Ni anticipated that the planned technical exchanges with Canada would be mutually beneficial. His colleagues and associates would be pleased to receive the comments of the Canadian mission and will welcome suggestions for improvements.

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO CHINA OCTOBER 5 - OCTOBER 23, 1975

Visits to Machinery Import and Export Corporation

These meetings took place on October 8, 1975 and the purpose was to introduce and discuss Canadian capabilities in port planning, in port and harbour and marine terminal installations and in design, development and manufacture of cargo handling equipments. Individual visits were made by all industry mission members. Reports are summarized as follows:

Steadman Containers Limited

Mr. G. A. Alter met with Mr. Ho Shi-Chung, a member of the Third Directorate of Machimpex.

It was not possible to determine the level of Chinese interest in containers or the Steadman Sidelift machine. The questions posed by Mr. Ho seemed to indicate that the Sidelift was looked upon as a general purpose machine rather than a specialized container handling device. It seemed that the PRC official had no concept of the container business or of standardization.

Mr. Alter arranged to supply the Directorate with comprehensive literature for circulation to those officials in the ports, railroads and shipping industry sectors.

Stephens-Adamson

Mr. John W. Hay met with Mr. He Yun-Yung and the meeting opened with an exchange of pleasantries and references to the importance of mutual technological help and continuing friendship.

Mr. Hay spoke to the company's capabilities and long-time involvement and experiences in developing and manufacturing bulk cargo handling equipment. Company brochures and illustrative material was discussed and given to Mr. He.

The visit prompted very few questions and a very mild interest was evident. The general impression was that Mr. He had little knowledge of conveyor equipment. However, he was polite and very patient. Mr. He will no doubt pass on the literature to interested officials in his Directorate.

Allis Chalmers Rumely Ltd.

Mr. James H. Hopkinson met with Mr. Ho Shi-Chung and Mr. Wang Yu-Ching.

Allis Chalmers capabilities and product lines were reviewed with emphasis on forklift trucks and stevedoring equipment. With the aid of brochures and company literature, the efficiency and capability of the various forklift models was fully explained.

The Chinese officials asked questions concerning the comparative qualities and performance of similar Clark equipment. Mr. Hopkinson noted specific areas of excellence in his company's product lines and advantages such as the drive train and serviceability features. Apparently a Clark truck had been purchased at the Peking Show in 1973;

Mr. Ho had very little information on this and it was assumed that possibly another technical group of the Machinery Corporation was involved.

Mr. Hopkinson commented on the advanced and unique features of the Allis Chalmers stevedoring trucks. Mr. Ho said that they had many forklift trucks but was not aware if such a specialized stevedoring truck was in use in the Peoples Republic.

The Chinese officials were told of the Canadian Mission itinerary and of the plans to hold seminar discussions on returning to Peking. Further brochures and technical information would be supplied and the meeting closed on a cordial note with the impression that the Chinese had been stimulated by the technical discussions and the capabilities of the company equipment.

Swan Wooster Engineering Co. Ltd.

Accompanied by Mr. Kuo Lung-Ming, Interpreter, Mr. Leighton met with Mr. Ho Shi-Chung of the Third Directorate of Machimpex.

In introducing his company, Mr. Leighton explained the functions of consulting engineering concerns. He noted that his company's clients included the Canadian Government, Private Canadian and U.S. Corporations, United Nations, World Bank, Governments of India, Cuba, Indonesia, Pakistan, Brazil, Chile, Yemen and others. World-wide company projects were then illustrated by pictures of port installations and materials handling equipment.

A great deal of interest was shown in the pictures of equipment. Mr. Leighton was repeatedly asked if Swan Wooster manufactured any of the equipment. Mr. Ho was informed that this was not the case, but that most of the equipment was made in Canada. It was pointed out that representatives of some of the Canadian companies who did manufacture the equipment were with the Mission and would be visiting the Machinery Corporation.

The Machinery Corporation officials explained that their function was to buy individual items of equipment. Mr. Ho advised that Techimport officials would be very interested in hearing more of the Swan Wooster Company capabilities and operations. Two brochures were left; one a general introduction to the Company and the other describing and illustrating international projects.

Interpreter Kuo was very helpful in explaining the role of a Consulting Engineer. Prior to the meeting he asked questions on this subject and seemed to grasp the situation remarkably well. He was enthusiastic about the proposed visit to Techimport.

Interimco Ltd.

After some unscheduled delays, Mr. Terry P. Lewis met with Mr. Ho Shi-Chung of the Third Directorate.

The Thomas Company product lines were explained at length using illustrated materials and brochures. It was somewhat disconcerting at times since no translation was offered. It was possible that the interpreter did not fully understand the technological content and drift of Mr. Lewis' presentation. On the other hand, Mr. Ho may have understood since he nodded his head from time to time. Beyond that he made little comment during the presentation which took upwards of forty minutes.

At the conclusion Mr. Ho asked if Thomas made larger equipment than that displayed and he was advised that this was not the case. Mr. Lewis said that any larger equipment could not be used so efficiently in the tight corners within ships holds or confined spaces in warehouses. Mr. Ho concluded that there were many machines in use in China similar to the Thomas products. Mr. Lewis replied by noting that if this was the case, it was unlikely that they would be as versatile or efficient as the Thomas products.

Maritime Industries Ltd.

Mr. J. D. Shrive met with Mr. Pa Chon-Kwen, a responsible member of the Machinery Import and Export Corporation.

With the aid of the model photographs and diagrams, Mr. Shrive explained the construction and operating advantages of the Mariner propulsion unit. Mr. Pa appeared intrigued and interested in the equipment. He added that he would make further contact with Maritime Industries if his Directorate intended to pursue the matter. He was not familiar with the equipment but apparently had received relevant correspondence and material from the Canadian Post in Peking.

Canron Ltd.- Western Bridge Division

Mr. D. F. Soon met with Mr. Ho Shi-Chung and after exchanging greetings and formal courtesies, the range of Canron product lines was introduced. Mr. Soon gave a detailed commentary on company products reinforced by illustrations and the company's brochure which latter was left with the Chinese officials.

Emphasis was placed on container handling cranes and Mr. Ho indicated that this type of equipment was not unknown because they had purchased some from another country. The Machinery Corporation official advised that his Directorate handled commercial aspects only and that any requirement to purchase would be followed up by others. In the event that there was a requirement for Canron equipment, the Canadian company would be contacted.

The general atmosphere of the meeting was polite and reserved.

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO CHINA OCTOBER 5 - OCTOBER 23, 1975

VISIT TO MINISTRY OF FOREIGN TRADE - OCTOBER 8, 1975

Mr. D. J. Janigan accompanied by Mr. M. Galbraith and Mr. H. Roberts visited the Ministry of Foreign Trade on October 8, 1975. They were received by Mr. Cheng To-Pin, Director of the Third Bureau of the Ministry. The meeting opened with the usual polite exchanges.

Mr. Janigan said he was pleased to be visiting China with the Canadian Port, Harbour and Marine Terminal Technology Mission. The Mission Team looked forward to the opportunity of studying substantial Chinese accomplishments in this industry sector. Mr. Janigan noted that the Mission was one of a substantial program of mission exchanges between Canada and China which over the past four years have totalled 39 in all.

Mr. Janigan said that such missions prove excellent opportunities for mutual study and exchange of information on problems of concern; they were excellent vehicles for promoting friendship and understanding. He added that early next year at the Joint Trade Committee Meetings in Peking, the Canadian side will present proposals for 1976 mission exchanges. Mr. Janigan advised that he had been authorized to extend an invitation to the Peoples Republic to send a return Port, Harbour and Marine Terminal Technology Mission to Canada some time in 1976.

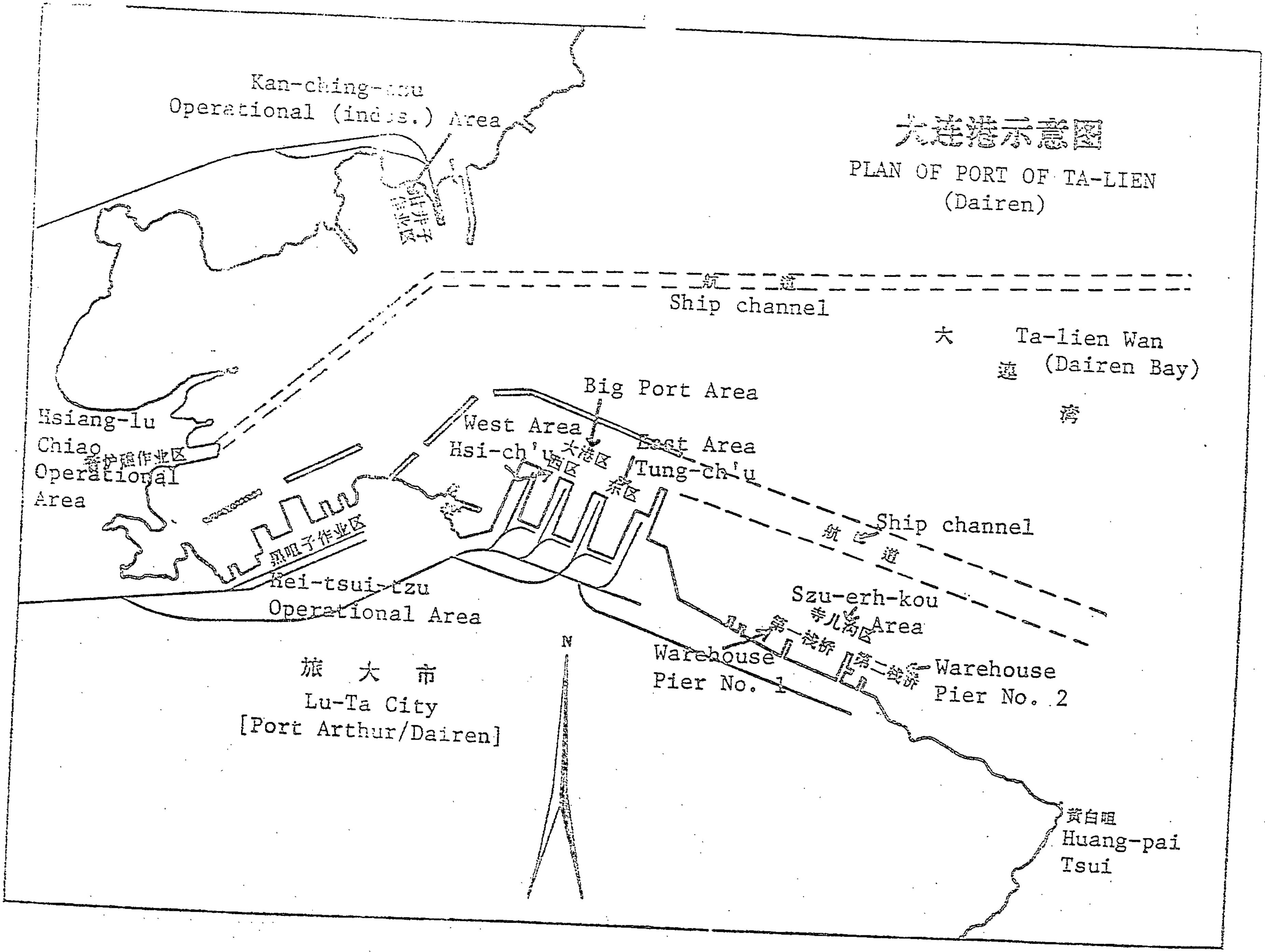
Regarding Chinese promotion activities, it was noted that in addition to a Native Products Corporation Mission to Canada this year, the Chinese are planning a major participation at the Pacific National Exhibition in Vancouver in 1976.

Discussions touched on the number of smaller exhibitions in China related to silk, textiles, bamboo and rattan wear, carpets and pharmaceuticals and furs. Canada would be interested in learning if these fairs together with increased promotional activity overseas may indicate a shift in the direction of export promotional efforts. Canada would also be interested to know of any area of co-operation in which we might work with the Peoples Republic to our mutual advantage, particularly in the area of exchanging information on Canada market opportunities or trends.

Mr. Cheng noted balance of trade problems and touched on some aspects of China's transportation problems. He added that the Peoples Republic is planning to improve its export record and will continue to welcome Canadian support.

Mr. Janigan mentioned that Canada was experiencing certain economic difficulties including inflation, unemployment and balance of payments; industries such as the textile business were particularly affected. He said that price delivery and performance coupled with a vigorous follow-up were essential to the exporting business and that Canada has long-term experience in trade fair activity and will be pleased to co-operate.

The meeting closed with expressions of goodwill.



大连港示意图
PLAN OF PORT OF TA-LIEN
(Dairen)
Operational
Area
航 道
Ship channel
大 连 湾
Ta-lien Wan
(Dairen Bay)
Big Port Area
West Area
Hsi-ch'u
大港区
西区
East Area
Tung-ch'u
东区
Hsiang-lu
Chiao
Operational
Area
香炉礁作业区
黑咀子作业区
Hei-tsui-tzu
Operational Area
Ship channel
航 道
Szu-erh-kou
寺儿沟区
Area
第一线桥
第二线桥
Warehouse
Pier No. 1
Warehouse
Pier No. 2
旅 大 市
Lu-Ta City
[Port Arthur/Dairen]
N
黄白咀
Huang-pai
Tsui

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

P.R.C. PORT OFFICIALS - DAIREN

MR. SHU SHI	Director of Dairen Harbour Administration
MR. LI YING-WU	Vice Director
MR. SYAU DZWO-TIAN	Chief of Mechanical and Electrical Division
MR. DZANG LI-SYANG	Head of the Office
MR. TANG JR-WEI	Head of Mechanical and Electrical Section
MR. GAO LIAN-BING	Staff Member
MR. CHENG HWAI-YUAN	Staff Member
MR. GAO JENG LIANG	Mechanical Engineer of Harbour Administration
MR. LIU DZ-TWEI	Technician - oil handling
MR. GAO HUAN-YOU	Technician - bulk cargo

VISIT TO PORT OF DAIREN

October 10 & 11, 1975

INTRODUCTORY REMARKS

The Canadian Group was warmly welcomed by Mr. Shu Shi, Director of the Revolutionary Committee of the Dairen Harbour Administration. Mr. Janigan replied appropriately expressing his pleasure to have the opportunity to see the port and share experiences with our Chinese friends.

Mr. Shu briefly reviewed the history of the port and said that construction commenced in 1899 and was completed in 1930. The port has six main areas with twelve finger type wharves for oil, timber, coal and other minerals; the grain wharf is under repair. Dairen Port handles coal, coke, rice, timber, oil and sorghum and port design capability is 1.2 million tons per year. However trade has exceeded expectations by a large margin. Dairen receives vessels from forty-five countries and has trade contacts with one hundred and thirty countries.

The port can handle 50 to 60 vessels up to 10,000 dwt and is equipped with 120 km. of train tracks. Deepest water is 10 metres and most of the load-up is direct to trains. Mr. Shu added that since 1949 the capability of the port has steadily increased and its facilities modernized. Planning for port extension and improvement is continuing. The terminal for oil export to Japan and Korea is still under construction and is expected to be completed to schedule.

Much of the handling equipment is made by the Chinese and certain cranes have been purchased from Italy, Hungary and Japan. Some mobile equipment is British made. The port's policy is to purchase from abroad if necessary and Mr. Shu said that there was still some 1930 vintage machinery being used but this will be phased out as the modernization program continues.

The port employs upwards of 16,000 people and women make up 50% of the labour force whereas before 1949 no women were employed. Dairen has a fifty-fifty export/import ratio and each year has exceeded its cargo handling quota.

PORT TOUR COMMENTS

General Remarks

The port facilities are fairly well maintained with most of the wharf structures of masonry or concrete crib design. There are four finger piers in the general cargo area, each with three berths on each side and the length of the fingers is about 450 metres. The fingers are about 400 metres apart and 250 metres wide allowing one or two vessels to be berthed at the end of the fingers. This provides for about 30 to 40 general cargo berths. Deepest draft is 10 metres.

Two-storey covered sheds have been erected down both sides of the fingers and aprons are about 15 metres wide. This space is fully occupied by the legs of Whirley cranes, making operations somewhat congested. Rail tracks in pairs are located on each apron and through the centre of the open storage area. Dockside cranes appear to be of good quality; Chinese-made level luffing 10 ton Whirley cranes and a few Italian and Hungarian cranes up to 20 ton capacity are of reasonably good quality.

The port officials advise that most load-up is done directly to trains and this may be the cause of the difficulty of access to the rear open storage area; this area was congested by miscellaneous products including steel skelp, aluminum ingots, chemical carbuoys in wicker baskets, structural parts, oil and gas piping of all sizes. Most of the latter appeared to be imported from Japan.

Fairly small bulk cargoes including chrome ore from Albania, phosphate rock from South China and rock salt were being off-loaded by Whirley cranes with clam buckets; some phosphate rock was being unloaded using cargo slings and unloaded directly into open-topped box-cars by hand labour. Cargo nets and slings were the principal handling methods and no pallets were seen in the port. Upwards of 25 ships were at the berths and 19 waiting. Because of the congested open-storage area, with much of the cargo being loaded directly to trains at dockside, it is concluded that the inland transport system may be the principal bottleneck to increasing port productivity.

Oil Terminal

The oil terminal has four berths and a 10 metre depth of water. During the visit, three tankers were being loaded and one of these was a 42,000 ton Chinese-built vessel which could only be part loaded because of draft restrictions. The piers at this terminal are built of concrete caisson dolphins 25 to 30 metres apart and connected by steel girder bridges with timber decks. Four oil lines serve the pier and all were insulated; size ranges were 30", 18", 15" and 12". Additionally, several ballast water treatment lines were installed and fendering at the dolphins was solid cylindrical rubber blocks. Oil is supplied to Dairen terminal by rail tank cars and pumped to storage through a loading system. There is no direct supply pipeline. The ballast water treatment plant was large in terms of the terminal size and this may indicate plans for future expansion.

Bulk Cargo Handling

We were unable to visit the coal dock which is a good distance from the general wharf facilities and the grain dock was under repair. A verbal description of the coal terminal was given. Wagons are of the hopper bottom construction and received at a station incorporating a screw conveyor which receives the material from the car and dispatches it to a belt conveyor. Wagons of 50 ton capacity are unloaded in ten minutes and the conveyor elevates the coal over a series of hoppers and it is distributed by means of a tripper. Chutes from the bottom coal pocket hoppers are directed into the ship hatches. This somewhat antiquated conventional method is still used in some ports at the present time.

Port authorities did not state the total yearly throughput and apparently this coal handling system is the only one at Dairen using a belt conveyor to handle bulk materials. Grain is unloaded using standard cranes with grab buckets which load rail cars directly alongside the berth. In some instances, ships gear is used for unloading and cargoes such as salt, chrome ore and soya beans are handled in this manner. Dairen is a general purpose port and apparently the volume of bulk materials handled does not warrant a mechanized system for receiving, storing, loading or unloading. We may assume that tonnages handled are not very large.

General Cargo Handling

Mobile cargo handling equipment was of a fairly standard type. Many of the lift trucks were made in China, several pieces of Japanese (TCM) equipment and British Rapier products were also being used. It was noted that all were straight lift trucks with forks only; loads were usually stored in a single pile. Drums were handled manually and set up in the upright position by two or three men after being transported into the storage area; it was apparent that attachments such as drum and bale clamps would be very useful. Sideloaders for use in connection with steel rods and pipes would provide a much more efficient operation. Railcars were not moved from the docks unless a locomotive was available; a land-rail pullcar would generally speed up operations.

Small mobile lifting equipment could be used to accelerate grain handling, in warehouse stockpiling and for clean-up in ships hold. It would be very suitable for rapid loading of trucks and cars from minerals stockpiled in the shipyard.

Containerization

There was no evidence of containerization at Dairen and the layout and location would seem to rule out its application in the normally accepted role. However, a "dry port" concept would lend itself quite well. There were several cranes which could readily handle 20 foot containers through the addition of a spreader. Assuming a six minute crane cycle, a train of only five cars could be loaded in one hour; two such trains could shuttle between the dockside and the dry port. Providing the inland port was equipped with a side-lift, Dairen could incorporate a small volume container operation. In terms of large container crane applications, the present port cannot be considered suitable due to space limitations. It would be necessary to handle upwards of a half million tons annually to justify one container crane. The port officials had some knowledge of large container cranes but apparently long term planning did not include this type of installation.

Barges and Lightering

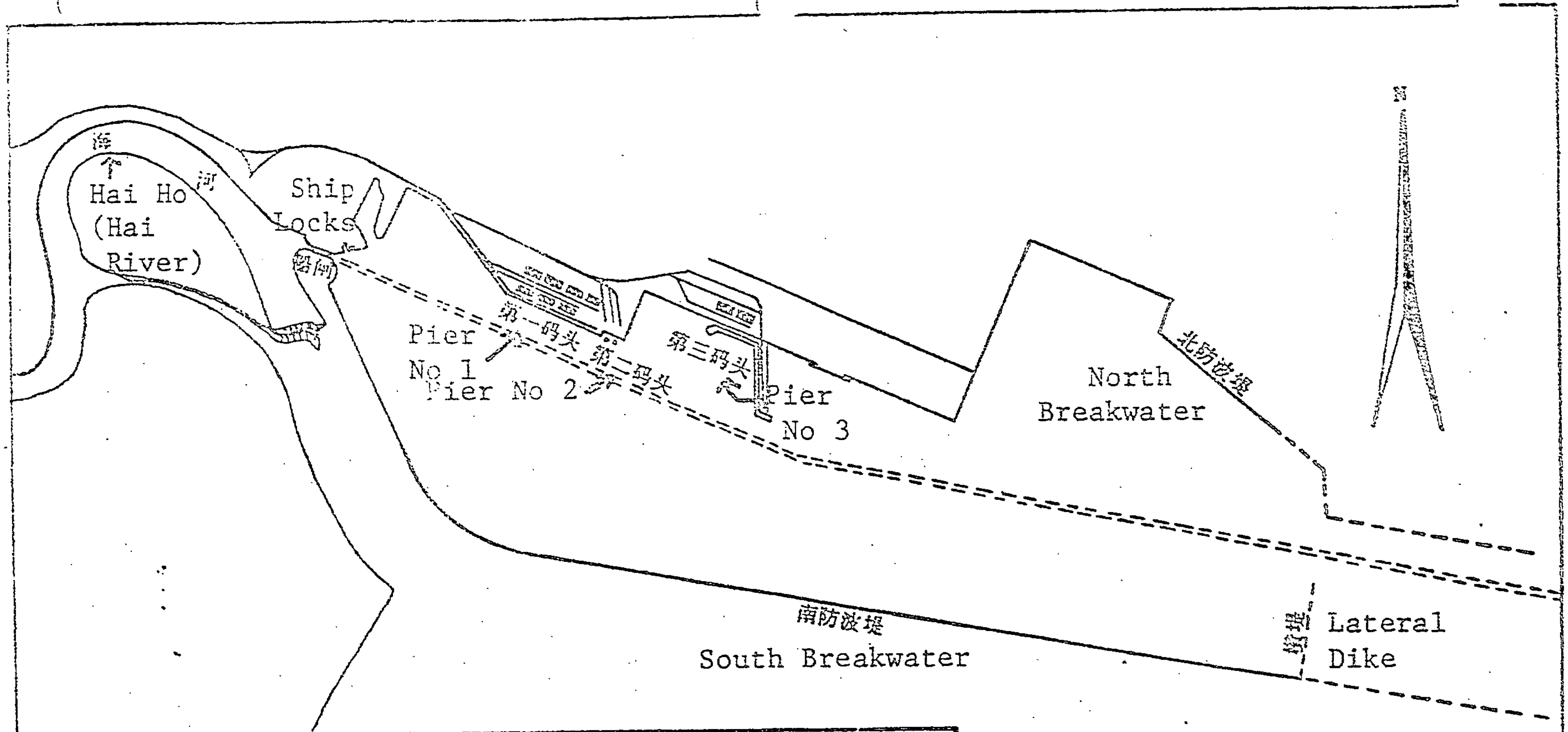
There are 17 barges in use at Dairen ranging in size from 600 to 1,000 tons. None of this equipment is self-propelled and no lightering is done. The barges ply between shore and vessels anchored in the harbour for resupplying drinking water, fuel oil and other commodities. At the time of the visit, there was very little barging activity. There does not appear to be any potential for supplying barge or lighter power drives to this port. In general terms the speed of port operations is fairly pedestrian.

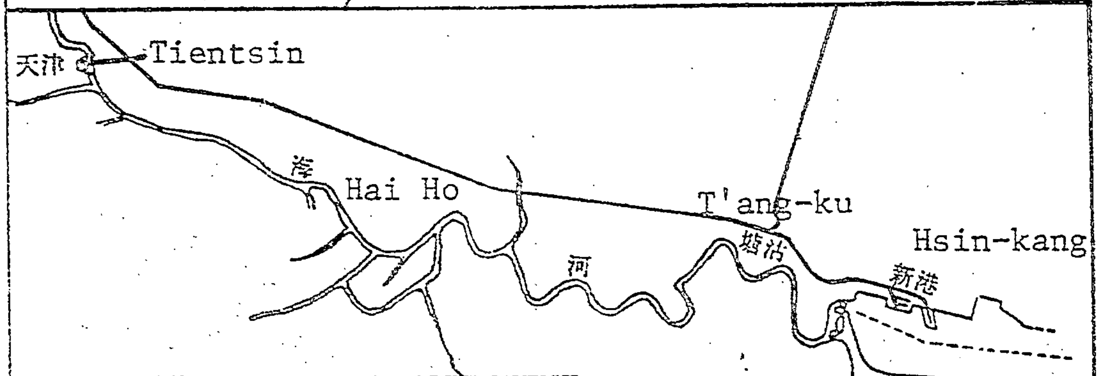
Canadian Industry Presentation

The Canadian Industry presentations to Dairen port officials were based on port-related product lines and capabilities. The general content covered the major aspects of port activities and cargo handling facilities.

Discussion following the presentations at Dairen focussed on container crane structural and performance data including horse-power requirements, ground pressures, lifting heights and speeds. General cargo handling questions included equipment maintenance and quick-change attachments. Bulk cargo loading and unloading speeds and the compatibility of Canadian equipment to Dairen port requirements were reviewed.

At the conclusion of the presentation the Vice Director of the Port thanked the Canadian Mission Team. He expressed pleasure and enlightenment at learning more of Canadian technology. He noted Canadian innovative methods and techniques and was impressed by the range of equipment reviewed. He concluded by extending Port of Dairen good wishes for continuing prosperity and deepening friendship.





DETAIL OF THE CONSTITUENT
MEMBERS OF THE PORT OF TIENTSIN
天津港组成部分略图

天津新港示意图
PLAN OF HSIN-KANG
(THE "NEW PORT") OF TIENTSIN

CANADIAN PORT HARBOUR AND MARINE
TERMINAL TECHNOLOGY MISSION TO CHINA
OCTOBER 5 - OCTOBER 23, 1975

P.R.C. PORT OFFICIALS - TIENTSIN HARBOUR ADMINISTRATION

MR. LI HWA-BING	Director of Harbour Administration
MR. WU HAI-CHING	Vice President of Harbour Administration
MR. WANG HAI-PING	Deputy Head of Mechanical and Electrical Division
MR. SHAO JI-LIAN	Deputy Chief Engineer
MR. CHENG WEN-LING	Secretary of the Office
MR. GUO	Personnel

P.R.C. OFFICIALS AT HSINKANG (TIENTSIN) SHIPYARD

MR. CHENG HAO-FANG	Deputy Director of Shipyard
MR. LIU YING-CHING	Chief Engineer
MR. PAN HWEI-HE	Director of the Office
MR. FAN SZ-CHANG	Head of Technical Section

VISIT TO HSINKANG (TIENTSIN) PORT AND SHIPYARD

October 12 & 13, 1975

INTRODUCTORY REMARKS

Mission members were received and welcomed by Mr. Li Hwa-Bing, Director of the Revolutionary Committee, Hsinkang Harbour Administration. There are ports at Tientsin, Tanghu and Hsinkang. Mr. Li said that Hsinkang is the outer port and can accommodate vessels up to 35,000 tons; Tanghu and the City of Tientsin can accept vessels up to 5,000 and 3,000 tons respectively.

Construction of the Hsinkang port began in 1939 and the Director added that under Japanese aggression it was extended for the purpose of plundering Chinese resources. Between 1939 and 1945, five berths were in existence, four of which were for general cargo. After the Japanese surrender in 1945 conditions at Hsinkang deteriorated under the old régime. With the establishment of the People's Republic of China in 1949, port improvement and reconstruction began on a planned basis; canals were re-opened, warehouses rebuilt and by 1952 the port was able to accommodate 10,000 ton vessels. Between the years 1958 and 1974, thirteen berths were constructed for vessels of 10,000 dwt. and above. The port authorities have long-range plans for further improvements, more berths and a new container terminal. The Director noted that further effort is needed to improve cargo handling equipment, mobile machinery and warehousing facilities. The current long-range plan embraces all aspects of port and harbour improvement and has the enthusiastic support of the workers.

Mr. Janigan thanked the Director for his lucid description of Tientsin ports, and introduced the Canadian Mission Members. He explained the importance of Canadian port development and improvement in terms of international trade. He noted Canada's extremely long coastline, the country's relatively small population and the technological advances made in all sectors of communication.

PORT TOUR COMMENTS

General Remarks

The Port of Hsinkang is the "outer port" of Tientsin. It is at the head of a dredged channel reported to be some 20 km. from the open sea. From the description given at the briefing, and what was seen, the following berths are available or under construction:

A four-berth quay for general cargo plus one bulk loading berth for salt, all having 10 metres of water at low tide (12,000 ton ship, plus or minus) - built in 1939-45; rehabilitated and deepend in 1952.

Thirteen berths built between 1958 and 1974. Of these, seven have 10 metre and six have 12.5 metre draft good for ships up to about 35,000 dwt. Although the quays are built about half the berths are very congested and only able to operate at partial capacity because the land behind the aprons has not been filled. We were told the crushed stone which was being used for filling, was hauled (by trains) from quarries 200 km. distant. The waste silt from the river dredging is being placed in the "back-land" areas which are being reclaimed from salt marsh. It will take several years of settlement to become useable load-bearing land.

Six new berths are currently under construction with the quays about half built. One of these will be a 300 metre long container berth.

The port appeared busy judging by the number of ships at dockside but the productivity appeared low; for example only two hatches were being worked on a 10,000 ton ship. As at Dairen, the bottleneck appeared to be on the land side where quays are crowded because of incomplete construction and possible lack of rail capacity; almost all cargo is hauled to and from the port by rail except for what appeared to be local traffic destined for Tientsin.

It is estimated that the port is handling not more than 30,000 to 40,000 tons/berth/year; a figure below that of many lesser-developed countries.

Construction of quays is of good quality. All structures are founded on precast reinforced concrete piles about 60 cm. square, both vertical and batter piles. The caps are small, square, poured in place concrete, cast individually on each pile after cut-off. The deck structure is entirely precast concrete beams on each bent, stringers and panel slab deck. In Canada, pre-stressed concrete with fewer piles and longer spans, would be used. Pre-stressing beds were not seen and when questioned, the Chinese did not seem to understand this technique. (Subsequently a large pre-stressing plant was seen at Nanking).

The quay arrangement is first class and when finished will provide large open areas and good space for transit sheds. The few existing transit sheds were built for forklift operation without loading docks - an excellent modern arrangement. Few transit sheds existed, apparently because of high settlement under filled areas. Those which did exist were of brick and badly cracked by settlement. Many sheds will eventually be needed and this would appear to be an excellent application for wide-span light weight steel portal-framed prefabricated buildings such as the Butler or Amico type made in Canada. These buildings can be erected quickly and are not highly sensitive to foundation settlement. While there is no doubt the Chinese are capable of manufacturing such buildings, none have so far been seen. If they are urgently needed in Hsinkang, they may be a saleable item and Canadian suppliers will be advised accordingly.

A large amount of foreign mobile equipment was seen in the port and in transit through the port, principally of Japanese manufacture.

The bulk export terminal was designed for unloading salt from rail cars by bucket elevator, and stacking in stockpiles. Two car unloaders (at eight minutes per car) about 250 tons per hour were placing salt in two stockpiles. Reclaiming was by eight 250 tons/hour traversing bucket reclaimers onto yard belts. Yard belt capacity was only 500 tons per hour for each of two yard belts so that no more than four reclaimers could operate simultaneously. Each yard belt fed a separate slew-boom shiploader of 500 tons capacity to provide total shiploading capability of 1,000 tons per hour. Size of yard appeared to be between 50,000 and 100,000 tons, indicating an export potential of 500,000 to 1,000,000 tons per year.

Small cargoes of bulk material (probably phosphate and potash) are unloaded direct from ship to rail cars using standard dockside cranes and traveling hoppers mounted on crane tracks.

The maintenance shop seemed overwhelmed with equipment requiring servicing. About 20 mobile cranes of various capacities and some ten or twelve forklifts were lined up apparently awaiting service.

The 300 metre container berth is only long enough to accommodate a single "third-generation" container ship. Since it is at the back of a slip (or pocket) it cannot be extended in length. This is not a good arrangement; preferably several berths should be placed in line to optimize the use of expensive container cranes. Mission members were told at one point that the container cranes were being built in China and at another time that they had been ordered from Japan. The need for a heavy log-grappling front-end loader was indicated to handle logs up to one metre in diameter and up to ten metres long.

Bulk Cargo Handling

The overall cargo handling operation consisted primarily of Whirley cranes handling general cargo. There was a single bulk handling system for salt; all other bulk operations used grab buckets with cranes handling material from railcars to the vessels or from ships to dockside or railcar.

Salt is mined in large quantities nearby and the bulk salt handling system is well designed. It consists of two runs of rail lines at right angles to the dock and 50 ton capacity railcars are stored for the lengths of these rails. A combination car unloader and stacker straddles the car. This is a self propelled gantry unit on rails. The unloader mechanism travels the total length of the connected cars which are unloaded in eight minutes. This unit incorporates a bucket elevator having two rows of buckets moulded on a chain. It is of similar construction to units used on river barges in the U.S.A. The bucket elevator discharges salt to a boom belt which in turn unloads to the stockpile. The booms are a luffing and slewing type to suit the pile. In this way two piles are built up by the two strings of railway cars at a rate of approximately 350 tons per hour.

On each stockpile of salt there are two bridge-type bucket wheel reclaimers with a capacity of 250 tons per hour. These reclaimers are mounted on separately driven steel wheels at either end of the bridge.

These two reclaimers for each string of cars in turn feed a 36" conveyor belt and discharge on to a shiploader at 500 tons per hour. The shiploader is a fixed structure with a slewing and luffing boom. At the discharge end of the boom is a flexible spout to allow trimming of the vessels. There are two shiploaders, one for each string of cars. No information was available on the total tonnage per year but it is estimated at approximately one million tons.

General Cargo Handling

The mobile cargo handling equipment is generally of a type used in Canadian and world-wide ports. Many of the forklifts are made in China and Japan. Machine capacities appear to range from one to fifteen tons and palletized loads were being handled including bagged material, cartons, bales, newsprint and general steel cargo. Large drums containing liquids might have been more efficiently handled using special clamps; similarly bale clamps would facilitate handling of loads which have to be placed on trucks or into warehouses. Three and six ton lift trucks were used in ships holds.

This port would benefit by using special stevedoring and improved standard-type forklift trucks. Port and harbour extensions will necessitate additional forklifts as well as a wider range of special attachments. When the container terminal is finished, there will be an obvious requirement for ten ton trucks. It was noted that Chinese-made trucks are unwieldy, cumbersome with poor visibility, and a large turning radius. Modern conventional trucks are certainly more manoeuverable, easier to maintain and with much better operator control.

Hsinkang lacks warehouse facilities and storage sheds. When the extensions are completed this port would certainly benefit from a fleet of smaller, more mobile loaders for use in ships holds and the rapid movement of cargo to warehouses and sheds. At present, logs shipped in from the Phillipines are handled and transported inefficiently. There is an obvious need for better grapple loading equipment.

Containerization and Cranes

The only containers on view at Hsinkang were six 10 foot units owned by Shincoa Transporting of Japan; these are not considered to be standard items. The new container terminal appeared to be developing slowly and port officials advised that the first pier would be 30 metres by 300 metres and be equipped with two container cranes. It was not possible to determine just where these large cranes would be manufactured. Discussions revealed that Italian-made general cargo cranes have been installed over the last years and currently twelve similar cranes manufactured in Shanghai are being erected.

A 100 ton floating crane was recently completed and a massive 200 ton crane for ship construction is being installed. Hsinkang port officials advised that straddle carriers were being considered for the container terminal; probably these machines could be built at the Shanghai heavy equipment factories.

Barges and Lightering

Upwards of 80 barges are being used to move cargo between Tientsin and Tanghu. Average barge size is about 800 ton capacity and there are a few up to 3,000 tons. None of these vessels are self propelled and speeds may be between six and seven knots. Most of the barges have living accommodation and the configuration of the stern sections varies. It was apparent that adopting a Canadian-built Mariner unit would involve a few problems. However these would not be insurmountable. Additional barges are being built which, under present arrangements, will necessitate additional tugs. A good level of interest was apparent in discussing the obvious advantages of the Mariner drive units.

Hsinkang Shipyard

This is a well planned yard still under development and it is designed to produce freighters and tankers in the 5,000 to 15,000 ton range. At the present time the shipyard employs about 4,700 people and it is expected to increase this labour force to some 6,400 employees when the facility is completed.

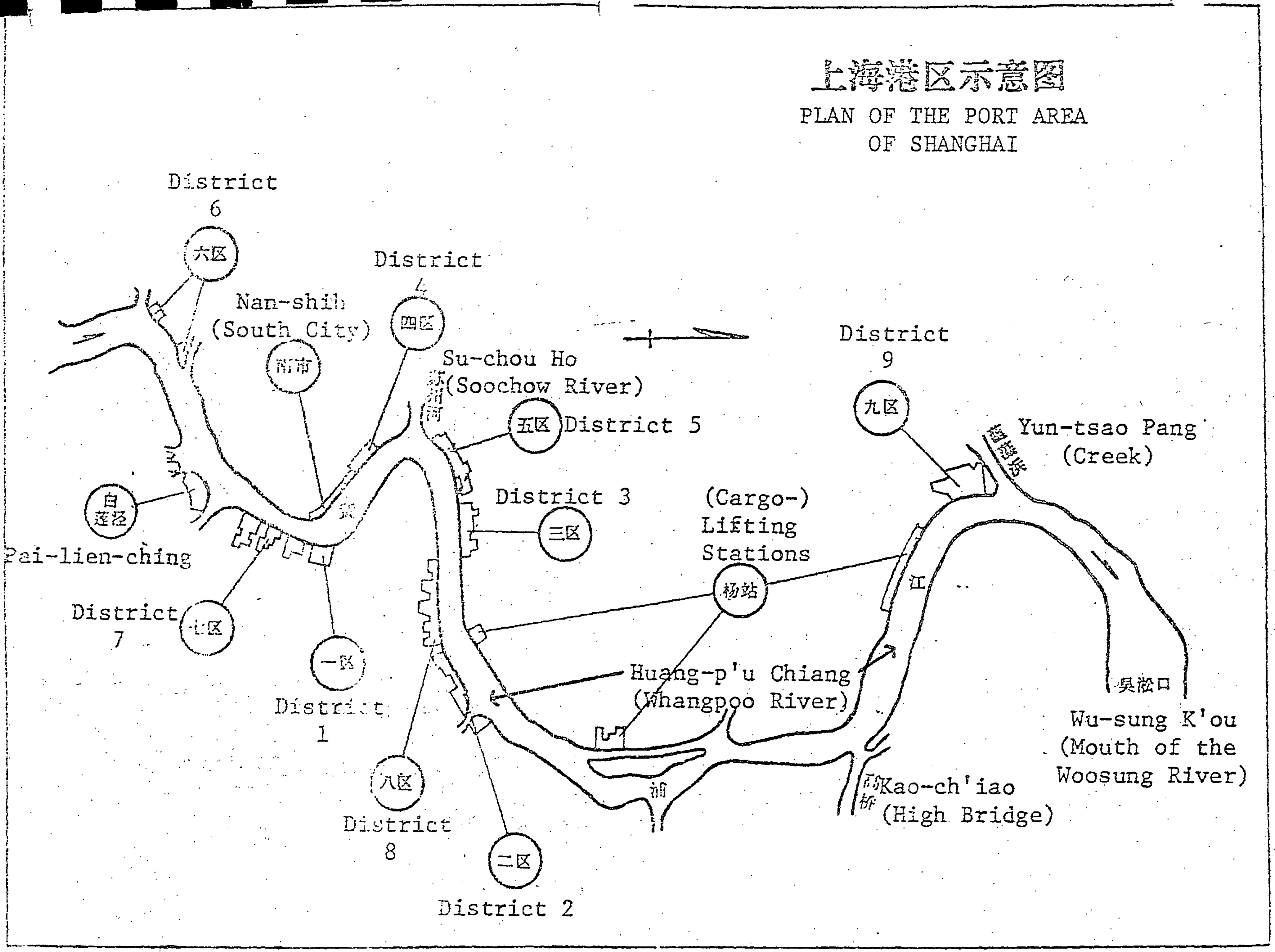
There are two dry docks, two outfitting basins and modern launching ways designed for 15,000 ton ships. Large building sheds have been erected for the fabrication of ships sections; these will then be welded together on the end-launching ways aided by a new heavy duty bridge crane of modern design. Wheel loads on this crane are approximately 40 tons each which is much higher then the usual North American average of some 25 tons per wheel. All structures, crane rails and shipways are found on piles.

Inspection and repair of domestic vessels is undertaken in dry dock. The capacity of the larger dry dock is 25,000 tons having the length of 212 metres and the width of 28 metres.

The shipyard facility includes a modern machine shop which is very well set out and equipped with several advanced material cutting and forming machine tools. Several pieces of equipment had digital readouts and it is quite apparent that local skills will be able to manage and operate numerically-controlled machine tools. An apprentice training school is in operation at the shipyard. Altogether this is quite an impressive and well-organized facility.

Canadian Industry Presentation

These presentations were well detailed and gave rise to a number of questions and a fair amount of discussion. Port officials were interested in the size of internationally-used standard containers and in stacking techniques. Discussions related to very large 40 ton container cranes, were focused on wheel pressure, size of wheel bases, all up-weight details and, design and manufacture delivery schedules. After reviewing capacity for design and production of forklifts, the Port technical officials posed questions concerning log handling and palletized loads. A lively interest was evident in propulsion units for barges. With the increase of cargo traffic between Hsinkang, Tientsin and Tanghu, it was evident that the port engineer and technical people may give very serious consideration to improved propulsion methods.


上海港区示意图
PLAN OF THE PORT AREA
OF SHANGHAI
District 6
六区
Nan-shih
(South City)
南市
District 4
四区
Su-chou Ho
(Soochow River)
苏州河
五区
District 5
District 3
三区
白莲泾
Pai-lien-ching
District 7
七区
一区
District 1
八区
District 8
二区
District 2
(Cargo-)
Lifting
Stations
杨站
Huang-p'u Chiang
(Whangpoo River)
District 9
九区
Yun-tsao Pang
(Creek)
蕴藻浜
吴淞口
Wu-sung K'ou
(Mouth of the
Woosung River)
高桥
Kao-ch'iao
(High Bridge)

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

P.R.C. PORT OFFICIALS - SHANGHAI HARBOUR   October 14, 1975

MR. YU HSING-CHOU	Responsible RC Member of the Shanghai Harbour Administration. (SHA)
MR. CHOU HUNG NYAN	Responsible RC Member of the Office - SHA
MR. LI SHENG	Responsible Member of the Mechanical and Electrical Section - SHA
MR. WANG HSING CHYWAN	Responsible Member of the Planning Section - SHA
MR. SYU GANG	Cadre of the Office of RC - SHA
MR. JIANG JIN	Cadre of the Office of RC - SHA (Interpreter)

October 15, 1975 - DISTRICT NO. 2 (GRAIN TERMINAL)

MR. JI BEN SYANG	Responsible Member of the RC #2 District - SHA
MR. MENG LIN	Responsible Member of the Office of the RC #2 District - SHA
MR. WU LIANG HSIEN	Responsible RC Member of the Production Section #2 District - SHA
MR. HANG CHENG	Responsible RC Member of the Mechanical & Electrical Section, #2 District - SHA
MR. CHYAN YOU FU	Cadre of the Office of the RC, #2 District, SHA.

SHANGHAI HARBOUR MACHINERY FACTORY - October 15, 1975

MR. SYUN YUNG SYAN	Responsible RC Member of the Shanghai Machinery Factory
MR. CHOU JYUN PU	Leading Member of the RC
MR. WU SYAN DA	Responsible Member of the Technical Office of the RC

SHANGHAI HARBOUR - NO. 5 DISTRICT - October 16, 1975

MR. HUO YING LUNG	Vice Chairman of the RC
MR. CHOU DZAI LUNG	Member of Technical Equipment Group of the RC
MR. YE HUNG FAN	Member of Production Group of the RC

SHANGHAI HARBOUR - TECHNICAL DISCUSSIONS - October 16, 1975

MR. YU HSING CHOU	Responsible RC Member - SHA
MR. CHOU HUNG NYAN	Responsible Member of the RC - SHA
MR. LI SHENG	Responsible Member of the Mechanical & Electrical Section - SHA
MR. WANG HSING CHYWAN	Responsible Member of the Planning Section- SHA
MR. SYU GANG	Cadre of the Office of RC - SHA
MR. JIANG JIN	Cadre of the Office of RC - SHA (Interpreter)
MR. WEI JR AN	Leader of the Mechanical & Electrical Section of the RC - SHA
MR. HUANG YU RUNG	Engineer of the Mechanical & Electrical Section of the RC - SHA
MR. JU TING HAU	Technician of the Mechanical & Electrical Section of the RC - SHA
MR. YU JR JIANG	Technician of the Mechanical & Electrical Section of the RC - SHA

VISITS TO SHANGHAI HARBOUR

October 14 - 16, 1975

INTRODUCTORY REMARKS

The Canadian Mission was warmly welcomed by Mr. Yu Hsing-Chou, the Responsible Member of the Shanghai Harbour Administration, who briefly reviewed the general port areas and activity. Mr. Yu said that the port, on the Whangpoo River, is one of the largest in China with more than 100 berths, 80 of which can accommodate vessels of 10,000 tons. There are nine main port districts and as yet the container terminal has not been started. The port has a large labour force of 40,000 people and handles 53 million tons of cargo annually. (On review this estimate is considered to be quite high). More than 2,000 pieces of cargo handling equipment are in use along the 61 km. of berths. Great improvements and a much higher level of efficiency in cargo handling have been achieved since liberation in 1949. Mr. Yu advised that foreign trade was increasing quite rapidly and that it was impossible to see all the port in so short a visiting time. However he was sure that the grain terminal at District No. 2 would be of great interest to the Canadian team. Mr. Yu concluded with the hope that the Mission would enjoy its short stay in Shanghai and that the visit would be mutually beneficial to Canada and the Peoples Republic of China.

Mr. Janigan introduced the Canadian Team and on the Mission's behalf expressed pleasure of the opportunity to co-operate with Chinese officials to port development projects. He advised the Shanghai Port officials that the Mission team included senior representatives from Canadian industries concerned with port development and cargo handling. The Mission Leader expressed his confidence that discussions would be very beneficial to all concerned.

No. 2 District Grain Terminal

This terminal has several berths which discharge wheat by traditional methods. It also includes a very new mechanized wheat unloading system. District No. 2 also exports rice to international markets. The traditional method for unloading wheat is to attach two or three grab buckets to ships gear which unload the hoppers on to the quay. The grain is then conveyed by a series of portable conveyors to a bagging shed for onward transportation by road or to barges for moving to up-river destinations. No rail service to the terminal was apparent and road congestion is extremely heavy.

New Grain Terminal

This terminal for bulk unloading of ships and transfer to dockside silo storage had just been completed and was undergoing "running-in". The single grain berth accessible to the new equipment has a 9 metre draft. At the time of our visit a 10,000 ton Chinese bulk carrier carrying Australian wheat was being unloaded.

The new terminal is a well built concrete structure with 18 silos and a bagging warehouse. The silos have a capacity of about 600 tons each and are approximately 40' diameter x 140' high.

To unload the grain there are five travelling pneumatic unloading gantries. Each unit has a luffing and slewing boom to support the suction pipe which unloads the grain. Receiving the grain from the pneumatic units is a hopper and discharging conveyor which is mounted on the gantry. Each suction pipe can unload 100 tons per hour giving each unit a rating of 200 tons per hour.

The discharging belt conveyors on the gantry feed receiving belt conveyors in the terminal. There are two pairs of these conveyors feeding into a central receiving conveyor. The pairs are about 36" belts, troughed at 30^{o} and running at 400 feet per minute; each is capable of handling about 600 tons per hour. The roof of the receiving gallery is cantilevered to allow the discharging belts free travel.

The central receiving belt is an inclined conveyor about 72" wide and 30^{o} trough; it is about 400' long carrying into the centre of the building. Grain is discharged into a large hopper with a weigh scale suspended below. The dust collection system is very efficient. After leaving the weigh scales, the grain is distributed to three sets of elevators: each set consisting of two belt-bucket elevators about 140' high, each with a capacity of about 600 tons per hour. The elevators discharge on to three belt conveyors about 42" wide by 300' long running over the silos. The grain is distributed by two-way belt conveyor trippers into the silos.

All equipment is of high quality. The conveyor steel work is well designed and fabricated and would compare favorably with a contemporary 1975 built Canadian Terminal. The chute work at transfer points is excellent with no evidence of spillage. The grain is reclaimed from the silos by gates and belt conveyors and carried over to the bagging area where it is bagged automatically and stored ready for truck shipment.

At the same time grain was being unloaded to the new terminal, and grain from the ship was being loaded into barges alongside. This operation was being handled by ships gear dropping the grain into a hopper arrangement on the barge.

The new terminal was reported to have been designed at the Shanghai Technical Institute and to have been built of all-Chinese equipment in twelve months. It appeared of excellent design and superior to most Canadian grain elevators in general arrangement and accessibility.

No.5 District General Cargo Wharf

This terminal handles international import and export cargo and is capable of berthing vessels up to about 20,000 tons at 10 metres draft. The District comprises of 1,200 metres of quay and has six or seven berths. There are 100,000 square metres of covered storage. Approximately 600 vessels berth at this terminal per year (foreign trade) and the terminal handles 3,000,000 tons per year.

Thus it can be deduced that on the average each vessel discharges or loads about 5,000 tons of cargo. Assuming 85 percent berth occupancy each ship on the average spends about 3.33 days at berth. This represents an overall handling rate of about 63 tons/hour/ship. If an average of 4 hatches/ship are worked simultaneously, gang productivity is about 16 tons/gang hour which is a relatively high figure. These figures must be modified to reflect the partial discharge and loading of cargo at mid-stream buoys.

Gangs range in size from five men on steel (skelp and structurals) to seventeen men on general cargo. In the case of general cargo about thirteen men will be working in the hold largely manhandling cargo with about four on the quay on hooks and tractor-trailer trains.

There is no rail service to the terminal. The basic operation is from ship direct to tractor-trailer, thence into transit shed storage or open storage areas. From storage a small portion is truck hauled to Shanghai and adjacent areas with the majority going back onto river ships and barges for up-river transport. An interesting system comprised a small opening in the quay face with a lighter basin behind the main wharf apron and a two ton bridge crane for direct transfer from ship's hold or large barge to river lighter.

In general the operation was clean and well run. Approximately 80 feet of open dockside apron is located by an open storage area some 120 feet wide. There are frequent generous aisles between these areas to rear transit shed storage.

It is estimated that more than 50 percent of all cargo goes direct to open storage or to barges or other ships for up-river transport. Transit sheds were only in use to about 50 percent of their holding capacity. The whole operation was palletized using steel pallets. The open storage areas were full of Japanese imports mainly steel skelp, metal ingots, pig iron, heavy machinery, chemicals, pipe and sealed pre-packaged products. Transit sheds contained baled cotton which presumably is raw material for China's textile industry and the usual food products for export plus textile machinery spare parts going to Pakistan and Africa.

The dock had large numbers of Chinese made mobile cranes up to about five ton capacity and Chinese forklifts up to ten ton capacity. There was one British crane of eight ton capacity and several fifteen ton Toyota forklifts. It was interesting to note that although the dock has two or three new five ton Chinese dockside cranes, the Port Director prefers the use of ships gear which was being used throughout.

We were subsequently informed in Peking that at Shanghai approximately 30 percent of the goods go into local consumption by either small barge or road truck. Approximately 30 percent goes up-river on larger barges or river freighters. The remaining 40 percent goes inland by rail. Apparently there is rail service to some international cargo terminals - specifically mentioned was the 9th District.

Containerization

No container activity was seen at Shanghai but the possibility of a container berth has been noted. At the Shanghai Machinery Factory the officials were asked about the container crane construction and we learned it is possible that a crane or cranes for Hsinkang would be designed and made at the plant. The Machinery Factory is very well equipped and would be capable of producing a 40 ton capacity container crane. As previously noted it was not possible to see the full extension of Shanghai port and harbour installations. The volume of miscellaneous cargo certainly merits serious consideration being given to a container facility.

General Cargo Handling

In general terms the terminal visited was well equipped with Chinese and Japanese made forklifts and cargo handling vehicles. The smaller Canadian made loader might be useful for clean-up purposes. Palletized loads were being handled on slinging bags in rope cradles and oil drums transferred using chain slings. Special clamping attachments would make for a much more efficient operation. Since the day's visit was restricted to the Grain Terminal, it was not possible to examine other potential applications for forklifts or comment in depth on general cargo handling. Additional information on this subject is provided in the report on No. 5 Terminal.

Barges and Lightering

Barges under the Shanghai Port Authority and private jurisdiction are widely used for hauling miscellaneous cargo such as coal, grain and domestic commodities to river destinations. Under the Port Authority barge capacity totals some fifty thousand tons and we were advised that this capacity will not be greatly expanded. Barges range in size from 50 to 2,000 tons with an average size of about 100 tons. A typically small 135 h.p. tug is used to pull six to eight in-line barges at a very slow speed. There are no self propelled barges in use.

Shanghai Machinery Factory

Mission members were welcomed by Mr. Syun Yung-Syan, the Responsible Member of the Revolutionary Committee. Mr. Syun gave a general description of the factory and said that in former days it was a small operation,employment about 100 people primarily repairing small harbour craft. Since liberation new production methods and product lines have been developed. In 1960 production was started on towing vehicles and belt conveyors having a capacity of up to 5 tons. Further facility restructuring and modernization led to the design, development and production of 10 ton dockside cranes and 15 ton truck cranes. At the present time the facility is able to produce cranes up to 60 ton capacity.

In the drive toward self reliance the Machinery Factory is designing new and improved products such as 7 ton gantry cranes, heavier Whirley cranes and special cargo discharging and loading equipment to meet Shanghai port requirements. The overall aim of the plant is to satisfy all local port equipment requirements. Mr. Syun added that container cranes are in the design stage. He rounded off his general remarks by extending warmest wishes to the Canadian visitors.

In general terms the machine tools and metal working equipment were fairly modern and well aligned for flow production. Several impressive and large boring, forming and gear cutting machines had been designed in the plant. As far as could be discerned components were routed through the workshops using a manual scheduling system and quality control methods were not intensive. The majority of the shop floors were unfinished - that is dirt floors. However precision machine tools such as shaft and gear grinders, high speed lathes and milling machines were producing components to fine tolerances with a high class finish.

Safety standards were rather low and scrap ends of materials lying on the shop floor occasionally presented real hazards; in all housekeeping seemed to be rather lax. We were told that the factory consistently topped its set annual targets. It was apparent that with improved production disciplines output could be increased still further.

Canadian Industry Presentation

Prior to the technical presentations, the Mission Leader thanked the Shanghai officials for their kindess and consideration in changing schedule arrangements to accommodate those Canadian visitors wishing to see No. 5 General Cargo Terminal. Mr. Janigan added that Mission members were greatly impressed by the level of activity in the harbour and the advances made in manufacturing technology evident at the Machinery Factory. He continued by briefly describing the Canadian scene; the long coastline, dependency on export trade, advances made in transportation and communication systems, the coast to coast rail and road network, modern Canadian ports and terminals, and problems in transportation many of which are similar to those presently being experienced by the Peoples Republic. Mr. Janigan noted that the Canada-China trade in 1974 totalled some $500 million and added that the bulk of this was grain exports. Canada and China having mutual development problems can resolve many of them in the spirit of friendly cooperation.

The Harbour Officials showed great interest in the technical presentations and a vigorous discussion and question period followed. Many aspects of bulk cargo and general cargo handling problems and techniques were reviewed. In particular the port technical people posed pertinent questions concerning bulk handling systems and automatic ship unloaders such as those used on the Great Lakes. Some previous reference had been made to containers and container terminals; it was pointed out to the port officials that container business inevitably will continue to expand and that a port such as Shanghai, handling a wide variety of cargoes, should seriously examine potential container business and the need to develop adequate facilities. Container terminal development, installation and equipment costs were discussed and the obvious advantages of inland dry ports were emphasized.

In the main, general cargoes at the Shanghai harbour berthing stations were handled by standard-type forklifts which, although ruggedly constructed, do not have the capacity and maneuverable capabilities of Canadian designed vehicles. In discussing general cargo handling, the Canadian side emphasized the special advantages of mobility and quick-change attachments for lift trucks.

Shanghai Industrial Exhibition

Several of the mission team visited the Shanghai Industrial Exhibition which was held in the same hall where the Canadian Electronic and Scientific Instrument Exhibition was staged in 1974.

A wide variety of equipment was on display ranging from agricultural and shipbuilding exhibits to clothing, electronic equipment and medical instrumentation. Several exhibits were scale models. A listing of some of the notable displays follows. No descriptive literature was available.

Exhibits incorporated many innovative features and generally demonstrated state of the art technology. The display emphasized that China is moving toward industrial parity with the rest of the world in many manufacturing, construction and assembly techniques.

Shipbuilding and Marine Engineering

Drillship for Oil Exploration

Ice-breaker Vessel

Suction and Bucket Dredges

Floating Dry-Dock - 25,000 Ton Capacity

Electronic Navigational Equipment

Magnetic Radar Equipment.

Vehicles and Agricultural Equipment

32-ton Dump Truck for Mining Operations

Foam Firefighting Truck

High Capacity and Mini-buses

Combine Harvester

Rice Planting and Harvesting Equipment

Walking Tractor

Miscellaneous Exhibits

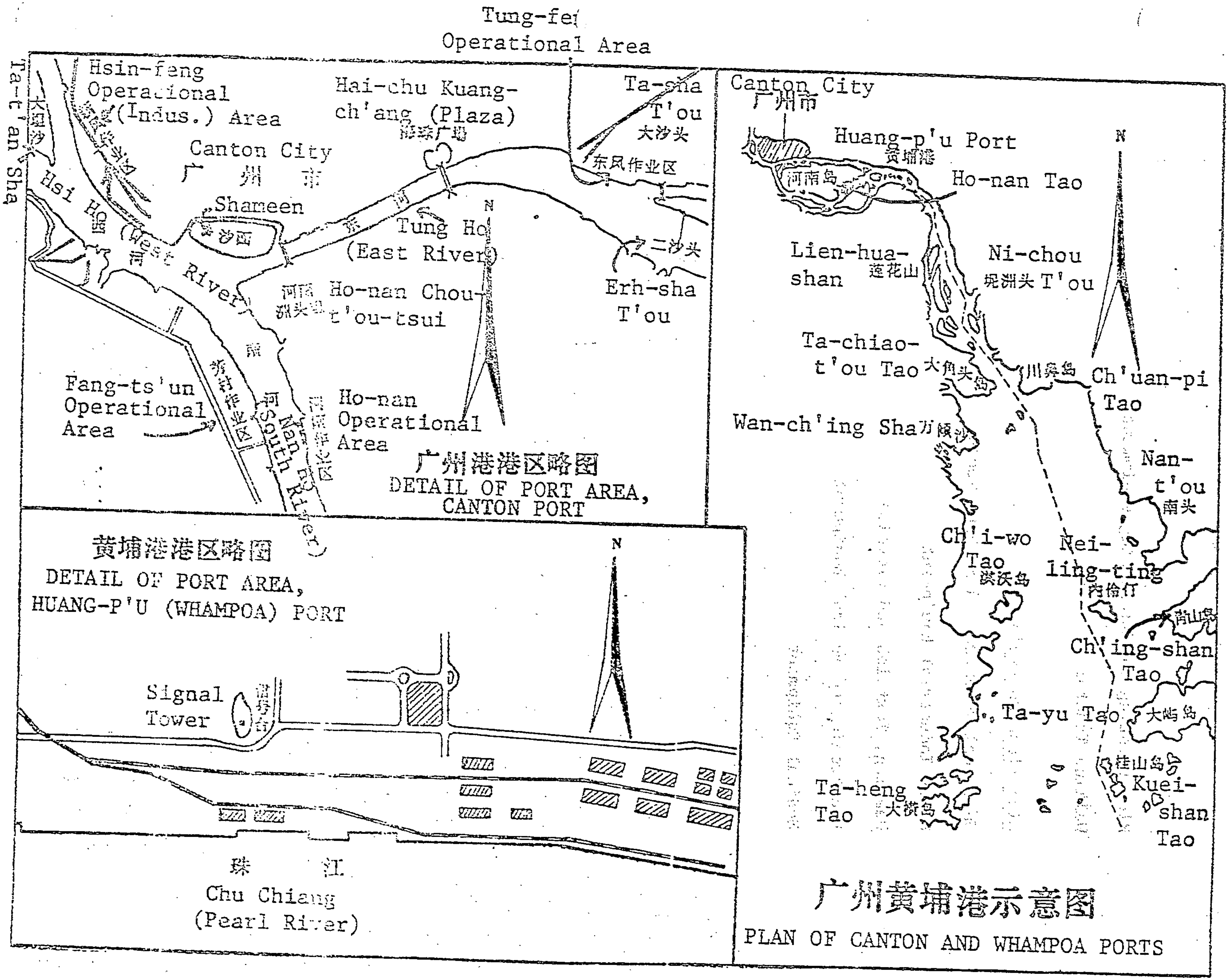
Numerically-controlled Machine Tools

Heavy Industrial Equipment

Weaving, Textiles and Clothing

Electronic and Musical Equipment

Medical Equipment



广州港港区略图
DETAIL OF PORT AREA, CANTON PORT

黄埔港港区略图
DETAIL OF PORT AREA, HUANG-P'U (WHAMPOA) PORT

广州黄埔港示意图
PLAN OF CANTON AND WHAMPOA PORTS

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

P.R.C. PORT OFFICIALS - WHAMPOA HARBOUR (Canton) - October 16, 1975
October 17, 1975.

MR. WANG HSI-NIN	Director of Whampoa Harbour Administration (WHA)
MR. CHIU MYAN-CHIN	Vice-Director of WHA
MR. LI DE CHWAN	Chief of Mechanical & Electrical Section
MR. TAN JIA-LIAN	Member of Office of WHA
MR. CHEN YI-MIN	Member of Office of WHA (Interpreter)
MR. CHEN JR-CHANG	Chief of Technical Section
MR. SU BAI	Chief, Cargo Transportation Section
MR. CHOU BIN-LIN	Chief, Cargo Transportation Section
MR. CHEN KANG-TYAN	Technician of Mechanical & Electrical Section
MR. LI TSUNG-CHING	Member of the Office of WHA

VISIT TO WHAMPOA HARBOUR

October 17 & 18, 1975

INTRODUCTORY REMARKS

Mr. Wang Hsi-Nin, the Director of Whampoa Harbour Administration, extended a very warm welcome to the mission members and reviewed the port's historical background. He noted that both Canada and the Peoples Republic had common experiences in suffering from "imperialist aggression". Mr. Wang said that the port had suffered damage through U.S. activity and that in 1949 Whampoa had only three berths. The Director noted that since liberation port facilities had been greatly improved and that planned developments and extensions are continuing. He advised that the port handled coal and a variety of mineral ores, wheat and miscellaneous cargoes.

The Director said that Whampoa is very well equipped with heavy duty gantry cranes and also has mobile cranes ranging from 5 to 20 ton capacity; tracked cranes up to 35 tons are installed and many of the forklifts are made in Shanghai. Since liberation there has been a great increase in productivity which is now ten times higher then in 1949. Heavy emphasis is placed upon equipment maintenance; a technical group of 300 workers is responsible for developing new equipment and advanced concepts in cargo handling methods.

At present the port handles about 7 million tons of cargo per year of which 40 percent is bulk. Two container berths are under construction and should be completed by 1976.

Mr. Janigan thanked Mr. Wang for his very informative description of the Whampoa facility and introduced the Canadian mission team. He noted the importance of increasing trade between China and Canada and added that the mission members had been impressed by the notable progress made by the Peoples' Republic in port and harbour development and in cargo handling techniques. Canada fully understands and shares the aims of the Republic toward self reliance the mission team visits will serve to enhance cooperation as well as strengthening friendship and understanding between our two countries.

Mr. Janigan then spoke to Canadian aspects and accomplishments in port and harbour development adding that the mission members represented several well known and progressive Canadian companies. He rounded off his remarks by saying that the team looked forward with great interest to seeing more of Whampoa harbour and the advances made at this important centre of shipping activity.

General Remarks

The existing Port of Whampoa comprises 7 berths for 10,000 to 12,000 ton ships complete with off-shore moorings located mid-stream. Four or five smaller berths cater to ships up to 5,000 tons. The port is on the Pearl River some 70 miles from the open sea with 9 metre depth at berth. Bulk cargo includes wheat, iron ore, sulphur, silica and coal; urea which could have been handled in bulk was being imported from Holland in bags. General cargo appeared to comprise largely of Japanese steel plate, skelp, wire, pipe and machinery.

Most ships are worked both sides, to lighters on the outside using ship's gear, and to the quay (for onward transfer to storage by forklift or tractor-trailer) using dockside 5 to 10 ton cranes. Other vessels discharge direct to lighters for up-river transport from mid-stream moorings. Because much of the material is bulk or heavy steel lifts and one-third of the cargo does not go over the wharf, this must account for the high annual throughput which is about 580,000 tons per berth. Assuming one-third does not pass over the quays, the quay productivity becomes about 390,000 tons per year, a reasonable figure for this type of operation.

Bulk Cargo Handling

Bulk unloaded material is handled by 1 to 3 ton capacity grab buckets attached to dockside cranes. It is dumped in a long stockpile on the quay immediately behind the rail tracks under the travelling dockside crane. After the ship has left its berth the material is grab-loaded into rail cars. Only wheat is transported directly to covered storage sheds for bagging; the grabs dump into very small hoppers from which the grain moves by a series of small conveyors into covered storage. There is a large amount of spillage which is cleaned up by a gang of girls who bag it and stitch up the bags. Grain was reported to be unloaded at 80 tons per hour; since three hoppers were available this would be about right for 1 ton per lift at 25 lifts per hour.

Two of the 7 berths are used exclusively for coal and lumber (whole logs); these berths are equipped with 7 small capacity "Whirley" cranes. Those in use dump immediately behind the quay for transfer to hoppers and portable conveyors by other dockside cranes for distribution through the yard. Dockside arrangements are quite spacious with some 300 feet of open storage behind the quays; transit sheds with various railway tracks are located behind this open storage area.

New Downriver Terminal

This terminal some 5 or 6 miles downriver from Whampoa will be capable of berthing 20 to 30,000 ton vessels. This probably means it will have about 11 metres of water.

Stage 1 is under construction now. On completion it will have 10 berths and 2,000 metres of quay all in one line. The quay is of concrete caisson construction and rock-filled; back-up land extending for 400 metres behind the quay is being filled with dredged sand. From the large fleet of dredges seen at the site it appeared this was being brought up-river by trailing suction hopper dredges, dumped and relayed into position by cutter suction dredge. Final levelling was being done by hand labour and a front end loader.

The first phase will include a bulk wheat import terminal similar to the new one built at Shanghai. The remainder of the berths will be for general cargo. Simultaneously with the new quay construction, office buildings and large blocks of worker flats are being built behind the port.

In Phase II which is scheduled to commence in 1976 construction will start upstream on two additional berths for bulk unloading. Concurrently, downstream ten new berths will be built for containers and general cargo. Apparently an extensive bulk material handling system is planned for coal and ore but no capacities or storage details could be obtained from the port engineers. It is likely that bulk cargo would be handled as follows:

Unloading	- by bridge-type unloaders with bucket to load cars or conveyor belt.
Storing	- by stacker from the conveyor noted above.
Reclaiming	- by bucket wheel reclaimer.
Car Loading	- by means of a loading station for cars loading from storage.

Of the above system it is likely that only the bucket wheel reclaimer and possibly a stacker-reclaimer combination machine would be manufactured in China.

Additional General Comments

Many two and three storey warehouses along the Pearl River are controlled by the Foreign Trade Ministry. They appear to be used for export and import cargo which is handled by the hundreds of lighters and barges which service ships at moorings or those at berth (on the water side).

A major shipyard is located between the two areas of the Whampoa commercial harbour. This appeared to have two drydocks probably able to accommodate 10 to 15,000 ton ships, a "marine-ways" for smaller vessels, two fitting-out berths, and very large sheet metal and machine shop for new shipbuilding. A new hulk of about 7,000-8,000 tons was observed. This was of rivetted construction.

A large fleet of dredging equipment was observed moored off the new terminal site. This included at least three very large trailing suction hopper dredges (hopper capacity about 4,000-5,000 cubic metres), three cutter suction dredges, one large and one small bucket dredge. Not one of them was pumping or dredging despite the fact this was a week day and a full labour force at work on the construction site. The quipment represented a capital value of at least $75 million - all idle.

General Cargo Handling

In common with other Chinese ports visited, general cargo was being handled primarily by standard Chinese and Japanese built forklifts. At Whampoa many of these vehicles were using a flat pan on the forks to transport rope-slung loads of bagged products. Coiled wire, barrels, flat zinc and aluminum bars and ingots were being moved by traditional methods. Paper rolls and bagged materials could be readily and more efficiently handled by using clamping attachments.

In the warehouse most of the goods were being moved in an uneconomical and primitve manner; for example grain was being shovelled into hoppers for bagging or directly into bags. Some disorder was apparent and operations impeded by debris which might be rapidly removed using a small and mobile loader. There was adequate room on the dockside for cargo but certain bulk materials such as sulphur, iron ore and other minerals should be better segregated and stacked using smaller economically operated vehicles. Similarly dockside scrap and waste materials might be better handled and removed. It is well known that in using grab buckets to unload cargo from ships holds, a certain amount of clean-up operation is required. Whampoa handles a wide variety of bulk materials and small loaders appear to be essential for use in holds thus improving ship turn-around times. A further application for smaller and versatile loaders could be seen at the new terminal presently under construction. At this location gangs of 50 or 60 people were hand-hauling, levelling and moving fill with shovels and wheelbarrows.

Containerization

The plans to develop a container terminal at Whampoa are noted above. The proposed container berth will be able to receive ships of some 20,000 dwt and the terminal will accommodate 40' units. Harbour officials were not able to state what handling equipment will be required. However it is quite likely that the Chinese planning authorities will know since handling gear must be considered at an early stage when reviewing the total layout. Very little definite information was forthcoming concerning containerization but it is possible that the Chinese will follow standard methods which will include large dockside container cranes capable of handling 30 or 40 tons. The requirement for supporting equipment such as straddle carriers, sideloaders or forklifts will no doubt be determined in due course.

Manufacture of these large container cranes will no doubt be undertaken at Shanghai. Ports at Hsinkang, Shanghai and Whampoa will probably need two of these cranes; there is a possibility that an additional two will be needed at Hsinkang in the 1980's.

Barging and Lightering

A certain percentage of cargo arriving at Whampoa is unloaded from ship to barges or lighters which then proceed to destinations along the Pearl River. The total barge tonnage under the Harbour Authority is about 15,000 tons; barges range between 50 and 1,600 tons in capacity. The average size is between 300 and 500 tons. Additional vessels under private control are also delivering cargoes.

The Whampoa Authority has been expanding its barge capacity by 3,000 to 5,000 tons annually. For economic and convenience reasons barge traffic will continue to expand. At the present time all barges and lighters rely on tugs and Harbour Officials were interested and responsive to the idea of deck-mounted overstern self propulsion units.

Canadian Presentation

During the Canadian technical presentations emphasis was placed on long-term port planning and selection of durable and well designed bulk and miscellaneous cargo handling equipment. With increasing international trade it was stressed that the Peoples Republic planning authorities may have to seriously consider off-shore terminals for larger vessels. It was noted that barges and lightering craft are much more maneuverable when fitted with self contained power units; cargoes can be despatched speedily and independent of tugs.

Because Canada is well experienced in the container business, it was suggested that we might usefully cooperate with the Chinese authorities in future terminal planning and in design and provision of container handling equipment. Again Canada has a world-wide reputation for advanced design of bulk terminals and can offer a turnkey operation which would incorporate the modern and advanced technology in port, harbour and terminal development.

The Harbour Director thanked the Canadian mission for its presentation. He said that he would take note of suggestions made and added that the Harbour Officials were impressed with the level of Canadian technology explained during the briefing.

SUMMARY PRESENTATION TO MR. WANG BAO-SHAN

Peking Hotel - Sunday, October 19, 1975

INTRODUCTION

Mr. Wang Bao-Shan, the Head of the Water Transportation Bureau, Ministry of Communications, had asked that the Canadian mission team relate experiences and impressions gained during the visits to the Ports of Dairen, Hsinkang, Shanghai and Whampoa. He said that there may be some shortcomings and deficiencies observed at these ports and that he would be pleased to receive comments.

Mr. Janigan thanked Mr. Wang for the opportunity to summarize the team's findings, adding that the verbal reports to be given should be looked upon as preliminary. A full report will be prepared at a later date. The Mission Leader placed emphasis on continuing cooperation and suggested that this could be increased through a return visit to see Canadian ports in the Spring of 1976. Mr. Janigan expressed his gratitude to all the Peoples Republic Officials who welcomed us so warmly and he paid tribute to the Peking Officials and Interpreters who accompanied the mission and contributed so greatly to its success. He then asked mission team members to summarize their impressions and comments.

Mr. Frank C. Leighton - Swan Wooster Engineering Co. Ltd.

Mr. Leighton said that the visits were rather short and therefore his comments would not be too penetrating. He was impressed by the spaciousness and good planning for the new terminals and, except in the case of Shanghai which is extremely congested, the ports were constructed and operating fairly efficiently in terms of present cargo tonnages. The extensions and development at Hsinkang and Whampoa would provide a good and flexible arrangement for cargo handling. At Hsinkang in particular he noted the good design of new transit sheds which eliminated loading platforms.

In general terms and because of shallow draft problems, the PRC port planners should consider constructing off-shore terminals and deep water ports; this comment was emphasized by citing several bulk terminal off-shore operations in Canada where water depth ranges between 20 and 30 metres. Mr. Leighton noted that a good deal of the cargo is for up-river ports and advised use of special barging transfer stations; he noted that in Canada these barges are upwards of 15,000 tons capacity. It was suggested that bulk cargo transfered from ship to rail is a slower method when compared with first stockpiling the cargo and then moving it in a continuous flow-line operation. It relieves congestion in the quays. Bulk material should be kpet quite separate from general cargo.

In a reference to Shanghai, Mr. Leighton said that port congestion was very heavy and that the rail service may be somewhat inadequate - even though much of the cargo goes to barges. It should be possible to improve methods and, for example, devise a more efficient system for moving bulk grain from storage to river barges.

<u>Mr. John W. Hay</u> - Stephens-Adamson.

Mr. Hay commented primarily on bulk cargo handling and noted that Dairen was adequately equipped in this respect but only in terms of present bulk cargo tonnages. At Hsinkang the salt terminal is quite efficient; the Shanghai grain facility was well designed and built and compares favourably with modern installations. It was suggested that consideration should be given to the increased use of mechanical delivering systems and belt conveyors for bulk cargo. At Whampoa an opportunity exists for installing the most up-to-date type of bulk system and we should be pleased to cooperate in ensuring its long-term efficiency.

<u>Mr. G. Alter</u> - Steadman Containers Ltd.

Since containerization in the Peoples Republic is essentially in an embryonic stage, Mr. Alter offered advice and comments for consideration. He explained that containerization is a growing international business and that in view of China's expanding trade a simple system might be developed. As container trade increases larger, more sophisticated and expensive installations may be considered. He said that there are many ways in which China and Canada may work together to set up an efficient low-cost system to initially handle small lots of containers. A series of "dry ports" could serve to launch the Peoples Republic into what will inevitably be a continuing program of containerization.

Mr. Douglas F. Soon - Canron Limited, Western Bridge Division

Mr. Soon commented on the planning and preparation for container ports in the Peoples Republic and noted the advanced concept of the proposed Hsinkang installation which will be ready in 1976. He briefly reviewed the methods and techniques in which standard 20 and 40 foot containers might be handled. He added that Canron had long-term experience in designing and manufacturing special container cranes. Because Chinese container terminals are at a very early stage of development, Mr. Soon was unable to offer any specific observation in terms of cranage. He advised that Canron would readily assist and work together with the Hsinkang technical staffs to ensure that the port would develop into a high class international container facility.

In closing Mr. Soon said that Canron container cranes take in the order of three months to design and a further nine months to complete the crane for installation.

Mr. Jeremy D. Shrive - Maritime Industries Ltd.

Mr. Shrive noted that with the exception of Dairen, the Chinese ports visited are making very extensive use of barges and lighters which inevitably require a large and expensive fleet of tugs for operating purposes. He said that a very good level of interest in the "Mariner" power unit had been generated. In forecasting increasing import and export trade, operating efficiency and advanced methods for cargo handling will become more apparent. At Shanghai in particular barging is congested and the demand for tugs will be increasing; in such ports great savings can be made in fitting out barges and lighters with self contained power units.

If appropriate commercial arrangements could be set up Maritime Industries would be pleased to work together with the Peoples Republic and share reaearch, development and production of its power unit.

Mr. James H. Hopkinson - Allis Chalmers Rumely Ltd.

Mr. Hopkinson noted that the ports visited were generally well equipped with standard and traditional forklift trucks. He was of the opinion that if the foreseen large increase in China's trade develops over the next decade, faster and more efficient methods of moving cargo would be needed. He suggested that in choosing additional vehicles, serious consideration should be given to their operating economy, lifting capability and maneuverability; stevedoring trucks having quick-change attachments would certainly improve operations. Mr. Hopkinson noted that miscellaneous cargo such as barrels, bales and newsprint were frequently being moved around and positioned by hand. The wide range of available attachments for Allis Chalmers-type trucks was noted and adaptability to all weather conditions emphasized. Mr. Hopkinson concluded by saying that in 1975, 350 Canadian built Allis Chalmers vehicles had been delivered to the East African Harbour Commission.

Mr. Terry P. Lewis - Interimco Ltd.

Mr. Lewis' comments were very similar to those offered by Mr. Hopkinson. During the tour of the four ports he had noticed that handling miscellanequs cargo on the dockside and in warehouses could be measurably improved using more mobile and versatile equipment.

He suggested that the somewhat congested dock areas could be quickly cleaned up using a small loader. Attachments to these vehicles would certainly increase port productivity and reduce ship turn-around time. Mr. Lewis thought it important that laneways and aisles should be kept clear for the heavier types of mobile machinery; this can be done with the smaller and adaptable vehicles.

CONCLUSION

Mr. Wang thanked the Canadian team for the presentation. He emphasized that the traditional friendship between Canada and the Peoples Republic of China was of great importance. He said that technical exchanges are very beneficial and further cement the good relation which we now enjoy. He said that the Mission Team comments were valuable and also that he would consider the kind invitation to visit Canada in 1976.

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR - Mr. F. C. Leighton - Swan Wooster Engineering
October 21, 1975

P.R.C. OFFICIALS:

MR. WU JIA-CHU	Engineer, Capital Construction Bureau, Ministry of Communication
MR. JIAN JUN-SHENG	Engineer, Capital Construction Bureau, Ministry of Communication
MR. HSU JIA-HE	First Navigation Engineering Bureau, Ministry of Communication
MR. TANG SHU-HSIANG	First Navigation Engineering Bureau, Ministry of Communication
MR. HSIANG HSIAN-KUEI	Second Navigation Engineering Bureau, Ministry of Communication
MR. LI YU-HO	Second Navigation Engineering Bureau, Ministry of Communication
MR. TAI PING-CHONG	Third Navigation Engineering Bureau, Ministry of Communication
MR. TIEN TSO-CHEN	Third Navigation Engineering Bureau, Ministry of Communication
MR. KAO YAN-FAN	Fourth Navigation Engineering Bureau, Ministry of Communication
MR. TU JIA-CHI	Water Transport Planning Institute, Ministry of Communication
MR. WANG CHANG-KUO	Water Transport Planning Institute, Ministry of Communication
MR. HO LI-YUN	Water Transport Planning Institute, Ministry of Communication
MR. LI TSONG-HE	Water Transport Planning Institute, Ministry of Communication

MISS LI HSIAO-LI	Technician, Water Taansport Planning Institute, Ministry of Communication
MR. JEN YUNG-HSIANG	Engineer, Academy of Science Ministry of Communication
MR. KUO LUNG-MING	Interpreter, Foreign Affairs Bureau, Ministry of Communication

NOTE: All above are engineers except Miss Li, a Technician, and Mr. Kuo, an Interpreter.

SUMMARY OF SEMINAR DISCUSSIONS

Peking Hotel - October 21 & 22, 1975

Swan Wooster Engineering Co. Ltd.

Mr. Leighton opened discussions by complimenting the Chinese officials upon the open nature of new terminal construction and in their recognizing the need for large open areas adjacent to the new berths. He added that the long continuous quay face for ten berths now under construction at Whampoa displayed thoughtful planning. Mr. Leighton said that the new bulk grain unloading terminal at Shanghai and the single level transit sheds at Hsinkang were particularly impressive and advanced in concept. He noted and discussed the difference between Canadian and Chinese port design techniques.

Commenting on the shallow draft of the ports visited by the Mission Team, it was pointed out that if the Peoples Republic intends to enter world bulk trades either in oil or dry bulk, and in large volume, deep water off-shore ports and terminals should be considered. The Chinese might also consider the problems and lost time associated with unloading direct from ship to train; mixed bulk cargo should not be handled at the same berth as general cargo.

Further discussions focussed on the problems of moving cargo from ship to river craft as at Shanghai and Whampoa. Mr. Leighton suggested that a barge ramp system in conjunction with flat-deck barges might be used; tractor trains could be used to speed this cargo movement and eliminate the hard physical labour of stevedore gangs. During discussion on this latter aspect of cargo handling, it was suggested that there should be an increase in use of cargo handling machinery in ships holds. It had been noted that many ships were only working one or two holds, the efficiency of multiple hatch distribution of cargo was explained and the accompanying benefits of faster turn-around time. The special problems at Shanghai were reviewed including lack of rail access to some districts, large quay to river movements and inadequate access for moving grain in bulk from new terminal to river barges.

Swan Wooster's current overseas projects were described together with the methods of working with foreign governments. The value of consultants services in taking a total systems approach was emphasized. Mr. Leighton noted that his company could work with the Peoples Republic either directly with the engineering and planning staffs in the true consulting role, or with Canadian manufacturers in designing turnkey terminal projects. At this point particular emphasis was laid upon Canada's specialized expertise in design and construction of bulk material handling terminals.

The Chinese officials posed several planning and concept questions including general guidelines which should be used in designing general cargo berths. Particular interest was shown in a small multi-purpose machine installed at a Central American port and capable of ship loading, unloading bulk material from ships and handling 20 foot containers. Questions were posed on barge ramp design and typical Pacific North Western flat-deck barges; the Chinese also sought information on methods for stabilizing newly reclaimed sites on poor foundations. The Peoples Republic officials showed a great deal of interest in the brochures left for their information.

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR: - MR. JOHN W. HAY - Stephens-Adamson - Oct. 22, 1975

P.R.C. OFFICIALS:

MR. YE MING-KAO	Deputy General Engineer of Water Transport Bureau, MOC
MR. HO PING-TAO	Engineer of Water Transport Bureau, MOC
MR. CHEN YUNG-CHIANG	Technician of Water Transport Bureau, MOC
MR. TANG SHU-HSIANG	Engineer of No.1 Navigation Engineering Bureau, MOC
MR. HSIUNG HSIEN-KUEI	Engineer of No.2 Navigation Engineering Bureau' MOC
MR. LI YU-HO	Engineer of No.2 Navigation Engineering Bureau, MOC
MR. TIEN TSO-CHEN	Engineer of No.3 Navigation Engineering Bureau, MOC
MR. TAI PING-CHUNG	Engineer of No.3 Navigation Engineering Bureau, MOC
MR. TAN CHO-MING	Engineer of No.4 Navigation Engineering Bureau, MOC
MR. LI HSIANG-FANG	Engineer of Water-Transport Planning Institute, MOC
Mr. WANG CHANG-KUO	Engineer of Water-Transport Planning Institute, MOC
MR. LI CHUNG-HO	Engineer of Water-Transport Planning Institute, MOC
MR. HO LI-YUN	Engineer of Water-Transport Planning Institute, MOC
MR. LI HSIAO-LI	Technician Water-Transport Planning Institute, MOC
MR. JEN YUNG-HSIANG	Engineer of Academy of Science, MOC
MR. CHAO CHI-LIANG	Engineer of Academy of Science, MOC
MR. FAN PO-CHI	Engineer of Capital Construction Bureau of Water Transport, MOC
MR. KUO LUNG-MING	Interpreter, Foreign Affairs Bureau, MOC
MR. TU MAI-CHIH	Staff Member of International Navigation Division Water Transport Bureau, MOC

Stephens-Adamson

Mr. Hay discussed bulk cargo handling technology and outlined a particular company research project which will advance the state of the art. Describing this research, Mr. Hay explained that the present maximum belt speeds are about 1,000 feet per minute. However the company is running a 48" wide belt at 2,000 feet per minute and will be able to estimate the effects of high speed operation on the total system. Subsequent analysis will point up what modifications may be required to the equipment.

Emphasizing the company's capability, port officials were advied that marine legs are unloading grain at a rate of 1,000 tons per hour each. Additionally Mr. Hay explained that a 84" wide belt conveyor has been developed for the Athabaska Tarsands and one 72" belt; the system is capable of handling 14,000 tons per hour. It is driven by a 4,200 h.p. motor with a 25 step accelerator.

Discussing bulk cargo bucket-wheel stackers and reclaimers, the normal bucket wheel speed is between 5 and 8 r.p.m. The advantages of Garland Idlers were described and discussed. The description of self unloading vessels gave rise to some discussion and the loop belt elevator system with the 75 metre boom was explained.

Several questions were posed and discussed concerning belt turnover and loading problems, loading gates and the methods of proper chuting for belt conveyors at transfer points. Other questions and points of discussion included weighing devices, and bearing and seal details, belt conveyor idlers, vibratory feeds, the relative merits of gravity versus electronically controlled equipment and the techniques of reclaiming bulk cargo from tunnels.

CANADIAN PORT HARBOUR AND MARINE
TERMINAL TECHNOLOGY MISSION TO CHINA
OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR - Mr. Terry P. Lewis - Thomas Equipment Ltd.
October 21, 1975

P.R.C. OFFICIALS:

MR. NI YUN-HO	Leading Member of International Navigation Division, Water-Transport Bureau, MOC
MR. LI HSING-CHEN	Technician of Water-Transport Bureau, MOC
MR. TU MAI-CHIH	Staff Member of International Navigation Division
MR. CHEN YUNG-CHIANG	Technician of Water-Transport Bureau
MR.HSU CHIA-HO	Engineer of No.1 Navigation Engineering Bureau, MOC
MR. HSIUNG HSIEN-KEI	Engineer of No.2 Navigation Engineering Bureau, MOC
MR. TIEN TSO-CHEN	Engineer of No.3 Navigation Engineering Bureau, MOC
MR. TAN TSO-MING	Engineer of No.4 Navigation Engineering Bureau, MOC
MR. LI HSIANG-FANG	Engineer of Water-Transport Planning Bureau, MOC
MR. LI CHUNG-HO	Engineer of Water-Transport Planning Bureau, MOC
MR. CHAO CHI-LIANG	Engineer of Science Academy, MOC
MR. CHIANG JEN	Staff Member of Foreign Bureau, MOC

Interimco Ltd.

The question period which followed Mr. Lewis' presentation on the Thomas Front End Loader gave rise to a fairly extensive review and further explanation of the vehicle's design features and capability. The Chinese officials were particularly interested in the hydraulic and hydrostatic principles and many questions were asked about operating procedures. One subject of interest was the reason why the Thomas Company chose a hydraulic/hydrostatic system in favour of a mechanical system. Mr. Lewis explained the efficiency and unique features and the reliability of the vehicle. Several questions were asked concerning hydraulic hose pressure build-up and under what conditions a hose might burst. The Chinese were particularly interested in emergency stopping in the event of a hose fracture.

The left and right hand drive systems were further explained and Mr. Lewis reviewed syncronization principles. He explained the dual transmission and controls. Operating methods and techniques gave rise to numerous questions and comparisons in the effort required to steer and maneuver the Thomas vehicle as compared to the standard mechanical drive.

From the detailed discussion period and in view of the questions which were asked, it was quite apparent that the Thomas vehicles embodied certain advanced state-of-the-art features with which the Chinese technical people were not familiar.

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR: - Mr. James H. Hopkinson - Allis Chalmers Rumely Ltd.
October 21, 1975

P.R.C. OFFICIALS:

MR. NI YUN-HO	Leading member of International Navigation Division, Water-Transport Bureau, MOC
MR. LI HSING-CHEN	Technician of Water-Transport Bureau, MOC
MR. TU MAO-CHIH	Staff Member of International Navigation Division
MR. CHEN YUNG-CHIANG	Technician of Water-Transport Bureau
MR. HSU CHIA-HO	Engineer of No.1 Navigation Engineering Bureau, MOC
MR. HSIUNG HSIEN-KEI	Engineer of No.2 Navigation Engineering Bureau, MOC
MR. TIEN TSO-CHEN	Engineer of No.3 Navigation Engineering Bureau, MOC
MR. TAN TSO-MING	Engineer of No.4 Navigation Engineering Bureau, MOC
MR. LI HSIANG-FANG	Engineer of Water Transport Planning Bureau, MOC
MR. LI CHUNG-HO	Engineer of Water Transport Planning Bureau, MOC
MR. CHAO CHI-LIANG	Engineer of Science Academy, MOC
MR. CHIANG JEN	Staff Member of Foreign Bureau, MOC

Allis-Chalmers Rumely Ltd.

Mr. Hopkinson's presentation emphasized Allis-Chalmers total capability in forklift truck design and production. Particular emphasis was placed on the model ACC 60-S stevedoring truck. He reviewed the special features of these vehicles compared with thode presently in use in Chinese ports. Lifting eyes, removable counterweight, wet sleeve engine, the choice of standard or power shift transmission, ease of maintenance and the simple rugged and very durable construction were explained. Subsequent discussion was centered on a wide variety of port and cargo handling operations and the usefulness of special attachments such as those for paper rolls, barrel claimps, bale clamps and side shift carriages. Mr. Hopkinson pointed out to the Chinese officials that in the planned drive to increase trade, such equipment will be required to more rapidly and effectively handle general cargo. As more warehousing facilities are provided at Chinese ports, it follows that the need for more versatile equipment with good maneuvering characteristics and greater capacity will be essential. Higher triple-stage masts would lead to better warehousing methods and higher productivity in ships holds or in railcar operations. In common with the discussions which took place between the same audience and Mr. T.P. Lewis (Interimco), it seemed that the state-of-the-art may have advanced somewhat beyond current Chinese knowledge in this particular industry sector.

CANADIAN PORT, HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR - MR. GABRIEL ALTER - STEADMAN CONTAINERS LTD., Oct. 21/75

P.R.C. OFFICIALS:

MR. YE MING-KAO	Deputy General Engineer of Water Transport Bureau, MOC
MR. LI CHIN-CHUAN	Technician of Water Transport Bureau, MOC
MR. HO PING-TAO	Engineer of Water Transport Bureau, MOC
MR. KAO TSU-WEI	Technician of Water Transport Bureau' MOC
MR. TANG SHU-HSIANG	Engineer of No. 1 Navigation Engineering Bureau, MOC
MR. LI YU-HO	Engineer of No. 2 Navigation Engineering Bureau,MOC
MR. TAI PING-CHUNG	Engineer of No. 3 Navigation Engineering Bureau, MOC
MR. KAO YEN-FANG	Engineer of No. 4 Navigation Engineering Bureau, MOC
MR. WANG CHANG-KUO	Engineer of Water-Transport Planning Institute, MOC
MR. TU CHIA-CHI	Engineer of Water-Transport Planning Institute, MOC
MR. HO LI-YUN	Engineer of Water-Transport Planning Institute, MOC
MR. LI HSIAO-LI	Technician of Water-Transport Planning Institute, MOC
MR. JEN YUNG-HSIANG	Engineer of Academy of SCIENCE, MOC
MR. FAN PO-TZU	Engineer of Capital Construction Bureau of Water Transportation
MR. KUO LUNG-MING	Interpreter
MR. PAO CHIEN-HSING	Interpreter

Steadman Containers Ltd.

Previous formal and informal discussions with Chinese port officials had pointed up that the many advantages of containerization may not have been altogether understood and possibly not thoroughly investigated. This was borne out in the seminar discussions.

In reviewing the advantages and economies of containerized cargo, Mr. Alter noted that 10 foot boxes were not considered standard in terms of international use. As far as he was aware only China and Japan use these small units and they are considered to be general cargo. They do not provide any real economy. The standard container unit is a 20 foot or a 40 foot box.

As an example in potential container use, Mr. Alter referred to the efficient method in which goods purchased by foreign countries at the Canton Fair might be shipped quickly and safely in standard containers. Similarly goods might be transported either by road, river or canal within China. Complete adaptability was stressed.

The Steadman "Sidelift" container handling vehicle was discussed; design and construction details were fully explained. The Chinese officials asked questions concerning the structure, reliability and performance of the machine. The low cost and high efficiency of the Sidelift were emphasized and the film which followed vividly illustrated its container handling capabilities.

CANADIAN PORT, HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR - MR. DOUGLAS F. SOON - CANRON LIMITED - Oct. 21/75

P.R.C. OFFICIALS:

MR. YE MING-KAO	Deputy General Engineer of Water Transport Bureau, MOC
MR. LI CHIN-CHUAN	Technician of Water Transport Bureau, MOC
MR. HO PING-TAO	Engineer of Water Transport Bureau, MOC
MR. KAO TSU-WEI	Technician of Water Transport Bureau' MOC
MR. TANG SHU-HSIANG	Engineer of No. 1 Navigation Engineering Bureau, MOC
MR. LI YU-HO	Engineer of No. 2 Navigation Engineering Bureau,MOC
MR. TAI PING-CHUNG	Engineer of No. 3 Navigation Engineering Bureau, MOC
MR. KAO YEN-FANG	Engineer of No. 4 Navigation Engineering Bureau, MOC
MR. WANG CHANG-KUO	Engineer of Water-Transport Planning Institute, MOC
MR. TU CHIA-CHI	Engineer of Water-Transport Planning Institute, MOC
MR. HO LI-YUN	Engineer of Water-Transport Planning Institute, MOC
MR. LI HSIAO-LI	Technician of Water-Transport Planning Institute, MOC
MR. JEN YUNG-HSIANG	Engineer of Academy of SCIENCE, MOC
MR. FAN PO-TZU	Engineer of Capital Construction Bureau of Water Transportation
MR. KUO LUNG-MING	Interpreter
MR. PAO CHIEN-HSING	Interpreter

Canron Limited, Western Bridge Division

In his presentation Mr. Soon explained the difference between a large-scale container operation for which a Canron-built crane would be used and the applicability of the Steadman system. He noted that the salient difference lies in the volume of container traffic which flows through the port or the container terminal. Mr. Soon discussed the layout of a typical container terminal and the essential and unique features of Canron cranes for loading and unloading containers.

In discussions which followed, it was noted that the container berth at Hsinkang is scheduled to open in 1976. Mr. Soon expressed some doubt as to whether the Shanghai factory could produce a crane to meet that schedule. On the other hand Canron can design and manufacture to suit customer requirements in twelve months from go-ahead.

Discussions took place on the comfort of the operator when subjected to fast operating speeds; the Chinese were advised that in designing Canron equipment, human engineering factors were very closely studied. The problems of swaying were noted; anti-swaying devices to counteract this were at the operator's command. Chinese officials asked questions about crane movement when handling containers. They were advised that an overriding system ensures that the gantry can not be operated during container removal. Further questions focussed on the rated capacity of the crane; Mr. Soon said that the equipment is designed to handle the latest generation of containers and that container loads are not greater than the crane's rated capacity. In response to a further question Mr. Soon advised that the turning radius of the crane is a design feature which can be incorporated to suit customer requirements. At the close of the discussions, the Chinese officials thanked Mr. Alter and Mr. Soon for the detailed and informative presentation. They expressed appreciation for the many constructive suggestions which stemmed from in-depth experience in container equipment design and handling.

CANADIAN PORT HARBOUR AND MARINE

TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

TECHNICAL SEMINAR: - Mr. Jeremy D. Shrive - Maritime Industries Ltd.

P.R.C. OFFICIALS:

MR. CHANG CHIEN-CHEN	Engineer of Water-Transport Industrial Bureau, MOC
MR. YE LEI	Engineer of Water-Transport Industrial Bureau, MOC
MR. YE MING-KAO	Engineer of Water-borne Transportation Bureau, MOC
MR. HUANG CHING-MAO	Engineer of Water-borne Transportation Bureau, MOC
MR. FAN PO-CHI	Engineer of Capital-Construction Bureau of Water Transport, MOC
MR. CHOU SHAN-YOU	Engineer of Hsingkang Shipyard, MOC
MR. WANG CHIN-KEN	Engineer of Hsingkang Shipyard, MOC
MR. CHEN SHU-FANG	ENGINEER of Yangtze River Vessel Designing Institute, MOC
MR. CHOU CHI-WEN	Engineer of Water-Transport Planning Institute, MOC
MR. CHAO CHI-LIANG	Engineer of Science Academy, MOC
MR. CHOU CHIEN-HSING	Interpreter
MR. LI CHUN	Staff Member of Scientific and Technical Committee.

Maritime Industries Ltd.

Engineer officials from Hsinkang shipyard and the Yangtze River Vessel Designing Institute were present when Mr. Shrive presented slides and a short film demonstrating the versatility of his company's over-the-stern Mariner drive. The scale model was also a focal point of interest. Mr. Shrive explained the simplicity of installing the Mariner on a barge or lighter and its many applications to a wide variety of cargo handling operations in sheltered waters. Its good and responsive maneuverability was explained and also the simple and effortless steering.

The Chinese officials showed a great interest in the drive unit and asked if any complications in mounting the unit might be experienced, particular reference being made to the trim of a vessel. It was explained that vessel configuration and trim posed no particular problems; the equipment is being efficiently and widely used with notable economy in many countries of the world. Discussion focussed on durability and reliability; the port officials were advised that downtime and maintenance records confirm the ruggedness of the equipment. The heavy duty diesel engine is economical and reliable in operations.

Mr. Shrive noted that long distance barging is standard practice in the People's Republic; he explained the attractive economics of using the Mariner over long hauls. From general discussions and the questions raised, it appeared that the Chinese engineers had had no previous experience with over-the-stern drives such as the Mariner. Mr. Shrive concluded by saying he saw wide and economical applications for the equipment in Chinese ports, estuaries, rivers and canals.

SUMMARY OF POTENTIAL EXPORT BUSINESS

Throughout the mission itinerary it was very apparent that Canada is held in high regard by the Chinese and that Canadian technology and demonstrated skills in port and associated sectors are of great interest to Chinese engineers and technical officials.

In the short time spent at each of the ports and with officials in Peking, it was not possible to determine accurately the current level of Chinese skills, particularly in port planning. However, at Hsinkang and Whampoa new berthing and port extensions are well designed and display thoughtful long-term planning. On the other hand, the visit to the Shanghai Harbour Machinery Factory where cranes and other port equipment are being produced, pointed up that the People's Republic is rapidly developing a capability to meet its self-reliant goals in the manufacturing sector.

The benefits of a "systems" approach, as explained and presented by mission members, were reviewed in depth and gave rise to many questions and much discussion at the Peking seminar and during port visits. This aspect of port development and extension certainly offers further opportunities for Canadian industry. At Shanghai, the busiest port, bulk and mixed cargo handling was very congested; the advantages of offshore terminals were pointed out. Again this is a Canadian speciality and one in which we have considerable experience and international prestige. Because of the Chinese self-reliance motif, possibly the best approach would be to propose a co-operative venture(s) in which a Canadian consortium would work with engineers and technicians of the People's Republic.

China's progress towards self-sufficiency has given rise to a good standard of productivity in developing and manufacturing of cranes and dockside cargo handling equipment. The ports are fairly well equipped with standard-type forklifts which are not nearly as maneuverable and do not have the operating flexibility and versatility of Canadian products. Particularly in ship's holds and in warehouse operations, vehicles which are compact in build, highly-mobile and equipped with quick-change features are needed. Although at the present time we are faced with very strong Japanese and European competition, Canadian manufacturers should be encouraged and continue to explore this market. If a return mission from the People's Republic visits Canada in late spring, 1976, demonstrations of a variety of forklift and other cargo handling equipment can be arranged.

Chinese port planning staffs are belatedly recognizing the economics and great expansion of international container business; they are now developing and constructing container terminals. The advantages and economics of large-scale, multi-vessel terminals are apparent. At the same time there was a growing Chinese interest in the "dry port" concept; this became more apparent as the mission progressed. Because of China's port congestion, the introduction and increase of container business through dry ports where ships gear, rather than huge cranes, can handle containers may provide further opportunities for Canadian business.

Large tracked cranes for shipside loading and unloading of containers can be produced in China and it is quite possible that those required at Hsinkang will be manufactured at Shanghai. China is not yet in the container business and its container crane design and manufacturing experience is quite limited. Consequently, as a temporary expedient, there may possibly be a requirement for off-the-shelf container crane purchase; this merits continuing follow-up action.

A good percentage of the cargo unloaded at Chinese ports is carried up rivers and by canals to its destination in barges. At Hsinkang additional barges are being built and at Shanghai and Whampoa the port authorities are expanding the barge fleets. There is no doubt that barges and lighters with self-contained power units would greatly lessen the need for expensive tug operations and measurably reduce congestion and improve vessel turn-around-time. Since the barging operation is particularly congested and complex, the potential market in the People's Republic for Canadian built over-the-stern drives cannot be assessed without further study. However, Chinese port officials and headquarters staff were very interested in the Canadian "Mariner" concept and its applicability to port operations. Sales promotion and follow-up will continue. Should a return mission visit Canada the Chinese officials should be given the opportunity to see the "Mariner" operating in B.C. waters.

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

ANNEXES TO REPORT

ITINERARY

Sunday, October 5		pm	Arrive Peking
Monday, October 6		am	Briefing at Canadian Embassy
		pm	Briefing on Chinese Harbours at Peking Hotel given by officials of the Water Transportation Bureau of the Ministry of Communications
Tuesday, October 7			Briefing on Canadian Harbours at Peking Hotel to Chinese engineers and technicians
Wednesday, October 8			Interviews with Chinese Machinery Corporation officials: F.C. Leighton, Swan Wooster Engineering Co. Ltd. J.D. Shrive, Maritime Industries Limited D.F. Soon, Canron Limited J.W. Hopkinson, Allis-Chalmers, Rumely, Limited J.W. Hay, Stephens-Adamson (Canada) Limited T.P. Lewis, Interimco Limited G. Alter, Steadman Containers Limited Interview with Ministry of Foreign Trade: D.J. Janigan, Mission Leader
Thursday, October 9	9:00	am	Visit to the Summer Palace
		pm	Fly to Dairen
Friday, October 10	10:00	am	Briefing on Dairen Harbour Visit Dairen Harbour
		pm	Tour of industries
Saturday, October 11		am	Visit Dairen Oil Wharf Technical discussions
		pm	Tour of industries Depart for Tientsin by train

Sunday, October 12	am	Arrive Hsinkang Briefing on Hsinkang Harbour
	pm	Visit Hsinkang Harbour Technical discussions
Monday, October 13	am	Visit Hsinkang Shipyard
	pm	Visit industry Depart for Shanghai by train
Tuesday, October 14	pm	Arrive Shanghai Briefing on Shanghai Harbour
Wednesday, October 15	am	Visit Shanghai Harbour
	pm	Visit Shanghai Harbour Machinery Factory
Thursday, October 16	am	Tour of Harbour and visit to Shanghai Heavy Industrial Fair
	pm	Technical discussions Depart for Canton by air
Friday, October 17	am	Visit Whampoa
	pm	Technical discussions
Saturday, October 18	am	Visit Canton Fair
	pm	Depart for Peking by air
Sunday, October 19	am	Preparations for technical seminar Meeting with Mr. Wang, Director, Water Transportation Bureau
	pm	Technical seminar
Monday, October 20		Sightseeing
Tuesday, October 21		Technical seminars
Wednesday, October 22		Technical seminars
Thursday, October 23		Depart Peking

CANADIAN PORT HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO CHINA

OCTOBER 5 - OCTOBER 23, 1975

INTRODUCTION TO CANADIAN PORTS AND HARBOURS -- PEKING HOTEL -- OCTOBER 7, 1975

Given by Frank C. Leighton, Vice-President, Swan-Wooster Engineering Co.Ltd.

Introduction by: Mr. D. J. Janigan, Mission Leader.

P.R.C. OFFICIALS PRESENT:

MR. CHANG CHI	Responsible Person of the Department concerned of the Foreign Affairs Bureau
MR. NI YUN-HO	Responsible Person of the International Shipping Division of Water Transport Bureau
MR. YEH MING-KAO	Deputy Chief Engineer
MR. LIU YUN-PEI	Engineer
MR. LI CHUN	Staff Member of Scientific Committee
MR. TU MAI-CHIH	Staff Member of Water Transport Bureau
MR. CHIANG JEN	Staff Member of the Foreign Affairs Bureau
MR. WU JAI-CHU	Engineer of the Basic Construction Bureau
MR. CHIANG CHIN-SHEN	Engineer of the Basic Construction Bureau
MR. KUO LUNG-MING	Interpreter
MR. CHU CHIEN-HSIN	Interpreter
MISS PAO CHIEN-HSIN	Interpreter

CANADIAN PORT, HARBOUR AND MARINE TERMINAL TECHNOLOGY MISSION TO CHINA OCTOBER 5 - OCTOBER 23, 1975

BRIEFING ON CANADIAN PORT AND HARBOUR TECHNOLOGY

PEKING HOTEL - OCTOBER 7, 1975.

The briefing was given by Mr. Frank C. Leighton, Vice-President, Swan Wooster Engineering Co. Ltd., Deputy Mission Leader.

Mr. Leighton was introduced by Mr. D.J. Janigan who thanked the People's Republic for inviting the Canadian team to see some of the principal Chinese ports and harbours and have the opportunity of discussing related Canadian technology both in equipment and engineering. Mr. Janigan added that the team appreciated the opportunity of studying and learning together in a spirit of co-operation and mutual friendship. He said that Canada fully understands and appreciates the PRC policy of self reliance which provides a strong common bond with similar Canadian aspirations.

The Mission Leader noted that the Canadian team was competent and capable of explaining and discussing technological progress made in Canada in meeting the challenges presented by the country's geography and economy. Mr. Janigan said that Canada has one of the longest coast lines in the world, is a very large country of some 3.8 million square miles with a relatively small population of 23 millions, 58 percent of which lives quite close to the U.S. border between Quebec City and Sault Ste. Marie.

More than 20 percent of Canada's G.N.P. ($110 billion) is dependent on export trade.

Mr. Janigan stated that in the interest of national unity it had been necessary to develop very advanced systems in the fields of navigation, communication and transportation. He illustrated this aspect by noting that in 1910 when the population was about 10 millions, Canada had four railways, two of which could be classified as transcontinental. At the present time the country has one of the longest microwave communications systems in the world using satellites to communicate nationally. Furthermore Canada has a Trans-Canada highway, two inter-continental railways and a large system of ports, harbours and marine terminals to meet its trade needs.

It was noted that Canada continues to face the challenges of a small population within a large country through the application of science and technology. Mr. Janigan expressed confidence that China and Canada will share a long and productive association of friendship and mutual co-operation particularly in the port and harbour sectors of industry.

Mr. Leighton thanked Mr. Ni for the very enlightening description which he gave the previous day on the Ports of China. In reviewing Canadian ports, Mr. Leighton added that he would describe the more noteworthy terminals. He then continued by noting that Canada is about the same size as China but, because it is surrounded by oceans on three sides, the length of its coastline is much longer than that of China. The Canadian coastline is some 240,000 kilometres long which is about 13 times as long as that of the Peoples' Republic.

The conditions under which we must develop our ports are often very severe. For instance, on the East Coast in the Bay of Fundy, waves coming in from the open Atlantic Ocean may be as much as 11 metres high in very bad storms, and the difference between high tide and low tide can be as much as 8 or 9 metres. Similar conditions occur on the West Coast of Canada near the Alaska border.

Although the mouth of the St. Lawrence River provides many thousands of kilometres of sheltered coastline, this part of the coast is subject to ice during the winter. Fortunately the East Coast ports of Halifax and Saint John are open all year round, though the approaches are subject to severe storms and fog during the winter.

The northern coast of Canada has few ports because the ocean is frozen for eight to nine months of every year. However, this area has recently become very important because oil has been found under the Arctic Ocean off Canada's northern coast. New ports are being built for use by the oil industry during the short summer season.

Canada's West Coast, which is probably of the greatest interest to China because most of the China-Canada trade flows through this coast, is fortunately ice-free all year round. In addition, the southern half of the West Coast is protected by off-shore islands providing sheltered water for ports; as a result the main West Coast harbours are in the south near to Vancouver.

Mr. Leighton then explained port administration in Canada and noted that fifteen of the largest ports are controlled by the National Harbours Board, a division of the Federal Government of Canada and similar to the Water Transportation Bureau in the Chinese Ministry of Communications. These ports are managed and controlled directly by the federal government.

Eleven harbours, generally of the second rank in size, are controlled by locally appointed Harbour Commissions. They are administered by locally appointed Commissioners. The only control by the federal government is over capital spending for new construction.

Finally there are about 300 smaller harbours administered directly by the Federal Ministry of Transport. All these ports together handled a total of 302 million tons of cargo in 1974.

A brief description of Canada's six largest ports ranked in the order of the annual tonnage of cargo moving through each port.

Vancouver is the largest port complex in the West Coast with its two satellite ports of North Fraser Harbour and Fraser River Harbour. In 1974 a total of 56 million tons of cargo was handled which is one-sixth of Canada's total tonnage; there were 16,700 vessel arrivals totalling 59,000,000 g.r. tons.

The main Port of Vancouver is a National Harbours Board port and handled 42 million tons of cargo in 1974. Other statistics on the port are as follows:

Traffic -	approximately 6 million tons of general cargo - half lumber, pulp and paper.
Bulk Products - Export	wheat and food grain, coal, potash and sulphur.
Bulk Products - Import	phosphate Rock, Salt and Sugar.

Export:Import ratio is 4.5:1

The Port of Sept Isles handles 31 million tons per year, predominately bulk iron ore export to Canadian and foreign steel mills. In 1974 the port registered 1,400 vessel arrivals representing some 19 millions g.r. tons.

The Port of Montreal handles 24 million tons per year; 4 million tons is general cargo and the balance of 20 million tons is liquid and dry bulk, mainly grain. In 1974 there were 3,900 vessel arrivals for a total tonnage of 32 millions g.r. tons.

The Lakehead is a Harbour Commission port handling in the order of 18 million tons per year primarily wheat, iron ore and mineral concentrates.

The Port of Quebec handles some 14 million tons per year of which 1.2 million is general cargo (container) and the balance liquid or dry bulk. Vessel calls in 1974 numbered 1,700 representing 12 millions g.r. tons.

The Port of Halifax in Nova Scotia averages 14 million tons per year and of this amount 2.3 million is in general cargo and much of it containerized; the balance is liquid or dry bulk cargo. In 1974, 2,250 vessels called at Halifax totalling 17 millions g.r. tons.

Mr. Leighton described some of the significant port and terminal installations in Canada and emphasized that all were designed, built and equipped by Canadian engineers and construction companies; some of them in the face of great natural difficulties.

Point Tupper in Nova Scotia is a tanker facility capable of receiving 300,000 dwt tankers. At this terminal the depth of water is 30 metres and the rate of discharge is 100,000 barrels of oil per hour through 4-16" and 4-12" diameter loading arms. The pier has two berths; 300,000 dwt on the outside and a 50,000 dwt berth for product distribution on the inside.

Come-By-Chance in Newfoundland handles crude oil imports for the refinery and distribution of products. It has two berths and can accommodate tankers to 300,000 dwt with 67,000 dwt product berths. Water depth is 28 metres.

Saint John in New Brunswick has a floating single buoy mooring in 43 metres of water with a very exposed location. Submarine lines are laid down to the shore and a 500,000 dwt tanker can be handled.

Halifax in Nova Scotia has a very efficient container terminal built on a 23 hectare sight. It has two principal container berths, three container cranes and handles approximately 120,000 t.e.u.'s per year. Most containers are delivered and received from the industrial areas by rail with a very efficient intermodal transfer.

St. Romuald in the Province of Quebec is located on the St. Lawrence River and designed to take 100,000 ton ships. There are 17 metres of water at the berths which were built in very difficult conditions; currents up to 1.5 metres per second and heavy ice floes during spring break-up. This terminal was built with special caissons which deflect the ice from the berthing station and thus protect the ship. There is a 5.5 metre difference in tide levels and wind gusts up to 135 km/hour may occur.

On the Northern Arctic Coast difficult weather conditions are encountered with ice for 9 - 10 months of the year. A new terminal has been made at Baffin Island, 800 km north of the Arctic Circle for shipping lead and zinc metal concentrates. The terminal was built in open water with 13 metres depth of berth. Because it must resist ice sheets in winter, there are no open structures and three gravel-filled steel sheet pile cells were installed for the berth. The apron is of the same construction but armoured with 2-1/2 ton rock. There is a covered stockpile for concentrates accommodating yearly production at 160,000 tons. Loading rates provide for 50,000 dwt in 48 hours. In the same geographical areas, oil drilling is carried out from artificial islands built by dredging and a new device called Monopod has been developed to break up the ice and prevent pressure build-up.

Vanterm in Vancouver houses a modern three berth container terminal and the berth length is 275 metres with a depth of 12 metres. This terminal will also receive roll-on/off vessels and extends 30 hectares. It has two travelling container cranes.

Mr. Leighton reviewed other West Coast specialized terminals including Seabord which is an ultra modern three berth pre-packaged lumber loading terminal on a 25 hectare sight. This terminal accommodates modern vessels of 30,000 tons and has a special dock assembly system for handling lumber loads. Vancouver Wharves and the Neptune terminal were also detailed.

Roberts Bank is a new outer port capable of taking 150,000 dwt vessels. The complex planning processes were explained and environmental aspects studied. A decision was made to build an island 5 km off-shore by dredging and to join the island to the shore with a causeway involving 4.5 million cubic metres of dredging. A master plan was prepared for a new port covering 2,000 hectares and eventually having up to 50 berths. The first berth was built on 17 hectares and is capable of handling 150,000 dwt vessels for export of coal and pet. coke with a capability of loading 12 million tons per year. This terminal is provided with a loop track for unit trains of 100 cars holding 100 tons in each car and storage is provided for 1.5 million tons of coal with machinery to stack it at 4,000/hour and load ships at 8,000 tons/hour.

Mr. Leighton concluded by thanking the audience and expressing the wish that Chinese officials might come to Canada to see some of our port, harbour and terminal installations.

CHINA'S COASTAL PORTS

PRINCIPAL PRODUCTS HANDLED

Port	Products Handled
Dairen	Oil, Iron, Steel, Mixed Ores, Wheat, Steel Products, Soya Beans, Ferrous and Non-ferrous Metals, Coal, Timber, Coke, Chemicals
Chinhuangtao	Oil, Minerals, Chemical Fertilizer, Rice, Ferrous and Non-ferrous Metals, Coal
Hsinkang	Rice, Salt, Chemical Fertilizer, Iron, Steel, Potash, Phosphate, Newsprint
Tsingtao	Chemical Fertilizer, Ferrous Metals, Mixed Ores, Phosphorus, Fish Meat, Rice
Lienyunkang	Coal, Chemical Fertilizer
Shanghai	Wheat, Rice, Iron, Steel Products, Non-ferrous Metals, Mineral Ores, Chemical Fertilizer, Oil, Cement, Cotton, Machinery
Whampoa	Coal, Rice, Wheat, Mineral Ores, Chemical Fertilizer, Ferrous and Non-ferrous Metals, Sulphur, Steel Products, Machinery
Chanchiang	Ferrous and Non-ferrous Metals, Oil, Chemical Fertilizer, Lumber

CHINA'S COASTAL PORTS

SUMMARY DATA

Port	Draft at Hightide (metres)	Crane Lift Maximum (tons)	BERTHS (tons) 10,000	5,000	Less 5,000	Foreign Vessels	Largest Vessel (tons)
Dairen	10.5	100	20	20	20	1,500	-
Chinhuangtao	10.2	-	5	4	-	1,000	35,000
Hsinkang	10.0	150	7	4	2	1,600	41,000
Tsingtao	12.0	50	8	13	-	900	30,000
Lienyunkang	8.0	23	1	4	-	400	10,000
Shanghai	9.0	100	80	20	-	2,900	46,000
Whampoa	9.0	30	7	4	-	1,000	30,000
Chanchiang	11.0	40	6	-	-	200	30,000

These ports are some of the deepest and busiest on China's coast.

Source: NTIS - Chung-kuo Hai-kang Kai-kuang.