PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF COMMERCIAL TRANSPORT

HON. F. X. RICHTER, *Minister* A. J. BOWERING, B.A.SC., P.ENG., *Deputy Minister*

REPORT OF THE

Department of Commercial Transport

containing reports on

COMMERCIAL VEHICLES, ENGINEERING, RAILWAYS, AERIAL TRAMWAYS, PIPE-LINES, AND INDUSTRIAL TRANSPORTATION

YEAR ENDED DECEMBER 31

1969

Printed by A. SUTTON, Printer to the Queen's Most Excellent Majesty
in right of the Province of British Columbia.
1970

VICTORIA, BRITISH COLUMBIA, February 4, 1970.

To Colonel the Honourable JOHN R. NICHOLSON, P.C., O.B.E., Q.C., LL.D.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits the Annual Report of the Department of Commercial Transport for the year ended December 31, 1969.

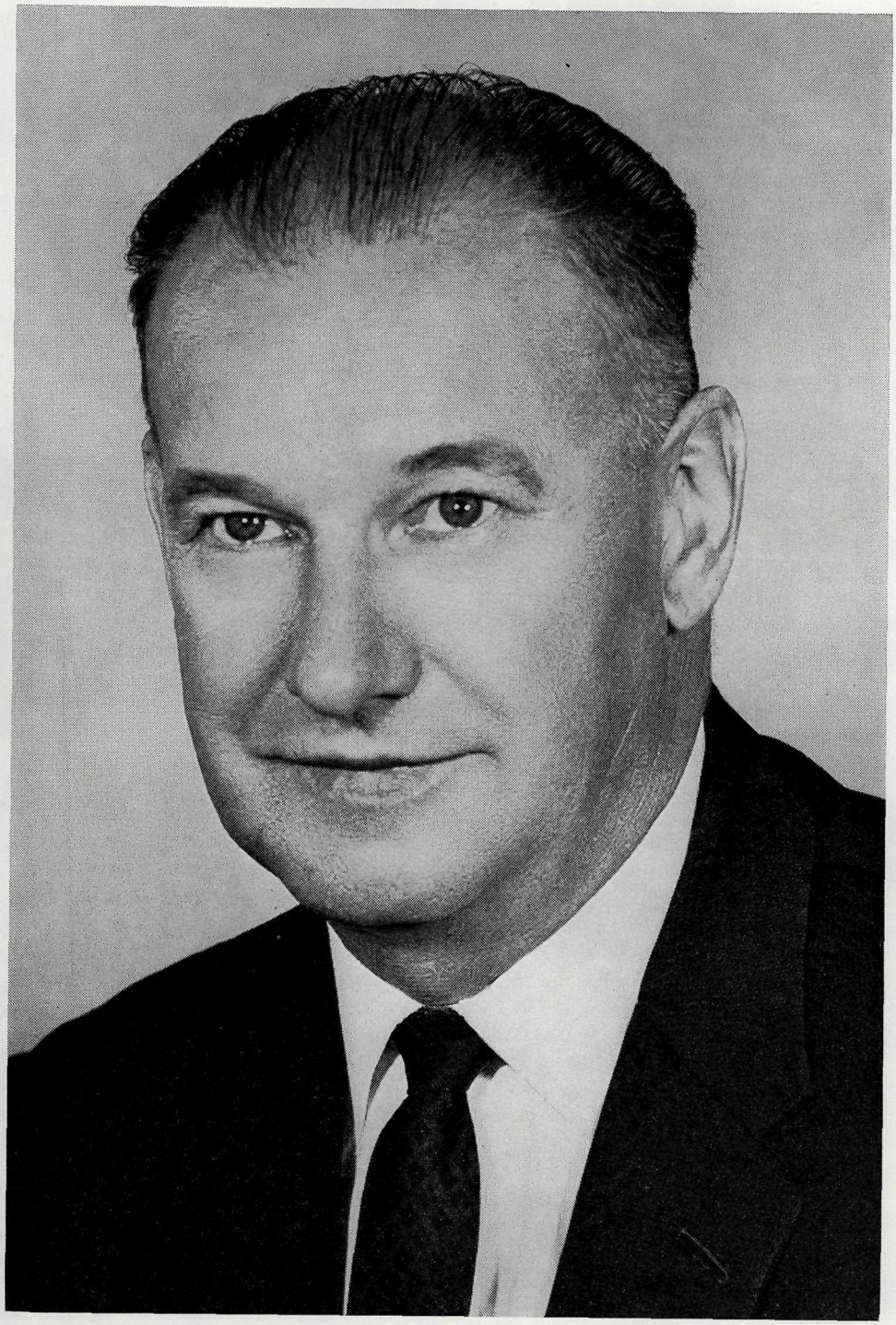
F. X. RICHTER,
Minister of Commercial Transport.

VICTORIA, BRITISH COLUMBIA, February 2, 1970.

The Honourable F. X. Richter,
Minister of Commercial Transport.

SIR,—I have the honour to submit the Annual Report of the Department of Commercial Transport for the year ended December 31, 1969.

A. J. BOWERING, B.A.SC., P.ENG.,
Deputy Minister of Commercial Transport.



The Honourable Francis Xavier Richter, Minister of Commercial Transport.

Alfred John Bowering, B.A.Sc., P.Eng., Deputy Minister of Commercial Transport.

Report of the Department of Commercial Transport

A. J. Bowering, B.A.Sc., P.Eng., Deputy Minister

The year 1969 has been a busy one for the Department, as transportation in many areas is changing rapidly and increasing in volume.

The number of commercial vehicles registered in the Province is up 11 per cent over the previous year. Permits issued for the movement of wide and heavy loads has shown a 7-per-cent increase and this coupled with an increase in tourist traffic during summer months has created a continuing problem to provide safety for the travelling public. The Weigh Scale Branch has been forced to set more rigid guidelines for the movement of large loads and industry must recognize that still further controls may be necessary in 1970.

In order to keep abreast of this activity, our Weigh Scale Branch has been extended with the addition of three more weighmasters to the staff. Two new weigh-scales have been built and one additional portable weigh-scale operation was started in the area, including Kamloops, Merritt, Lillooet, and 100 Mile House. The two permanent scales were established at Kamloops on Highway No. 5, and at Tête Jaune Cache on the Yellowhead route. Traffic at the new Kamloops station has been heavy with peak periods of 80 vehicles per hour.

Motor-vehicle licence reciprocity agreements which have previously been arranged with other Canadian provinces and 16 American states are working well with only minor difficulties. Several states made changes in their motor-vehicle laws during the year and these changes meant an adjustment in their appendices to the Agreement.

Extensions to the Pacific Great Eastern Railway and construction of the railway to the Roberts Bank Superport have created a considerable increase in work within the Department both in approval of plans and in field inspection. The Pacific Great Eastern Railway extensions involve 330 miles of line and the port railway construction is 23 miles in length with several miles of sidings. All highway crossings must be checked carefully and formal approval arranged with due regard to safety and protection for the public.

On the existing rail-lines several new automatic signals have been installed at main highway crossings, including those on the John Hart Highway. Signalization of other major highway crossings is proceeding on the Pacific Great Eastern Railway extension to Fort Nelson and a number of signals will be installed at main highway intersections on the railway to Roberts Bank Superport. Three of these signals will be installed on a temporary basis at Pacific Highway, King George VI Highway, and Highway No. 17 until grade separations have been completed. At Highway No. 17, there will be a detour established during construction in 1970.

Detailed reports covering inspections of railways are included later in this report. This has been a very active year with respect to railway construction and we anticipate an equally busy year in this area of the Department's work in 1970. If the Kootenay and Elk Railway decide to proceed with construction of their proposed line from Natal to the American border at West Roosville, the Department will be involved to a further extent next year.

It is interesting to note that there are 35 industrial railways, two common carrier railways, and four recreational railways operating within the Province.

For a number of years, the Department has been involved with the Canadian Standards Association in the preparation of approved standards for pipe-line construction and aerial-tramway construction and maintenance. Although this requires a fair amount of effort on the part of senior staff in the Department, we consider the results are well worth the effort and, in fact, very definite improvements have been noted during the past two years as a result of this work.

Although no major pipe-lines were built during 1969, there were 222 miles of pipe-line installed as additions to existing systems and 58 miles of gas pipe-line were upgraded and tested. Test procedures are developed in each particular case in advance of the actual test to avoid delay and added expense to the company.

Many more aerial tramways have been built by private industry during the year and, as these are nearly all major installations, frequent inspections were required to ensure that tower footings and other safety features were properly constructed. During the past two years, about 25 new facilities have been installed. Major facilities require several inspections during the year and when problems arise weekly inspections have sometimes been necessary. The Canadian Standards code for aerial-tramway construction and maintenance, which was adopted by the Province in 1967, has been of assistance to both the Province and to companies which manufacture equipment. Because of this standard code, which the Department took a leading part in developing, companies may obtain competitive bids based on the same safety requirements. A great deal of credit must be given to our Engineering Branch personnel for the competent manner in which they are dealing with these recreational and industrial facilities.

A programme of safety within the Department has been carried on consistently over the past few years and, as a result of nearly five years of accident-free operation, the Department received the million-manhour award and Prime Minister's safety trophy.

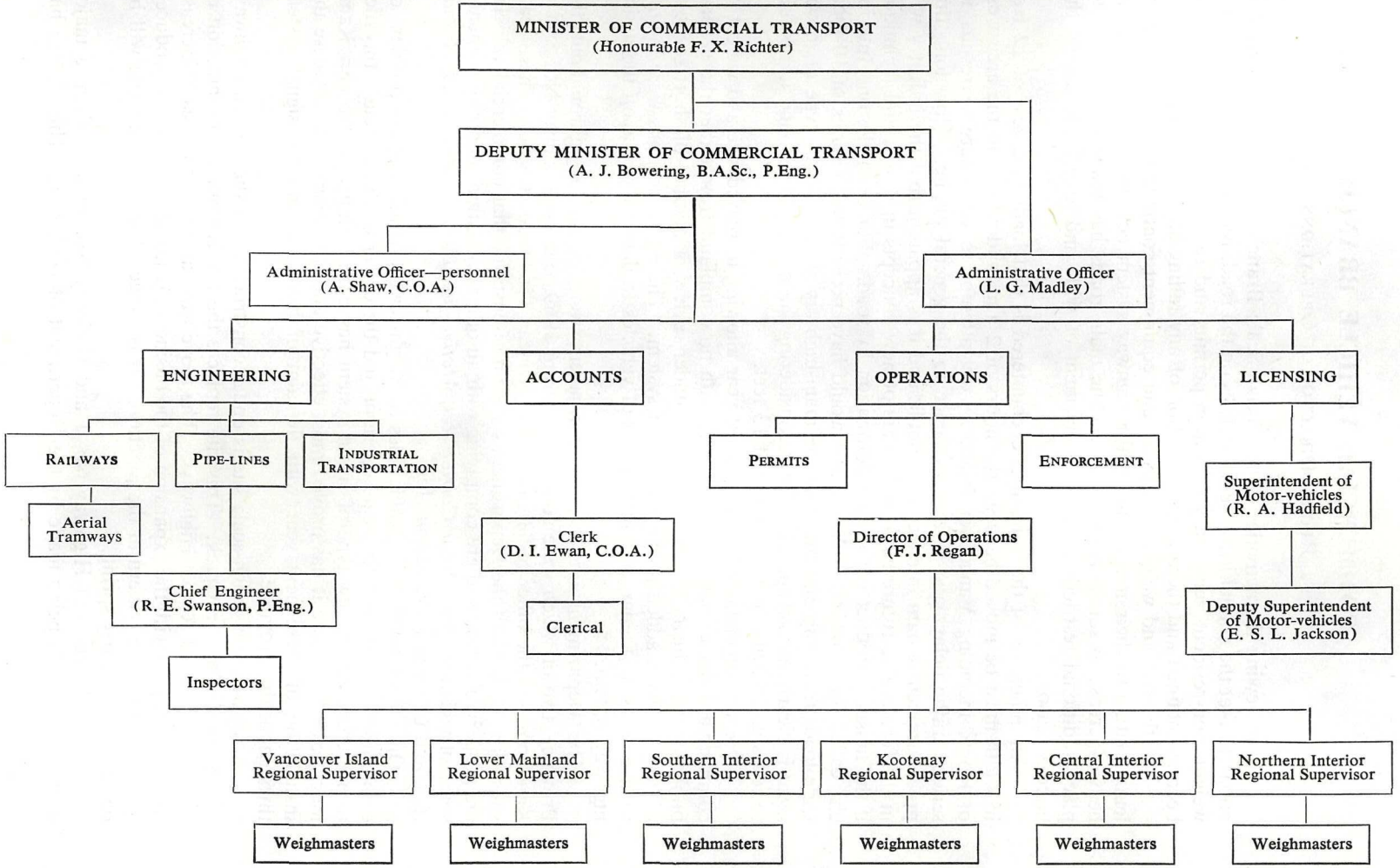
This Department, although considered a low accident-rate Department, actually operates under high-risk conditions. In the Weigh Scale Branch, operators weigh trucks, using portable scales, in all types of weather and under varying conditions of daylight or darkness and in high traffic-density areas. In the Engineering Branch, inspectors while checking aerial-tramway construction and maintenance must carry out this inspection from the top of towers or from moving facilities.

We have been fortunate to operate over this extended period of time and under these conditions without an accident and our field staff must be commended for this excellent record.

During the latter part of the year, the Department headquarters staff moved from the Douglas Building where they had been established for 11 years to the Temple Building on Fort Street. These offices, which were renovated by the Public Works Department, provide additional needed space which compensates to some degree for the inconveniences of being farther from the Minister's office and other departments of Government.

In presenting this report, mention should be made of the excellent co-operation received from other departments of Government and industry in carrying out our responsibilities.

ORGANIZATION CHART



COMMERCIAL VEHICLE BRANCH

F. J. REGAN, DIRECTOR OF OPERATIONS

In reviewing the activities of the Weigh Scale Branch for the year 1969, it is apparent that the annual increase in vehicles on the road, issuance of oversize, overweight, non-resident, temporary operation permits and restricted permits route has been maintained and there is no indication of any falling-off in these areas.

As the size and weight of vehicles and equipment continue to increase, problems relating to their movement on the highway system continue to multiply. A heavy increase in summertime traffic on the main roads has made it necessary to place additional restrictions on the movement of wide and long loads during the holiday season.

An indication of the difficulties encountered is that loads in excess of 12 feet in width must be moved between the hours of 2 a.m. and 5 a.m. in the area west of Hope, including Vancouver Island. Any attempt to do otherwise results in serious traffic delays and in inconvenience to the general public. How long this procedure can remain in effect is in doubt and it is apparent that the industry will in the foreseeable future be forced to adopt new concepts in design and technique if the finished product is to reach destination by road. For example, one Interior city called for a roof truss design that would have necessitated a series of 19-foot-wide loads travelling 300 miles on the main-highway system. This type of movement is clearly not acceptable. On reconsidering the matter, they found it possible to redesign the truss to a maximum of 13 feet.

The new regulations introduced last year allowing increased size and weight of commercial vehicles has functioned well with no complaint from either the general public or the industry. During the year under review, a number of short sections of highway were added to the Schedule I system. These new sections were mainly to give access to the larger combinations of vehicles to delivery points off the main-highway system.

The Department operated 36 permanent weigh-scale sites throughout the Province, two of which were completed during 1969, one on Highway No. 5 near Kamloops and the other on Highway No. 16 near Tête Jaune Cache. These scale sites form the basis of the Department's system of ensuring that commercial vehicles are properly licensed and are complying with all other regulations and requirements, some of which are the *Motor Carrier Act, Motive-fuel Use Tax Act, Stock Brands Act,* and *Consumer Protection Act.*

One of the most vexing difficulties in weigh-scale operation is the problem of communication between the scale operator and the driver of the vehicle. In order to overcome this, a new type of signal system has been installed at the new Kamloops scale. To date it has proved most effective and it is planned to increase the installation of these next year with the aim of having a uniform signal system throughout the Province.

A replacement weigh-scale site is under construction on the Alaska Highway, just north of Dawson Creek. This site replaces the present one at the junction of the John Hart and Alaska Highways. The move was caused by the steady increase in traffic coupled with the expansion of the business area of the city which produced a dangerous traffic pattern at the junction. It is expected that the new site will be operational by early spring.

At the junction of Highway No. 1 and Highway No. 95 at Golden, a major change in route is being made by the Department of Highways. This change has

made it necessary to relocate the present scale and a new site has been developed on the north side of Highway No. 1 which will provide adequate storage for vehicles while they are detained for traffic, weather, or permit applications. It is anticipated that the move will be completed in 1970.

The programme of replacement of wooden scale decks with steel, which was started in 1968, has been continued. There are now 11 axle scales with steel decks. These decks require a minimum of maintenance and reduce the amount of foreign material which accumulates in the scale pit. They protect the weighing mechanism and provide a more uniform surface to transfer the load. It is planned to continue this programme in 1970.

This year, weighmasters employed by the Department were issued with a summer-type light-weight uniform. The new issue has met with a favourable reception by the men concerned and will be continued.

The Province of British Columbia has a prorate reciprocity commercial motor-vehicle licence agreement with 16 American states. This agreement has been in effect since 1961, when there were 14 states involved.

At present there are 220 American companies operating commercial vehicles into this Province and 60 British Columbia-based companies operating south of the border. The agreement provides for licence fees to be paid on the basis of miles operated within the Province. Companies which have a limited number of trips to make into the Province may purchase single-trip or quarterly permits. The cost of single-trip permits is one-twelfth of the annual fee based on gross weight.

During the licence-year 1968/69, there were 3,758 single-trip and 162 quarterly permits purchased for commercial vehicles from 47 states and two territories. The majority of these trips originated in the States of Alaska, California, Idaho, Indiana, Iowa, Minnesota, Montana, Oregon, Texas, and Washington and the Yukon Territory.

Licence reciprocity between Canadian provinces has been arranged under a different formula. The Canadian formula requires operators to license their units in the home-based province and pay a fee equal to $10 per gross ton in other provinces with which the home province has an agreement. The Province of British Columbia has such an agreement with the Provinces of Saskatchewan, Manitoba, Ontario, and New Brunswick. In addition, the Province has an arrangement with the Provinces of Quebec and Nova Scotia for the movement of used household goods. These arrangements are working well at present with no major problems. If Part III of the *National Transportation Act* is proclaimed, then some adjustment will be necessary in the method of providing operating authority for vehicles moving between provinces.

In conclusion, I am pleased to advise that the Weigh Scale Branch has continued to receive excellent co-operation from the other departments of Government and the various trade associations of industry.

SAFETY

The Department of Commercial Transport, while rated as a low accident rate department according to the British Columbia Safety Council Standards, nevertheless has a high degree of accident risk exposure in carrying out the duties assigned to it by the various Statutes.

The duties that have a high risk as far as the Weigh Scale Branch is concerned include the measurement and weighing of commercial vehicles at both fixed and portable sites in all types of weather and traffic conditions. This function is carried out during the hours of darkness as well as daylight and frequently requires the

Premier presenting one million man-hour safety award.

Safety awards.

weighmaster to climb on top of the load. In the operation of portable scales, the danger factor inherent in the movement of personnel and equipment in close proximity to the wheels of heavily loaded trucks is increased when these duties must be carried out in areas of high traffic density.

The Engineering Branch carries out regular inspections of railways, pipe-lines, aerial tramways, and vehicles and bridges on industrial roads. These inspections are done under actual operating conditions and require close and accurate visual observation of moving parts. This factor exposes the Inspector to a wide variety of risks due to the very nature of the facility being inspected. For example, when inspecting an aerial tramway it is necessary to carry out part of the inspection from the top of the supporting towers in order to observe the action of the cable over the pulley.

It is with a great deal of pleasure that I am able to report that the Department was the recipient of both the award of honour and Prime Minister's safety trophy and the million man-hour award and Prime Minister's safety trophy at a presentation held December 18, 1969, in the Legislative Buildings.

It is apparent that the dedication of the members of the Department to the basic principles of safety has been the prime factor in achieving these awards. It is also apparent that the supervisory staff has been effective in promoting a safety-orientated work-pattern throughout the Department.

PERMIT ISSUING OFFICES

Weigh-scales

Cache Creek.
Chetwynd.
Dawson Creek.
Deas Island North.
Deas Island South.
Duncan.
Fernie.
Fort St. John.
Golden.
Hunter Creek.
Kaleden.
Kamloops.
Kamloops North.
Kinnaird.
Midway.
Pacific.
Parksville.
Pattullo Bridge.
Port Mann East.
Port Mann West.
Prince George North.
Prince George South.
Quesnel.
Rossland.
Ruskin.
Rutland.
Saanich.
Sicamous.
Terrace.
Tête Jaune Cache.
Tupper Creek.
Vanderhoof.
Vernon.
Victoria (term permits).
Williams Lake.
Yahk.

Portable Patrols

Kamloops.
Kootenay.
Lower Mainland.
Nelson.
Okanagan.
Peace River.
Prince George.
Victoria.

Department of Finance Government Agents

Alberni.
Ashcroft.
Atlin.
Burns Lake.
Clinton.
Courtenay.
Cranbrook.
Creston.
Duncan.
Fernie.
Fort Nelson.
Fort St. John.
Golden.
Grand Forks.
Ganges.
Invermere.
Kamloops.
Kaslo.
Kelowna.
Kitimat.
Lillooet.
Merritt.
Nanaimo.
Nelson.
New Westminster.
Oliver.
Penticton.
Pouce Coupe.
Powell River.
Prince George.
Prince Rupert.
Princeton.
Quesnel.
Revelstoke.
Rossland.
Salmon Arm.
Smithers.
Terrace.
Vancouver.
Vanderhoof.
Vernon.
Williams Lake.

Motor-vehicle Branch Offices

Abbotsford.
Campbell River.
Chilliwack.
Cloverdale.
Dawson Creek.
Gibsons Landing.
Kamloops.
Mission.
New Westminster.
North Vancouver.
Pemberton.
Port Hardy.
Queen Charlotte City.
Sechelt.
Squamish.
Trail.
Valemount.
Vancouver (East).
Vancouver (Main).
Vancouver (Point Grey).
Victoria.

Miscellaneous

Director of Operations, Department of Commercial Transport, Victoria.
Engineering Branch, Department of Commercial Transport, Vancouver.

COMPARISON OF GROSS REVENUE COLLECTIONS FROM COMMERCIAL LICENCE AND PERMIT FEES FOR FIVE-YEAR PERIOD 1964/65 TO 1968/69, INCLUSIVE.

Source	1964/65	1965/66	1966/67	1967/68	1968/69
Commercial licences	$9,706,486	$10,674,538	$11,281,095	$11,732,631	$13,010,278
Non-resident permits	410,645	429,067	459,048	444,302	565,877
Trailer fees	81,223	91,177	97,934	100,278	114,782
Temporary operation permits	80,692	98,007	99,604	102,337	113,642
Oversize and overweight permits	530,171	629,453	706,213	785,690	840,305
Totals	$10,809,217	$11,922,242	$12,643,894	$13,165,238	$14,644,884

SUMMARY OF COMMERIAL VEHICLE LICENCES AND PERMITS FOR FIVE-YEAR PERIOD 1964/65 TO 1968/69, INCLUSIVE

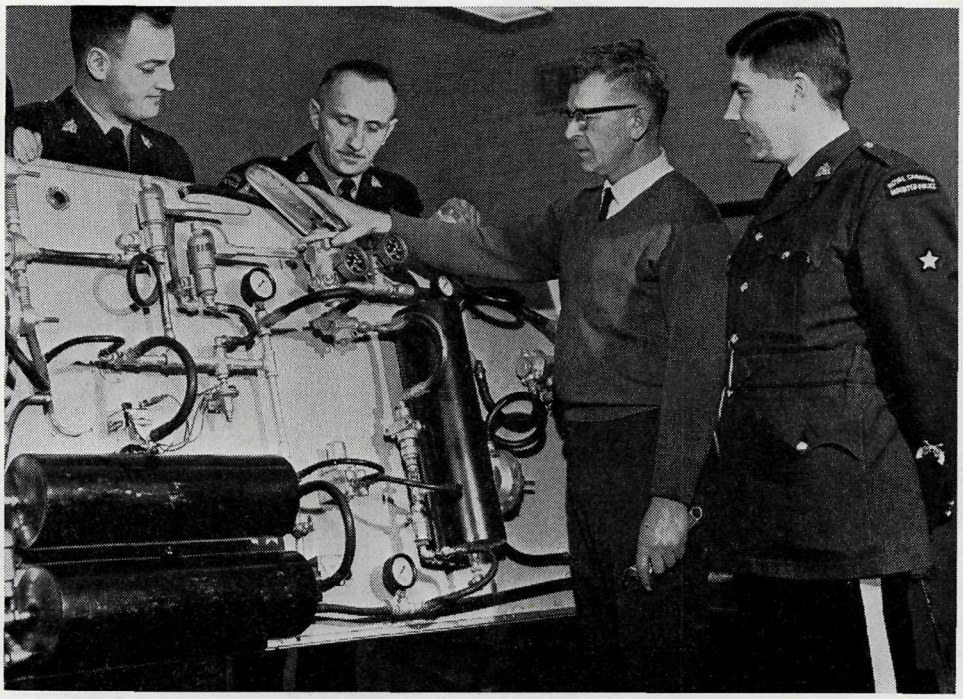
Source	1964/65	1965/66	1966/67	1967/68	1968/69
Commercial motor-vehicle licences	142,886	155,670	165,703	175,358	182,742
Non-resident commercial permits	15,364	16,720	17,085	16,142	18,839
Commercial trailer licences	14,518	16,978	19,057	20,929	21,188
Temporary operation permits	30,452	36,732	38,179	39,137	42,814
Oversize and overweight permits	29,470	32,919	36,101	44,777	46,768

REVENUE FROM GASOLINE AND MOTIVE-FUEL USE TAXES FOR PASSENGER AND COMMERCIAL VEHICLES

Fiscal Year	Amount	Fiscal Year	Amount
1955/56	$19,820,000	1962/63	$43,129,000
1956/57	22,593,000	1963/64	46,420,000
1957/58	24,500,000	1964/65	50,865,000
1958/59	26,100,000	1965/66	56,441,000
1959/60	28,582,000	1966/67	61,388,000
1960/61	30,093,000	1967/68	65,548,000
1961/62	39,262,000	1968/69	69,414,000

NOTE.—The above information on revenue from gasoline and motive-fuel taxes has been combined, as separate returns for commercial vehicles are not available.

New weigh-scale at Kamloops showing improved signal system for directing trucks.



Inspector Dyck training R.C.M.P. officers on special course in air-brakes.

ENGINEERING BRANCH

(Railways, Aerial Tramways, Pipe-lines, and Industrial Transportation)

R. E. SWANSON, P.ENG., CHIEF ENGINEER

The transport industry has kept pace with the general expansion of the economy throughout the year 1969, consequently railroading, trucking, pipe-lining, and the building of aerial tramways have been on the increase throughout the Province. Carloadings on the Pacific Great Eastern Railway will nudge the 100,000 level for the first time in the company's history. The 1969 surge in carloadings can be attributed to grain shipments being nearly doubled over 1968 with wood chips up 20 per cent and pulp shipments ahead by more than 50 per cent. Three hundred and thirty miles of railway extension were under construction on the Pacific Great Eastern Railway during the year, with another 300 miles of extension projected for the seventies with preliminary surveys made during 1969. The Roberts Bank project, which involved 23.1 miles of mainline railway, with 5 miles of sidings, was fully under construction during 1969 and is due for completion early in 1970. Both Pacific Great Eastern Railway and British Columbia Hydro and Power Authority Railway extensions have generated a heavy work load in the Engineering Branch as no extra help has been brought in to compensate for the increase in the work load.

The programme of signalization of major railway crossings has continued during 1969. The major railway crossings on the John Hart Highway have now been signalized. In some instances power has not been available by conventional means but modern technology has utilized the principle of burning propane to charge batteries. In a number of cases this has made signalization possible and the communication people of the Pacific Great Eastern Railway are to be commended in this regard. Signalization is under way on the Pacific Great Eastern extensions north of Fort St. John and a number of installations have been ordered for the new railway to Roberts Bank. In West Vancouver, where a whistling ban is in effect, crossings are being signalized as road traffic increases to a point where stop signs at railway crossings tend to impede street traffic at rush hours when often trains are not in the area.

Railway grade-level crossings on the new Pacific Great Eastern extensions and the railway to Roberts Bank have required considerable attention as municipalities and other authorities are naturally concerned with respect to traffic. On the Roberts Bank project railway overpasses are under construction.

The technology of motive power for railways has made a new breakthrough in control methods for diesel-electric power. Steam could never compete again with diesel. At one time a 500- to 1,000-horsepower steam locomotive was tops, whereas today the unit trains in British Columbia will have 39,000 horsepower, most of which is controlled by means of radio. The Pacific Great Eastern Railway took delivery of four 3,000-horsepower diesel electric locomotives in 1969 and has also purchased the slave car equipment to control these locomotives in long-unit trains.

The inplant railways and switching complexes of the pulp-mills and wharves have continued to increase in tonnage handled. Trained staffs to man the locomotives and to handle the switching have been a problem and in this regard our Inspecting Engineers have conducted courses to train new men and have directed

the training programme of the various companies. As an example, at Powell River, crews were trained for a narrow-gauge operation while other crews at the same location were required to be certified for standard-gauge operation, where barges are switched, handling regular railway equipment. In other instances special precautions were enforced where chlorine and ammonia are unloaded from tank cars at pulp-mills.

The Engineering Branch is responsible for the proper and safe storage of flammable liquids adjacent to railway and special rules are provided based on the standards set up by the Railway Committee of Canada. All of our Inspecting Engineers are appointed as Assistant Fire Marshals in order to cover this phase of the work. The storage areas are, in a number of cases, adjacent to the Canadian Pacific Railway and the Canadian National Railway but as they are not on land dedicated to railway right-of-way, these areas do not come under Federal jurisdiction and are, therefore, under Provincial jurisdiction. A number of large installations are located on the Pacific Great Eastern Railway and British Columbia Hydro and Power Authority Railway. Most installations involve propane tanks in which case annual certificates are issued by our Inspecting Engineers.

At Taylor, the loading area for propane and other liquid-petroleum gases is inspected annually as at times tank cars are not properly loaded or leaks are in evidence. This condition causes a problem with public safety when such cars enter the warm coastal area. The problem has been quite serious where liquid-petroleum gas tank cars are loaded in Alberta during sub-zero weather and moved over the Canadian Pacific Railway or the Canadian National Railway to the coast area. There have been times when defective cars had to be flared off to avoid an explosion. In such cases, special tools and equipment are provided in individual sets and men are trained to perform this hazardous operation. The Engineering Branch and the Fire Marshal's office jointly handle the direction of this operation on all railways in British Columbia. The individual sets of special tools and equipment are stored in Nelson, Kamloops, Prince George, and Vancouver, with one set looked after and maintained by each of the following railways: Canadian Pacific Railway, Canadian National Railway, Pacific Great Eastern Railway, and the Great Northern Railway. Our engineers make an annual inspection of the special sets of tools to see that they are being properly maintained.

In the oil- and gas-production fields, the construction and testing of oil and gas pipe-lines have been regularly supervised by our field engineers. A considerable number of installations in the production field have large pressure vessels, scrubbers, separators, etc. These are inspected and checked to see that the companies are making periodic tests and maintaining proper procedures as to safety. In other instances oil tanks and tank farms require to be inspected where dyking and other matters are checked.

Recovery stations and compressor stations in the production field have been in operation for a number of years as the natural pressure of the gas or oil in the ground has decreased due to the gas or oil being taken out. Compression is necessary for transportation and in recovery a pattern of forcing water into the ground is established to move the gas or oil to the point or well where production is taking place. The large compressor stations of the Westcoast Transmission Company serve the purpose of increasing throughout by raising pressures to compensate for that which has been lost by pipe friction. By the addition of power, pressures can be raised to the safe limits of the pipe, thus increasing throughput within the bounds of pipe-line economics. Some stations exceed 20,000 horsepower and in all cases are powered by using the gas being transmitted as fuel to drive the compressors. Oil-pumping

stations, on the other hand, utilize diesel power, electric power, or natural gas to drive gas turbines or engines. The same principle applies, namely, the energy lost due to pipe friction is restored by the addition of power or energy equal to that which was lost. The compressor stations of the Westcoast Transmission Company, Alberta Natural Gas Company, and Inland Natural Gas Co. Ltd. are inspected and tested each year by our field staff. The same inspection applies to all oil-pumping stations. Plans and specifications for all new pipe-lines, compressor stations and pumping stations are approved by the Engineering Branch, as are all tests on new pipe-lines or the upgrading of existing pipe-lines. Matters affecting right-of-way, easements, drainage, and the crossing of other facilities, such as railways, highways, and streets, also require the approval of the Engineering Branch.

The liaison established over the past few years with the Motor-vehicle Branch has continued and grown in 1969. Our engineers inspect heavy vehicles on their behalf and submit reports and, in addition, we train their vehicle inspectors on the special knowledge of air brakes as used on trucks on highways. Joint attendance at air-brake seminars with the trucking industry is commonplace. This has been most beneficial to the trucking industry as well as to the general public as public safety is bound to be improved by co-operation between the two branches involved.

The Industrial Transportation Section of the Branch became involved in many projects during the year. In one instance, the Yukon Territory asked that we train their personnel so that they, themselves, in turn, could properly train heavy transport drivers to the standards established in British Columbia by our Engineering Branch. Two hundred and thirty-five men were trained and this was followed by a request from the Motor-vehicle Branch of British Columbia to train the staffs for the new vehicle-testing stations. In this regard, 100 men were trained and certified. A third request was received from the Royal Canadian Mounted Police where 48 policemen were trained and certified. Other courses and training lectures were routine as they have been established over the years; notwithstanding, 1,075 men attended air-brake and other lectures during 1969, and vehicles and industrial roads were inspected throughout the Province where accidents occurred or special requests were made for inspections.

Transport by ropeway has continued to expand, especially in the mountain ski areas. Twenty-five ski-lift facilities have been installed over the past two years, some of the construction projects carrying over from one year to another so that an exact number in any one year or season cannot be stated. Sufficient it is to say that 10 years ago about 25 facilities in as many areas were registered, whereas at the end of 1969, 85 areas are registered with 150 facilities operating or under construction. Each facility requires at least one, and sometimes three, inspections during the season and, as the season is normally of five months' duration, the winter months are taken up to a large extent with aerial-tramway inspections. Some of the large mining and oil-producing companies have helped on certain projects as a contribution to recreational facilities provided for the enjoyment of their employees. Every new major facility involves a considerable volume of engineering drawings which must be checked and approved by the Engineering Branch prior to erection. The Canadian Standards Code Z-98 adopted in 1967 has been of great assistance in this respect as manufacturers in Austria and Switzerland who supply most of the aerial-tramway equipment can now quote and supply on a common basis.

The International Organization of Travel by Ropeway met in Lucerne, Switzerland, in September, 1969, and the Branch was represented and participated in the meetings. In October, 1969, the Canadian Standards Association meetings were held in Ottawa, Canada. These meetings were chaired by our chief engineer. The

results and conclusions reached in the Lucerne meetings were thus fused into the Canadian Standards so that the amendments proposed in the meetings will bring our standards to the level of world standards. This is beneficial to the ropeway industry in Canada and particularly to British Columbia and Alberta, where many of Canada's ski-lifts and ropeways are in operation.

The Gas Pipe-line Code meetings followed the aerial tramway code meetings in Ottawa under the same chairmanship and the same pattern prevailed. When the Gas Pipe-line Code was formulated and published in 1966/67, one of the weaknesses recognized was that the type of material used in steel pipe-lines was not always compatible with the Canadian climate and, secondly, many sources of failure seemed to point to the technicalities of the test procedures established over the years in other countries prior to any pipe-lines being built in Canada. As a result of the Canadian Committee recognizing the implications of these problems, the new Code encompassed an improved technology in test procedure and at that time a new committee on high-strength pipe-line materials was set up under the same chairmanship. In May, 1969, the International Organization for Standardization (ISO/TC) met in Dusseldorf, Germany, on steel materials for the petroleum industry. All major countries of the world were represented, with Canada being represented by personnel from our Department. As a result, a great many of the conclusions reached at the Dusseldorf meetings were infiltrated into the conclusions reached at the Ottawa meetings in October, 1969, and, as a result, a new standard on high-strength line-pipe will be published in 1970 which will upgrade the standards and the over-all safety in the entire pipe-line industry throughout Canada.

In the Pipe-line Section of the Engineering Branch, the normal work load prevailed. Extensions of pipe-lines, retests and routine inspection was the pattern for the year; notwithstanding, an extra work load was imposed due to the Department's participation in Canadian Standards on several committees. The results have been beneficial to British Columbia as a great many failures during test have now been eliminated due to better materials, more stringent rules and guidelines and, most of all, a better understanding of the technology of materials and methods now available in many parts of the world.

A close liaison has continued between the Railway Committee of Canada and our Department. Several meetings were chaired in our Vancouver office during the year, where the Great Northern Railway, the Canadian Pacific Railway, the Canadian National Railway, and the British Columbia Hydro and Power Authority Railway, together with ourselves and representatives from the Railway Committee of Canada reached amicable decisions on acceptable methods of joint operation over the new Roberts Bank Railway, it being recognized that the railway will remain under Provincial jurisdiction while the three mainline railways, themselves, operate under Federal charter. A spirit of co-operation has grown over the past few years and where grey areas appear to exist, joint inspections have been conducted with Federal and Provincial engineers both present, and, as the same rules apply under either jurisdiction, the problems usually have had obvious solutions quite readily solved.

In the mining railways, joint inspection with the Mines' inspectors and ourselves have been carried on for many years and in 1969 a joint inspection was made of the 10-mile tunnel railway at the Granduc mining operation near Stewart, British Columbia.

All common-carrier railways, logging railways, recreational railways, aerial tramways, pipe-lines and industrial roads were inspected, the details of which are set forth in the following reports.

RAILWAYS

Pacific Great Eastern Railway Company

Chief Engineer's Report

The procedure of annual inspections of the Pacific Great Eastern Railway roadbed and facilities has been firmly established over the past 25 years and, accordingly, during the last two weeks of October, 1969, in company with the appropriate officials of the Pacific Great Eastern Railway Company, a complete inspection was made of the main line from North Vancouver to Fort St. John and the branch lines to Dawson Creek, Mackenzie, and Fort St. James, a distance of approximately 1,000 miles of track inspection. The inspection included roadbed, track, drainage, bridges, yards, trader sidings, railway crossings, shops, stations, rolling-stock and the communication system. In addition, inspections were made in September of the grading and track laying on the new extension from Fort St. John to Fort Nelson. The general inspection in October was made from north to south by flying first to Fort St. John and making the trip over the entire railway system by track motor.

As in the past, the annual inspection trip was timed to be just ahead of the arrival of snow in the Rocky Mountain passes and at a time when the annual capital work was completed sufficiently to report on progress.

The 1969 capital programmes included the replacement of several bridges with fill, the rebuilding and redecking of other bridges, replacement of 85-pound rail with 100-pound rail on certain subdivisions and the installation of creosoted ties on the main and branch lines as renewals become due. Also, crushed-rock ballast to replace pit-run is now a part of each year's capital programme.

It can be reported that approximately 200,000 treated ties were installed during the year. Three hundred miles of crushed-rock ballast has been installed and 143.3 miles of 100-pound rail was laid, 110 miles of which was laid in 78-foot lengths with 33.3 miles laid in 39-foot lengths. This rail was purchased new in 39-foot lengths and butt-welded together to form 78-foot lengths in Prince George where the company is operating a contract rail-welding plant. The longer lengths now used cut the number of joints by one-half which proportionally reduces the wheel impact at rail ends, giving 50 per cent smoother ride.

The line from Fort St. John to Chetwynd is in good condition, commensurate with the volume of traffic. The fill at the John Hart Highway overpass near Fort St. John has consolidated. The earth work done has arrested further settlement. On the south bank of the Peace River, a diversion was under way to clear sloughing conditions. Derails at the TECO Pit were checked and found in order. Alignment on the 28-mile tangent is quite good and all capital work completed over the past three years, namely, fills and ballast, has provided good operating conditions.

The Dawson Creek subdivision from Chetwynd to Dawson Creek was inspected. The track here is laid with 60- and 70-pound steel which is quite crooked, especially at the joints. Some of the ballast under the ties seems to contain large rocks which make alignment difficult. A plough treatment in some spots might be advisable; however, it is doubtful if the volume of traffic over this line would justify relaying with heavier steel using black ties and crushed-rock ballast. No passenger trains operate over this line and it is felt the condition of this branch is quite satisfactory.

A new grain elevator is being erected at Groundbirch. Other grain elevators were built at Dawson Creek over the past few years. These additional facilities will, in due course, assist greatly in the over-all economics of this important branch line.

The 22-mile branch line to Mackenzie was inspected. This is an excellently constructed branch line—good bridges, well-opened cuts, and good drainage, and maintenance is being well handled. Traffic on the branch line is quite heavy and further additions planned to the industrial complexes at Mackenzie will cause traffic to steadily increase over the next few years. This line is laid with 60- and 70-pound rail and it is felt that within two years this rail should be changed out for 100-pound rail with black ties and crushed-rock ballast. Road vehicles were using level crossings which had been taken out subsequent to the original construction of the line. The officials were instructed to restore the ditches in the interests of public safety and, where access roads are necessary, application should be made for access crossings to serve those who wish access into the areas affected by the railway.

At Mackenzie, the railway facilities are quite adequate and are being properly installed. The town of Mackenzie is a credit to the northern area and is being well served by the Pacific Great Eastern Railway.

The 72-mile branch line to Fort St. James was inspected. Parts of this branch are still in a state of construction as the line is opening up new country. The first 13 miles are in quite good condition but most of the remainder of the track, with the exception of that portion where new 85-pound rail was laid, is rough. This is largely due to the rail used being relay quality; however, the condition of the track is commensurate with the volume of traffic, the bulk of which is logs and lumber. This branch is being extended another 80 miles with additional extensions announced for the 1970's. This branch can be expected to be a substantial feeder to the main line as the line will traverse country rich in minerals and timber and the type of construction will be upgraded as traffic volume increases; meantime the track is safe and is serving the needs of a frontier area.

The main line from Chetwynd to Fort St. John is in quite good condition. The construction ties are now being changed out and in places rail wear bears the evidence of ever-increasing traffic. Several new steel bridges have replaced the shoofly diversions of the construction days. The old 4-mile sinkhole has stabilized. New sidings have been provided for the three new pulp-mills and the oil refinery near Prince George. The Fraser River bridge was inspected and found to be in order.

The grade from the Old Prince Station to the Fraser River Bridge would justify a moderate revision which would help local rail traffic between the Prince George Industrial Park and the pulp-mill complex north of the bridge.

An inspection was made of the Prince George Industrial Park. This complex has enjoyed a phenomenal growth over the past five years. Recently sawmills, a chemical plant, a creosoting plant, and many machinery sales and service organizations have built large warehouse facilities and machinery yards in the park area.

The inspection from Prince George to Quesnel revealed the track to be in good condition. The decking was being renewed on the Ahbau and Cottonwood Bridges. Both bridges were inspected and found in order.

From Prince George to North Vancouver, the track is constructed to main line standards. As previously stated, 143.3 miles of new 100-pound rail were laid in this area during 1969, making a total of 306 miles of 100-pound rail installed with tie plates on tangent and curves, with better than 70 per cent treated ties. Hundred-pound rail is, therefore, continuous (with the exception of four or five scattered miles of trackage) between North Vancouver and Williams Lake, a total distance of 313.1 track miles.

The new yard facilities at Williams Lake are modern and well built. Platforms and refueling equipment are efficient and up-to-date and the work has been com-

pleted to proper standards. The level crossing of the Chilcotin Road presents a serious problem. Its accident record is poor. An overpass has been planned for years and was being replanned by the Department of Highways at the time of my inspection. The crossing should be signalized forthwith and when and if a road overpass is ever constructed, the signal can be moved to another location. The crossing at Exeter will be much improved when the station is moved. The new station was complete at the time of my inspection and the move was to be made in the immediate future.

Wire crossings have been installed by the British Columbia Hydro and Power Authority at Kelly Lake. The pole-line crossing is not dead-ended. This should be done forthwith as the installation is substandard. Several bridges on Pavilion Hill were being replaced with fill. These installations should be complete by the end of the year and will improve safety at these points. The Lillooet River Bridge was inspected. The new deck and superstructure installed last year, subsequent to a fire, are satisfactory and the bridge is in good order.

The railway facilities at Lillooet were found to be in order. Fueling systems were clean and properly maintained. Station facilities, washrooms, etc., were inspected and found satisfactory. Ballast, ties, and rail conditions between Lillooet and Squamish were satisfactory. Ditching and shoulders are being maintained. The oilers installed on the Squamish subdivision are doing a good job; however, the heavy curves in the Cheakamus Canyon take their toll on rail wear so rails have been turned and worn rail moved to tangent locations. The bridges on this subdivision are in good order. Six railway crossings have been signalized during the year over the entire line. This will improve safety, especially during the ski season at the Whistler Mountain ski complex adjacent to Alta Lake.

At Squamish, a new car-rebuilding shop was under construction, scheduled for completion before the end of 1969. This will be the railway's main car maintenance depot and will permit efficient manufacture and repair comparable to shops on transcontinental railways. During the year, the Car Department at Squamish produced two large consists of cars for use by the construction gangs on the northern extensions. A third consist was produced for the bridge gangs throughout the line.

The Locomotive Shop at Squamish was inspected. Improvements in methods over former years can be reported. This shop was extended recently and it is worthy of mention that this locomotive shop is by far the best equipped and the most up-to-date in British Columbia.

Between Squamish and Vancouver, the line is in good condition and laid with 100-pound rail. Bridges, tunnels, and cuts were found to be in order. Considerable difficulties are still experienced with slides but in this type of mountainous terrain, the same condition is common to all railways.

Facilities at North Vancouver were inspected. The Budd shop and car shop continue to be efficient as they were planned and built for this work. Fueling and cleaning facilities have been improved at this point. The yards at North Vancouver were inspected and found to be clean and in order. The interchange between the Canadian National Railway and the Pacific Great Eastern Railway was found to be satisfactory; however, the Canadian National Railway has at times blocked level crossings and this matter was cleared up after a meeting with Canadian National Railway officials.

Weed control over the entire line was observed. The 1968 spray contract has done a fairly good job on the deciduous foliage but has entirely failed on the evergreens, such as Douglas fir and western cedar. Unless a follow-up is done in 1970

with proper chemicals for the evergreens, slashing will be required in a number of places over the entire line.

The communication system and dispatching system were inspected and found to be modern and efficient. This is due to the personnel in charge keeping pace with the trend to the modern concept of solid-state electronics.

During the year, the Pacific Great Eastern Railway purchased four new giant 3,000-horsepower diesel-electric locomotives and also purchased the radio-controlled slave unit equipment which will permit locomotives to be placed back in the train and operated by radio control from the cab of the leading locomotive. The roster of motive power on this railway is now as follows: Locomotives—four 3,000-horsepower Alco, 29 1,800-horsepower Alco, 25 1,600-horsepower Alco, and three 1,000-horsepower Alco switchers; Budd cars—six 600-horsepower Budd passenger cars or coaches.

All locomotives and other motive power, boilers and pressure vessels were inspected and certified by our inspecting engineers during the year and, in addition, they inspected all oil, gas, and propane storage on, or adjacent to, the railway.

The railway employs a safety director who works closely with the Department on accident prevention as workmen's safety is the responsibility of the Department of Commercial Transport, rather than the Workmen's Compensation Board, on all railways and switching areas in British Columbia.

Conclusion.—It can be reported that the Pacific Great Eastern Railway is being properly operated and maintained so that it is serving the public in a safe and proper manner.—*Robert E. Swanson, P.Eng.*

Roberts Bank Superport Railway

R. E. Swanson, Chief Engineer

During the year the Roberts Bank Superport Railway was under construction. This project involves 23.1 miles of new railway construction with five miles of sidings or passing tracks, plus trackage at the coal-loading facilities at the port area. The line extends from Cloverdale where it joins with the British Columbia Hydro and Power Authority Fraser Valley Branch, and traverses in a due westerly direction to the high-tide mark near Ladner, and thence for 2½ miles on a causeway to join up with the trackage of Kaiser Resources Ltd. at the new superport, a distance of 23 miles.

The line follows, basically, the old Great Northern Railway location from Cloverdale to a point near Ladner, where it leaves the old Great Northern abandoned grade and traverses new ground to the port area. Use was made of the abandoned right-of-way for these reasons: firstly, the location was excellent from a point of railroad design and operation; secondly, the least number of residents and property owners were disturbed as the old right-of-way was not generally occupied for any use other than a portion had been utilized for Colebrook Road (which was relocated adjacent to the new rail-line); and, thirdly, the final location, as built, will make possible the rerouting of the Great Northern Railway from the United States border near Blaine, to a point near Cloverdale, where it would join the new Roberts Bank Superport Railway location (as it did many years ago) and thus make it possible to take the Great Northern tracks away from White Rock and restore the entire shoreline from the United States border to Point Roberts for recreational and residential purposes.

The rail route will utilize the present British Columbia Hydro and Power Authority Railway from Cloverdale, bypassing the town of Langley on the west

side of town, and joining with the Canadian National Railway near Fort Langley by a new 2.1-mile rail link being constructed by the Canadian National Railway. Thus, the two transcontinental railways, the Canadian Pacific Railway and the Canadian National Railway, will be given direct rail access to the new superport as will the British Columbia Hydro and Power Authority and the Great Northern Railway which connects directly with all railways in the United States. An alternate route is also provided via Port Mann for the Canadian National Railway, and via the New Westminster Bridge and Coquitlam for the Canadian Pacific Railway. By the last route, using the Canadian National Railway and the Great Northern Railway, rail traffic from Vancouver, British Columbia, including Pacific Great Eastern rail traffic, can be given a direct-rail route to and from the new superport at Roberts Bank.

The line from Fort Langley to the superport is being laid with 115-pound rail, with tie-plates, using 3,000 creosoted ties to the mile, and with a 15-inch lift of crushed rock ballast shouldered to Class I standards. All passing tracks are 8,000 feet in length to accommodate unit trains of 105 cars per train. The maximum gradient is 0.7 per cent, with a maximum curvature of 5 degrees.

Road overpasses are to be constructed at Pacific Highway, King George VI Highway, and Highway No. 17. These locations will require preloading and, as the line is to be in operation early in 1970, signalized temporary level crossing are to be installed at these locations. Several signalized crossings will be in operation on the 23.1 miles between Cloverdale and the superport, with a railway overpass at Highway No. 499, near Colebrook. Other signalized crossings and an overpass are planned between the Fort Langley and the Cloverdale connection, but this section of line is not within the scope of this report.

Inasmuch as the Canadian Pacific Railway, the Canadian National Railway, the British Columbia Hydro and Power Authority Railway, and the Great Northern Railway will jointly be operating over common trackage, some of which comes under Provincial jurisdiction, and some under Federal charter, and some of the companies are under Federal charter with the British Columbia Hydro and Power Authority under Provincial charter, problems might have arisen if the Uniform Code of Operating Rules had not been adopted by all four railways, and if meetings of the operating departments of all the participating railways had not been held in our Engineering Branch in Vancouver where the anticipated difficulties were ironed out and agreement reached. It is therefore expected no major problems will arise with the operation of all four railways over joint trackage, with the Great Northern Railway also operating passenger trains.

During the location of the line, assistance was given by our Engineering Branch as to the final location, after which plans, profiles, and books of reference were approved in the established manner. During construction, inspections have been made over the route, particularly where drainage, road relocations, railway crossings, fencing, and revisions required approval and finalization. Inspections have also been carried out at the port area where Kaiser Resources Ltd. coal-handling machinery and trackage have been under construction.

It can, therefore, be reported this railway is being constructed to the best main-line standards and it is expected the line will be given the final inspection pursuant to the *Railway Act* during the first quarter of 1970, at which time my report will be submitted, thus enabling the Minister to declare the line open for revenue traffic, provided it meets with the necessary requirements.—*Robert E. Swanson, P.Eng.*

Recreational Railways

Chief Engineer's Report

Two major recreational railways operate in British Columbia where steam locomotives are the feature attraction. The Fort Steele Dunrobin Railway is registered under the Department of the Provincial Secretary and is operating jointly with the Parks Branch of the Department of Recreation and Conservation. The locomotive *Dunrobin* was built in Scotland in 1895 and ran on British railways for many years. It was brought to Canada in 1965 and put in working condition so that it was an operating exhibit during the Centennial Celebrations of 1967, where it ran on Vancouver Island and in the Lower Mainland of British Columbia. It was then taken to Fort Steele over the Canadian Pacific Railway lines and has operated at Fort Steele during the seasons of 1968 and 1969. In 1968 *Dunrobin* hauled 20,000 revenue passengers.

The railway consists of 2¼ miles of standard-gauge track laid with 60- and 70-pound rail and with a ruling grade of 2½ per cent. The old Fort Steele station has been moved to the new site and is again serving an enthusiastic public. A second sightseeing station platform is provided at the top end of the run for sightseers. A loop arrangement at each end of the run, with spring switches, provides a continuous run of 2¼ miles with all the realism of the pioneer days of railroading, complete with steam.

When it was realized in 1968 that the original coach was small and inadequate, a full-sized coach was obtained directly from British Railways in England. British Railways was persuaded to take a coach, built in 1954, out of service and sell it to the British Columbia Government at a token cost, so that we were able to ship it on the deck of a vessel, through the Panama Canal, unload it at Vancouver, move it over Canadian Pacific Railway lines on its own wheels, and place it on Fort Steele tracks; all of which was done in eight weeks from the date of purchase in Great Britain. The coach weighs 32 tons, is 67 feet in length and seats 48 adults, or 65 adults and children. During the 1969 season, 24,000 revenue passengers were carried on the Fort Steele Dunrobin Railway.

It can be reported this railway is in good condition and safety is up to the proper standards for the operation of passenger trains. It can also be reported this railway is serving the recreational needs of the touring public and will continue in the future to be an excellent tourist attraction in the interests of British Columbia.

Cowichan Valley Forest Museum

The Cowichan Valley Forest Museum is sponsored by donations from several of the larger lumber and pulp industries, and other interests throughout British Columbia. The museum grew out of the railroad hobby of Gerry Wellburn, of Deerholme, and was moved to its present site several years ago. It is located on the Trans-Canada Highway two miles north of Duncan.

Slightly over one mile of three-foot gauge track is in operation with extensions planned for 1970. Stations, bridges, cuts, trestles, water tanks, and cars of genuine vintage or replicas are in evidence everywhere. The line is laid with original Canadian Pacific Railway 56-pound rail and is in good condition throughout. Three steam locomotives operate on this line to haul two passenger coaches on each train and two gasoline locomotives are provided to haul lighter trains on off-days. The equipment is inspected and tested each year by our inspecting engineers.

Many old, retired steam locomotives are on standing display at this museum—Shays, Climaxes, and relics of logging and pioneer railways which operated on

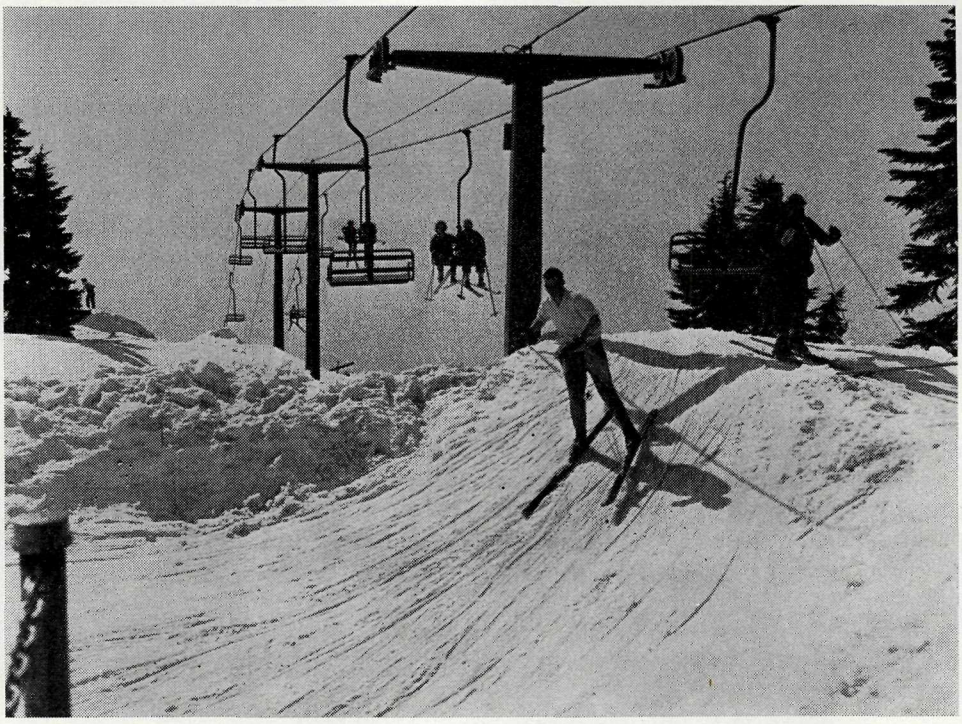
Vancouver Island in the early days. In addition to the railway interest, original spool-donkeys of 1900 vintage are set up as though operating under the trees. Wagons and carriages of the early days are displayed in a long open shed and huge circular saws, the largest ever used in British Columbia, are on permanent display.

Truly, this is a living memorial to those pioneers who built British Columbia; and the pioneer Cowichan Valley Railway is safely serving the public and, at the same time, giving many people a great deal of pleasure.

Terry Fergusson's Pacific Tours Ltd.

This company owns one Climax 70-ton locomotive and operates on the Pacific Logging Railway at Cowichan Lake under an agreement with owners of that seldom-used line.

" Railway Days " or tours are arranged during the summer months where rail-enthusiasts borrow equipment from the main lines and ride it over this short-line railway. Camera " run-bys " are arranged and thus a considerable number of people from all over North America derive a great deal of pleasure in the actual participation of steam railroading as a hobby.—*Robert E. Swanson, P.Eng.*



A Murray-Latta chairlift manufactured in Vancouver, British Columbia, in operation at Mount Seymour. A duplicate of this equipment is being installed at Manning Park.

The last load of logs hauled by steam in Canada (MacMillan and Bloedel) at Nanaimo River operation on December 1, 1969.

Pacific Great Eastern Railway freight train is pictured moving over all-steel Clinton Bridge, 200 miles north of Vancouver. Company's freight traffic has recorded dramatic increases in past decade. During that period annual carloadings have almost doubled.

Roberts Bank Superport area showing Kaiser Resources railway and loading facilities for coal export.

Wharves and Inplant Railways

Chief Engineer's Report

Vancouver Wharves Ltd.—Periodic inspections were made during the year of the railway trackage, yards, and motive power of the Vancouver Wharves Ltd. in North Vancouver. This operation utilizes approximately 12 miles of railway, including sidings and yards. The track is laid with 85-pound rail with tie plates on No. 1 creosoted ties. Generally, the track is in good condition throughout.

During the year, two serious derailments occurred where flanges split switches, causing loaded cars of bulk commodity to be derailed and piled up. The wrecks were investigated and attributed to be a combination of wheel flanges worn to almost the condemning limit, and switch points worn to the same condition. More rigid maintenance was recommended with respect to track and switches.

Motive power was inspected and certified. In one case a diesel locomotive was sent to Squamish for turning and rewheeling; in other cases wheels and tires were renewed on the job so that safety standards were maintained to the Department's rules and requirements.

A number of brakemen and engineers were trained and certified for the operation where, from time to time depending upon shiploadings, six locomotives operate on a three-shift-per-day basis, requiring 18 engineers, 12 firemen, and 26 brakemen. The roster of motive power is as follows: One 550-horsepower diesel-electric, one 600-horsepower diesel-electric, two 90-ton Pacific Coast steam shays, and two Samuel Williams English diesels.

This railway and its wharf facilities serve both the Pacific Great Eastern Railway and the Canadian National Railway with deep-sea export facilities.

Pacific Coast Terminals.—This company operates two rail-switching complexes, one at New Westminster and one at Port Moody. Both operations utilize several miles of railway to serve large deep-sea loading ports.

Switching at these operations is not done with locomotives but is carried out using large front-end loaders adapted with a hook-coupler to handle railway cars. The tracks are completely black-topped as is the space between tracks. This gives the appearance of a huge parking-lot upon which railway cars are parked and shuttled around, not in trains, but a few cars at a time. These rubber-tired locomotives have become known as rhinoceroses due to the horned nose and neck appearance of their coupling device; nonetheless they are most effective and efficient in their operation in this type of railway yard.

This equipment, together with track and car-dumping arrangements, is inspected on a regular basis by our inspecting engineers and the safety record is good at these operations.

Alaska Steamships Surrey Trainship Dock.—This rail and dock facility has approximately three miles of trackage and a comprehensive steamship docking facility. The dock serves the Alaska Steamships Company which operates a large ocean-going railway-car ferry between Surrey and Anchorage, Alaska, thus connecting the Great Northern Railway in Canada with the Alaska Railroad in the State of Alaska. The company in Canada owning the Surrey rail complex and dock is, in turn, owned by several American railways, amongst which is the Great Northern Railway acting as the connecting link between the other American railways. The Surrey dock thus connects the Alaska Railroad, via a train-ship ferry and a Canadian port, with all the railways in the remaining 48 continental states of the United States. An interchange between the Great Northern Railway in Canada and the Canadian National Railway therefore also connects all the Canadian railways with the Alaska Railroad via the Surrey train-ship dock.

A 600-horsepower diesel-electric locomotive operates on this railway. The locomotive is inspected and certified by our inspecting engineers who also inspect and approve the trackage. Very few operational problems have arisen and it can be reported this rail and dock complex is being properly operated.

Twigg Island Railway.—This railway connects with the Vancouver and Lulu Island Railway (operated by the British Columbia Hydro and Power Authority) with the Vancouver Rolling Mills on Twigg Island where a yard and rail complex exist to serve the steel mill. The Twigg Island Railway also connects with the Canadian National Railway via a barge slip on Twigg Island and a barge slip on the Canadian National Railway, Tilbury Island branch line. The steel mill is a subsidiary of Cominco, which, in turn, is a subsidiary of the Canadian Pacific Railway. A Canadian Pacific Railway diesel-electric locomotive is, therefore, permanently assigned to the Twigg Island Railway and, as the Twigg Island Railway operates under Provincial charter, the locomotive is inspected and certified annually by our inspecting engineers who also inspect the trackage. It can be reported the track, bridges, barge slip, and motive power are in good condition.

Hooker Chemical Company Ltd.—The railway is owned and operated by the Hooker Chemical Co. Ltd. in North Vancouver. The railway serves the plant and connects the plant with the Canadian National Railway in North Vancouver. This company owns and operates one 300-horsepower diesel-electric locomotive and a large number of tank cars which interchange with the Canadian National Railway and thus with other railways in the United States and Canada. The locomotive is inspected and certified by our inspecting engineers who also check on the periodic testing of the tank cars in accordance with American Association of Railways Regulations. Copies of all tests are filed with our Branch. This railway is in satisfactory condition.

Rayonier Canada (B.C.) Limited Woodfibre Railway.—This rail operation serves the pulp-mill at Woodfibre and connects with the Pacific Great Eastern Railway via a barge slip at Woodfibre and a barge slip on the Pacific Great Eastern Railway. Both barge slips are inspected by our engineers as is the trackage and trackmobile motive power. All equipment operators have been certified.

F.M.C. Chemicals, Squamish.—This rail-switching operation serves the F.M.C. Chemical Company at Squamish where a barge slip is operated and a trackmobile is used for switching. The operators have been certified and as the commodity is chlorine, a dangerous commodity, frequent inspections have been made during the year.

Powell River Operation, MacMillan Bloedel Ltd.—This operation has a barge slip and standard-gauge shore trackage. It also has a narrow-gauge railway complex with narrow-gauge locomotives to serve the pulp sheds. Our engineers made regular inspections during the year and filed satisfactory reports.

Canadian Forest Products, Port Mellon.—This operation utilizes a barge slip and standard-gauge shore trackage to serve the pulp-mill. A 300-horsepower diesel-electric locomotive is used which is annually inspected, together with the trackage, by our inspecting engineers.

Nanaimo River Operation, MacMillan Bloedel Ltd.—This operation utilizes three miles of trackage at Nanaimo River to serve a log-loading works. Steam locomotives haul the logs 19 miles to Ladysmith to connect with the Esquimalt & Nanaimo Railway. Two steam locomotives were in use until November 30, 1969, when the rail operation was shut down. Regular inspections have been made of the locomotives and the Nanaimo River Bridge during the year. Conditions have always been satisfactory.

Chemainus Mill Rail Operation, MacMillan Bloedel Ltd.—This operation has five miles of railway to serve the sawmill and connect it with the Esquimalt & Nanaimo Railway. The line also serves the purpose of connecting the Esquimalt & Nanaimo Railway with the log dump at Chemainus. This line has been in operation since 1887 and has always been powered by steam locomotives. Two steam locomotives operate on the line and they have been inspected annually, together with the trackage, by our engineers.

Island Tug & Barge Rail Operation, Victoria. — A barge slip on the Inner Harbour of Victoria connects the Milwaukee Railroad with the Esquimalt & Nanaimo Railway in Victoria. A yard complex is adjacent to the barge slip. Regular inspections were made at this operation during the year.

Northwood Pulp Ltd., Prince George.—This company operates several miles of standard-gauge railway to serve its pulp-mill at Prince George and to interchange with the Pacific Great Eastern Railway. A diesel-electric locomotive is operated as well as two trackmobiles. A number of inspections were made during the year and it can be reported this railway and equipment are safely and properly maintained.

Prince George Pulp & Paper Ltd. Inplant Railway.—This company operates about 2 miles of trackage to serve its chip operation. The Pacific Great Eastern Railway switches this plant on a regular basis and our inspection revealed safe and proper operating procedures.

Intercontinental Pulp Company Ltd. Inplant Railway.—This company owns 2 miles of trackage but is switched by the Pacific Great Eastern Railway on a regular basis. The company operates one trackmobile on the chip operation. Our engineers report safe conditions.

Harmac Operation, MacMillan Bloedel Ltd. — This railway and yard serve the Harmac pulp-mill near Nanaimo. A barge slip connects with considerable shore trackage and a 550-horsepower diesel-electric locomotive is used for switching. Our inspecting engineers have made regular inspections of the locomotive, the trackage, and the barge slip and safe conditions have been reported.

MacMillan Bloedel Ltd. Pulp Mill Railway, Port Alberni. — This operation serves a large pulp-mill and connects by rail with the Esquimalt & Nanaimo Railway. A large number of cars and considerable tonnage are handled on a regular basis. A 300-horsepower diesel-electric locomotive is used and often is operated on a three-shift-per-day basis; consequently, a number of crews require training by our engineers at which time the locomotive and trackage have always been inspected, usually twice a year. Safe conditions and good maintenance have been reported after certain problems had been resolved.

Kamloops Pulp & Paper Co. Ltd.—This operation has an inplant railway to connect the plant with Canadian Pacific Railway lines. The railway has been brought under the *Railway Act* and inspections have been made on an annual basis. Safe conditions have been reported by our engineers in the operation of this inplant railway.

Crestbrook Forest Industries Ltd.—This pulp-mill is at Canal Flats. The company owns its own inplant railway, which has been registered under the *Railway Act*. This company asked advice as to the use of converted front-end loaders as used at Pacific Coast Terminals. Our engineers have made inspections and reported the operation to be satisfactory.

Sullivan Mine (Cominco) Railway, Kimberley.—This railway is 5 miles long, with 3 miles aboveground and 2 miles underground. It is the main haulage at Sullivan Mine and is 3-foot gauge and is laid with 85-pound rail. Automatic loading is

used at the crusher area underground, with automatic dumping at the surface discharge point. Electric eyes and a sophisticated system of electrics and electronics have been installed to automate this operation. This system was jointly approved by the Chief Inspector of Mines and ourselves.

Three electric locomotives with trolley poles from an overhead trolley wire are used on this railway. The locomotives were inspected and certified by our engineers and a copy filed with the Chief Inspector of Mines, as this railway has always been considered to be operating under our joint jurisdiction. It can, therefore, be reported this railway is in excellent condition, is fenced on surface, and is being properly and safely operated.

Granduc Mine Ten Mile Tunnel Railway.—During October, 1969, a joint inspection with the Chief Inspector of Mines was made of the above new underground railway project at Tide Lake. This railway is entirely underground and runs 10 miles on a tangent under three glaciers to tap the orebody on the other side of the mountain range.

The line is laid with 100-pound new rail, using tie plates on creosoted ties. The overhead trolley wire will carry 1,700 volts through pantagraphs on the locomotives. Three new locomotives were inspected on the site. They were just delivered from Japan and are of the most modern design. Bells and grab-irons were ordered to be installed as such safety devices are required on engines of this size. The locomotives were satisfactory and were certified.

All of the haulage equipment was approved jointly by ourselves and the Chief Inspector of Mines prior to its manufacture. Unit trains are to be operated with a locomotive at each end to avoid turnaround. Automated loading and dumping will be used and each train is scheduled for continuous service. Crews are hauled in special cars which are excellently appointed and heated for the comfort of those being transported over the 10-mile run.

The mine is scheduled for official opening in June, 1970, when a final inspection and approval will be given. Thereafter, the railway, locomotives, and equipment will be inspected annually under a joint inspection arrangement with the Chief Inspector of Mines.—*Robert E. Swanson, P.Eng.*

British Columbia Hydro and Power Authority

Inspecting Engineer's Report

An inspection of the railway facilities owned and operated by the above Authority in the Fraser Valley and New Westminster District was made on Friday, December 5, 1969.

In company with Mr. Fred Friedel and Mr. W. Alcock, division engineer and roadmaster respectively, a trip was made by rail car between New Westminster and Chilliwack during which time the main line, tracks, sidings, passing-tracks, buildings, bridges, crossings, and yards were inspected.

During the past year, 21,000 yards of crushed-rock ballast was used over the system, 8,000 treated ties replaced and approximately 5,000 rail anchors installed. There were 7.4 miles of relaying and upgrading from 85- to 115-pound rail.

The maintenance-of-way programme for the control of vegetation has proven very satisfactory from the appearance of the road beds and ditches. It is also pointed out at this time that all track speeder vehicles and equipment are equipped with radios and contact with them can be maintained.

The bridges at Serpentine River, Salmon River, Gifford Slough, Chilliwack River, Vedder River, Knox Slough, and Whatlam Road were inspected. The bents,

caps, stringers, ties, and bull rails are all creosoted and are in good condition. The north rail on the Salmon River Bridge has been superelevated three and one-half inches due to the curve and to facilitate the Roberts Bank traffic and increase in speed.

Highway crossing protection signals at Newton, Langley, Abbotsford, and Chilliwack were all in working order. The train crews report the condition of the signal system as they cross them by radio-phone to dispatcher if defective. At Langley there is a positive stop for rail traffic, and at Cloverdale Pacific Highway crossing there is a 10 miles per hour speed restriction for east-bound traffic and a positive stop for west bound. All crossings are protected by the standard advance warning and cross block signs. There is to be an automatic signal installed early in the New Year at the Vedder crossing.

The industrial development programme carried out by the company is moving along very well. The Robin Hood Flour Mills, Nissan Datsun, William Neilson, and Vulcan Thermo Company have located in the District No. 1 Complex, while at the Newton Industrial Complex the Cloverdale Paint spur line has been installed. This complex takes in approximately 200 acres. A passing-track of 635 feet was laid at Mile 59.2, Sumas, to accommodate Canada Packers York Farm Products Division.

The Langley Diversion, to be completed in the very near future, has involved the laying of 2.3 miles of track with a half-mile industrial lead. This diversion will eliminate the railroad running through the centre of Langley and also the intersection of Highway No. 10 and Langley By-pass road.

The locomotive and car shops were inspected and found to be in a clean and orderly condition.

The motive power consists of four 600-horsepower General Electric, eleven 900-horsepower General Motors, and two 1,000-horsepower General Motors diesel-electric locomotives.

The shop staff handled two 600-horsepower locomotive major overhauls and a total of seven locomotive truck overhauls in the past year. Tenders have been let for the construction of two cabooses for 1970.

Regular inspections were made of all motive power and rolling stock and no serious defects found.—*D. F. Burges.*

Crown Zellerbach Canada Logging Railway

Inspecting Engineer's Report

On December 15, 1969, the annual inspection was made of the Crown Zellerbach Railway between Ladysmith and the Nanaimo Lakes, a distance of 22 miles. The inspection was made by rail car, with Mr. B. Duncan, railway supervisor, and Mr. R. A. Turner, assistant manager, Engineering and Forestry, Southern Division, in attendance during the inspection.

Generally, the track was found to be in good alignment and well maintained. Approximately 6,000 ties have been replaced in this last year and it was observed that sectionmen were in the process of changing out ties at Storm's Siding, Mileages 14 and 18. There were also 30 tons of steel relaid along with 400 rail anchors and 500 yards of ballast.

The bridges at Nanaimo River, Deadwood Creek, Boulder Creek, and Haslam Creek were inspected and the following conditions noted:—

Nanaimo River Bridge: South end bents renewed in 1967; north end bents renewed in 1968; sprinkler system installed in 1969. The stringers and ties

are scheduled to be changed in August, 1970, along with approximately 50 ties on the steel span.

Boulder Creek Bridge: Due to a small fire at this bridge last February 5, bents along with caps, stringer braces, and ties were replaced. All others are sound and in a good and solid condition.

Deadwood Creek Bridge: This bridge was renewed in 1962 and is in good condition. There is a large piece of driftwood against the No. 3 bent and this must be removed.

Haslam Creek Bridge: The north end of this bridge was renewed in 1961 and the south end and spans are to be replaced in 1971.

It was noted that Boulder Creek Bridge did not have Jordan rails and this was brought to the attention of Mr. Duncan.

The communicating and dispatching is done by radio-telephone. The motive power and rolling stock consist of one 1,000-horsepower diesel-electric locomotive and 80 log cars in use along with two rail cars and a gas locomotive. This equipment moved approximately 1,300,000 board feet over the line from the Nanaimo Lakes to Ladysmith in 1969. The motive power was inspected and found to be in good condition. The power is also checked over each day before dispatching and a thorough examination is made on the week-ends by company personnel.

All railway crossings were inspected and the proper cross block and stop signs noted. The planking at the Ladysmith yard is to be replaced and also the switch-stand target at Mile 21 is to be straightened out or replaced.

In general, the railway is in good condition and is being properly maintained.—*D. F. Burges.*

MacMillan Bloedel River Sawmills Inplant Railway

Inspecting Engineer's Report

On December 16, 1969, an inspection was made of the railway facilities operated by the above company in their red band shingle-mill, particle board, specialty board, Vancouver Plywoods, and Canadian White Pine plants on the Fraser River in Burnaby.

The railway has two connections with the British Columbia Hydro and Power Authority Marple–New Westminster line and also a barge connection with the Canadian National Railway.

A company owned Model 5-TM Whiting Truckmobile is used as motive power to switch cars to and from the British Columbia Hydro interchange throughout the area of aforementioned plants and to service the barge slip.

An inspection was made of all trackage and it was found that all requests made in previous reports had been complied with and no further work is required at this time.

The switch crew consisting of a trackmobile operator and a switchman were interviewed and their satisfaction with general conditions noted. Mention was made of slight roughness in the track which was attributed to the marshy nature of the terrain. Switching operations were observed and it would appear that they are being carried out in a safe and conscientious manner.

The single-track barge-loading ramp was inspected and found to be in good condition. It was noted that substantial safety hooks back up the hydraulic lifting cylinders.

The entire operation reflects an adequate safety programme that is being conscientiously followed.—*E. A. Smith.*

Canadian Industries Limited

Inspecting Engineer's Report

On November 18, 1969, an inspection was made of the barge slip, trackage, and diesel locomotive owned and operated by the above company at its James Island operation.

The locomotive was inspected and the air reservoirs hydraulically tested and everything was found to be in good order.

Since the last inspection, the wheels of the locomotive have been renewed and should be good for many years of operation.

Generally, the railway is in good condition and no unsafe operating procedures were noted.—*E. A. Smith.*

B.C. Forest Products Limited

Inspecting Engineer's Report

On December 15, 1969, an inspection was made of the railway trackage and equipment owned and operated by the above company at its Crofton pulp-mill site.

All trackage, including sidings and chemical unloading spurs, were found to be in very good condition. Chemical cars being unloaded are prevented from moving by use of proper wheel blocks as well as hand brakes set on. The spur tracks have padlocked derails in place and the train crew are the only personnel having access to the keys.

The Company owns one 650-horsepower diesel locomotive. This was inspected on November 19, 1969, and found to be in good condition. The Company also has 13 wider-than-standard flat cars used for the handling of pulp and paper and these cars have not presented any hazard to the train crews as was previously feared. Where necessary Clearance not Standard signs are provided well lighted and of adequate size.

The car unloading ramp is in good condition and train crews report no difficulty in moving cars off and on barges.

The good condition of trackage and clean yards is reflected in the 2,000-day injury-free record of the ten-man railway crew.

The following items require attention: Loose track spikes on the rails at the approach to the landing ramp, derail signs to be repainted.—*John Dyck.*

LIST OF RAILWAYS AND SUMMARY OF MILEAGE

Industrial Railways

No. and Owners/Name of Railway	Head Office	Operating	Mileage			Gauge
			Main	Sidings, Etc.	Total	
1. Aluminum Company of Canada Ltd.	Montreal	Kitimat	2.90	3.19	6.09	Standard.
2. Arrowhead Wood Preserves Ltd.	Revelstoke	Revelstoke	0.92	.....	0.92	Standard.
3. British Columbia Forest Products Ltd.	Vancouver	Crofton	1.50	2.50	4.00	Standard.
4. Canada Creosoting Co. Ltd.	Montreal	New Westminster	3.00	3.00	6.00	30″ and standard.
5. Canadian Forest Products Ltd.	Vancouver	Nimpkish Valley	91.00	19.10	110.10	Standard.
6. Canadian Forest Products Ltd.	Vancouver	Port Mellon	0.50	0.50	1.00	Standard.
7. Canadian Industries Ltd.	Montreal	James Island	6.25	1.25	7.50	30″ and standard.
8. Columbia Cellulose Co. Ltd.	Montreal	Watson Island	.....	7.01	7.01	Standard.
9. Cominco Ltd.	Trail	Trail	1.00	.....	1.00	18″.
10. Cominco Ltd.	Trail	Trail	9.00	3.01	12.01	18″ and 36″.
11. Crown Zellerbach Canada Ltd.	Vancouver	Ladysmith	21.80	4.02	25.82	Standard.
12. Elk Falls Co. Ltd.	Vancouver	Duncan Bay	.....	3.00	3.00	Standard.
13. F.M.C. Chemicals Ltd.	Squamish	Squamish	.....	0.30	0.30	Standard.
14. Hillcrest Lumber Co. Ltd.	Mesachie Lake	Mesachie Lake	6.00	1.50	7.50	Standard.
15. Hooker Chemicals Ltd.	North Vancouver	North Vancouver	0.10	1.90	2.00	Standard.
16. Intercontinental Pulp Co. Ltd.	Prince George	Prince George	.....	3.50	3.50	Standard.
17. Island Tug & Barge Ltd.	Victoria	Vancouver	.....	0.20	0.20	Standard.
18. Island Tug & Barge Ltd.	Victoria	Victoria	.....	0.30	0.30	Standard.
19. Kamloops Pulp & Paper Ltd.	Kamloops	Kamloops	.....	2.70	2.70	Standard.
20. MacMillan Bloedel Ltd.	Vancouver	Chemainus	1.58	3.81	5.39	Standard.
21. MacMillan Bloedel Ltd.	Vancouver	Dunsmuir District	1.00	3.10	4.10	Standard.
22. MacMillan Bloedel Ltd.	Vancouver	Harmac Pulp Division	2.20	.....	2.20	Standard.
23. MacMillan Bloedel Ltd.	Vancouver	Port Alberni	.....	1.00	1.00	Standard.
24. MacMillan Bloedel Ltd.	Vancouver	Powell River	1.50	.....	1.50	Standard.
25. MacMillan Bloedel Ltd.	Vancouver	Vancouver	.....	1.30	1.30	Standard.
26. Northwood Pulp & Paper Co. Ltd.	Vancouver	Prince George	.....	3.16	3.16	Standard.
27. Osborne Bay Wharf Co. Ltd.	Mesachie Lake	Crofton	0.33	.....	0.33	Standard.
28. Pacific Coast Bulk Terminals Ltd.	New Westminster	Port Coquitlam	.....	4.70	4.70	Standard.
29. Pacific Coast Terminals Co. Ltd.	New Westminster	New Westminster	5.20	.....	5.20	Standard.
30. Pacific, Jefferson Lake, Westcoast (Pacific Petroleums Ltd.)	Calgary, Alta.	Taylor	3.05	0.71	3.76	Standard.
31. Prince George Pulp & Paper Ltd.	Vancouver	Prince George	.....	3.51	3.51	Standard.
32. Rayonier Canada (B.C.) Ltd.	Vancouver	Woodfibre	.....	Ferry Slip	.....	Standard.
33. Vancouver Steel Co. Ltd.	Vancouver	Twigg Island	1.25	.....	1.25	Standard.
34. Vancouver Wharves Ltd.	Vancouver	North Vancouver	6.00	.....	6.00	Standard.
35. Western Forest Industries Ltd.	Honeymoon Bay	Honeymoon Bay	7.00	0.60	7.60	Standard.

LIST OF RAILWAYS AND SUMMARY OF MILEAGE—*Continued*

Common Carrier Railways

No. and Owners/Name of Railway	Head Office	Operating	Mileage			Gauge
			Main	Sidings, Etc.	Total	
36. British Columbia Hydro & Power Authority	Vancouver	New Westminster	76.58	35.29	111.87	Standard.
37. Roberts Bank Superport (B.C. Hydro)*	Vancouver	Huntingdon–Chilliwack	23.00	5.00	28.00	Standard.
38. Pacific Great Eastern Railway Co.	Vancouver	Vancouver to Fort St. John and Dawson Creek	788.60	172.22	960.82	Standard.
39. Pacific Great Eastern Railway Co.	Vancouver	Mackenzie spur	21.70	5.20	26.90	Standard.
40. Pacific Great Eastern Railway Co.	Vancouver	Takla extension	74.00	1.50	75.50	Standard.
41. Pacific Great Eastern Railway Co.*	Vancouver	Fort Nelson Extension	250.00	------	250.00	Standard.

Recreational Railways

42. Cowichan Valley Forest Museum	Duncan	Duncan	0.875	0.125	1.00	36″.
43. Stanley Park Miniature Railway	Vancouver	Vancouver	0.42	------	0.42	18″.
44. Sam Sunter, Mattick's Farm	Saanich	Saanich	0.20	------	0.20	10″.
45. Fort Steele Foundation	Victoria	Fort Steele	1.75	0.10	1.85	Standard.

* Under construction.

INDUSTRIAL TRANSPORTATION

Time required to attend to matters concerning the *Industrial Transportation Act* has increased greatly over the past year, and as a result inspecting engineers have been forced to devote their evenings and week-ends to training, lecturing, and to the inspection of equipment in order to give coverage to industry. This has been especially true in the northern areas of the Province where consolidation of existing lumbering companies and the opening up of new forest complexes has necessitated this extra time and effort.

The instant town of Mackenzie is a prime example of what is happening in the north country. Lumbering in its new form of total utilization has arrived and the development is expected to double in size in the coming months.

To look farther north, the area around Fort Nelson could be said to be only awaiting the completion of the Pacific Great Eastern extension from Fort St. John to engage its lumbering industry into high gear.

The multimillion-dollar forest projects at Fort St. James and Houston will, together with the aforementioned areas, shortly require a vast number of log-hauling units and trained drivers. All of this, of course, will result in an added work load in these particular areas for the Department.

The roads within the town of Tahsis on the west coast of Vancouver Island were declared industrial roads under section 13 of the *Industrial Transportation Act* during 1969 and the Tahsis Company submitted regulations for traffic using these roads. The regulations were subsequently approved and a representative from the Department made a visit to Tahsis and addressed a general meeting of the company employees outlining the provisions of the Act and regulations.

Representation from the Department of Education of the Government of the Yukon Territory was made to this Department to conduct an educational training programme for drivers and mechanics operating and maintaining air-equipped vehicles. Arrangements for this programme were finalized, and in April an inspector, together with a fully equipped mobile-training unit, proceeded to Whitehorse where facilities had been provided at the Yukon Vocational and Technical Training Centre. Day and evening brake courses were run continuously for a period of two weeks and a considerable number of drivers and mechanics were able to avail themselves of the opportunity to attend the lectures. The reception to this programme was most gratifying and, but for lack of seating space, many more people could have been accommodated. During his stay in Whitehorse, our inspecting engineer also trained selected personnel from industry as instructors in order that the training of drivers and also mechanics might continue.

The result of this joint endeavour is that today an air-equipped vehicle-operator's licence, whether it be obtained in the Yukon or in the Province of British Columbia, is recognized as the requirement to operate heavy duty air-braked units on industrial roads in either place. The Yukon Territory is also adopting the Industrial Transportation Act Regulations in respect to safety equipment installed in air-braking systems on off-the-road trucks and trailers.

Back in British Columbia, the hauling methods in mining have undergone a drastic change. Access to railways and shipping facilities has become mandatory with the increased foreign demand for native ores. A case in point is one involving the Granduc Operating Company located some 30 miles north of Stewart. When production begins in mid-1970, the company will be employing large tractor trailer units to convey concentrates to tidewater from the mine at Tide Lake over some 15 miles of private company road and the remaining distance upon public road, partly in British Columbia and partly within Alaska.

Meetings were held with company officials at the mine site regarding safety on the haul units and the licensing of the drivers in order that operational safety get off on the right foot. Also in attendance at these meetings were representatives from the British Columbia Department of Mines and Petroleum Resources. Their interest in these matters stems from the fact that the Industrial Transportation Act Regulations have been incorporated into the *Mineral Act* of British Columbia, and therefore the interpretation and the administration of these regulations is of utmost concern to them.

In the matter of mine-haul vehicles, many new types are currently being introduced into the field and only close co-operation between the two Departments has kept braking safety standards at their present high level. As braking systems tend to become more complicated on these very large vehicles, only continued watchful control by both regulatory administering bodies will maintain this standard.

The logging industry is well known as one which never ceases in its search for better production methods. In 1969, the validity of this statement is borne out once again. At this writing, huge single axle type tractors are being modified to handle logging trailers in place of the conventional tandem axle tractors. Claims for these units are less tire and brake-lining wear and a new departure in tractor braking. These units would also be adaptable for use with the truck trains which were initiated some three years past.

It has been realized that after a truck driver obtains his air ticket he tends, as time goes by, to forget what he has been taught and as a result sometimes gets involved in an accident of his own making. With this in mind, our inspectors have conducted refresher courses in various logging centres to review the operation of existing air systems and to pass on information on the latest equipment. These lectures appear to have aided in cutting down on the number of accidents and have been extremely well received by the truck drivers.

It has been noted that there is a strong interest in obtaining air tickets among the highway-transport drivers and an increasing number of requests for lectures have come from trucking firms in order that an upgrading may take place among their operators.

Prior to the opening of the Richmond Motor-vehicle Inspection Station, a three-day course on air brakes and heavy duty vehicle inspection was conducted for the benefit of the new men to be employed at the station. The purpose of this course was to enable two-man inspection teams to put an air-equipped vehicle through the testing station in the quickest and most efficient manner. This service was performed for personnel at the Victoria testing station in 1968 and the results have proved this job conditioning of new inspectors to be of great value.

Three-day lecture sessions were also conducted by our inspectors for the Royal Canadian Mounted Police Traffic Division Conference in Victoria in April and October to acquaint members with the operation of air brakes and the manner in which vehicles should be inspected and tested.

Numerous accident investigations were conducted for the Royal Canadian Mounted Police, City of Vancouver and New Westminster Police Departments. It is interesting to note that, almost without exception, the underlying causes of these accidents proved to be lack of driver-training or inadequate maintenance.

Training courses in air brakes were also given by our inspectors to students at the various vocational schools throughout the Province and at the British Columbia Institute of Technology, where courses were given to classes of drivers attending upgrading programmes.—*J. W. Kirkland.*

AIR-BRAKE LECTURES AND EXAMINATIONS CONDUCTED DURING 1969

Lectures held	44
Lecture attendance	1,075
Logging-truck operators certified	554
Vocational school (air-brake examinations)	85
Royal Canadian Mounted Police (air-brake examinations)	48
Heavy-duty mechanics air-brake course	28

ADDITIONAL LECTURES AND EXAMINATIONS HELD FOR OTHER AGENCIES

	Number	Attendance
Yukon Vocational School personnel (teaching staff)	15	235
Haney Correctional Institute	1	35
Motor-vehicle Branch personnel	9	100

AERIAL TRAMWAYS

The development of ski-ing facilities in British Columbia over the past few years has been almost unbelievable. If one were to look back to 1959, the number of aerial tramways in the Province was comparatively insignificant when viewed against the total in operation today. The industry at that time appeared to have leveled out inasmuch as there were no new projects under way nor did it appear that there were any new plans on the drawing-board. The amount of time required for annual inspection was relatively short as tramway installations were limited to Grouse Mountain and Mount Seymour in the Lower Mainland area, Rossland and Nelson in the Southern Interior, and two industrial ropeways, one at Kemano and the other at Dog Mountain. This, then, was the situation until in the early sixties, suddenly winter recreation in the form of ski-ing captured the imagination of people in every corner of the Province. Existing operations immediately began to reassess their facilities as to the feasability of adding new ski lifts and in addition new areas were surveyed to determine their recreational potential. This trend has continued to the point where today there are aerial tramways operating within a stone's throw of the United States border to as far north as Fort St. John, and in the east at Fernie adjoining the Crowsnest Pass to Green Mountain on central Vancouver Island.

Skiers tend to be of the nomadic type and it is not uncommon to see a group visit three areas in the course of a week-end. Today, with so many mountains dotted with ski lifts of one type or another, the British Columbia skier has an advantage over skiers in other parts of Canada in that he may choose the runs and types of snow conditions that he favours whether they be on the Coast mountains or the colder slopes of the Interior ranges.

While these recreational areas undoubtedly contribute much to the enjoyment of winter sports, the problems confronting the Department have increased tenfold. It is necessary for Department Engineers to conduct comprehensive inspections on all aerial tramways at least once a year to ensure that they are in safe operating contion. In addition, plans and drawings for all new installations must be made while each lift is being built. Finally, before they open to the public, each conveyance is thoroughly proof-tested under the supervision of Department Engineers and only then is a certificate to operate granted. Firms which underwrite the liability insurance for ski resorts have come to appreciate the worthiness of the Department certificate inasmuch as they will not issue a policy on a tramway which cannot exhibit a current permit to operate.

It can be seen therefore that the time consumed by this branch of the Department is considerable and the prospects of a slowdown in the work load are very remote at least in the foreseeable future.

The year 1969 again showed a substantial increase in the number of new installations which include a new T-bar situated at Gibson Valley where at present a double chair-lift and two rope tows exist. Last Mountain Resorts near Kelowna have also added a T-bar to add to the existing chair-lift. In the eastern section of the Province, T-bars have begun operating at both Fernie and Panorama Ski Hill west of Invermere. On the way from Vernon to Silver Star Mountain, Winterside Recreations Ltd. have put in a T-bar which will be an added attraction to the snowmobile track for which this site has been known in the past. Silver Tip Development Ltd., located a few miles south of the big slide on the Hope–Princeton Highway, has erected a new T-bar in conjunction with the two rope tows in use at present. The district of Stewart in northern British Columbia also became infected with the ski-ing bug and built a T-bar on a mountain at the back doorstep of the town. The Fort St. John Ski Club purchased a platter-lift which had been used in Alberta and then later in southern British Columbia. This was modified to comply with the new C.S.A. Z-98 Code for Aerial Tramways. This community organization is to be complimented for its efforts as this is the most northerly situated lift of its kind in the Province. On Vancouver Island at Green Mountain after a year's running with only a rope tow, the Sno-Birds Ski Society succeeded in obtaining a new T-bar for its excellent hill thus filling a need for greater use of the mountain. In the vicinity of Harrison Lake, where previously no ski area existed, a new Mueller double chair-lift was successfully tested and now gives access to a new ski-ing location. The number of ski lifts at Grouse Mountain has been increased by two, namely, a double chair-lift extending to the mountain peak and a double T-bar paralleling the existing cut chair-lift. This is the first double T-bar lift of its kind in British Columbia. This surface lift is capable of transporting two lines of skiers rather than a single file as is usually the case. A few miles north of Squamish, Garibaldi Glacier Resorts Ltd. began construction of a multi-lift complex but due to apparent financial problems the project has been shelved for the present, but expectations are that this venture will continue in 1970.

In addition to those areas already mentioned, additional rope tows have been added in various communities throughout the Province in order that a start can be made in introducing more people to this sport of ski-ing.

In the matter of industrial tramways, no new installations were recorded. The existing ones were inspected as in the past and all were found to be in safe working condition.

The licensing of ski-lift attendants was put in motion this year with the area operators being held responsible for the training of their personnel as well as conducting Department-approved written examinations. Those applicants successfully passing the examinations received licences to operate ski lifts for the area by which they are employed. It is felt that the upgrading of the attendants in this manner will lead to fewer accidents and a better attitude on the part of the attendants themselves.

Even as this is written, word has been received that plans for additional ski lifts throughout British Columbia are already under consideration and it would appear that yet another active year in this branch of the Department is forthcoming.
—J. W. Kirkland.

AERIAL TRAMWAYS REGISTERED WITH THE DEPARTMENT OF COMMERCIAL TRANSPORT TO DECEMBER 31, 1969

Location No. and Name	Location	Gondola	Chair-lift	T-bar	J-bar	Rope Tow	Industrial Freight
1. Grouse Mountain	North Vancouver	1	4	2	----	3	----
3. Mount Seymour	Mount Seymour	----	2	----	----	4	----
4. Whistler Mountain	Garibaldi Park	1	3	2	----	2	----
5. Diamond Head	Garibaldi Park	----	----	----	----	1	----
6. Mount Becher	Courtenay	----	----	2	----	2	----
7. Green Mountain	Nanaimo Lakes	----	----	1	----	1	----
8. Kemano (Alcan)	Kemano	----	----	----	----	----	1
9. Bear Mountain	Dawson Creek	----	----	1	----	----	----
10. Tabor Mountain	Prince George	----	----	1	----	1	----
11. Wells	Wells	----	----	----	----	1	----
12. Dog Mountain (B.C. Telephone)	South-west of Hope	----	----	----	----	----	1
13. Mount Jarvis (C.N.R.)	East of Hope	----	----	----	----	----	1
14. Tod Mountain	North of Kamloops	----	1	1	----	----	----
15. Lac Le Jeune	South of Kamloops	----	----	1	----	----	----
16. Mount Revelstoke	Mount Revelstoke Park	----	----	----	1	1	----
17. Mount MacKenzie	South-east of Revelstoke	----	----	1	1	2	----
18. Silver Star Mountain	North of Vernon	----	1	3	1	1	----
19. Big White Mountain	East of Kelowna	----	----	3	----	----	----
20. Invermere	West of Invermere	----	----	1	----	1	----
21. Gibson Valley	Manning Park	----	1	1	----	2	----
22. Princeton	Princeton	----	----	----	----	2	----
23. Apex Mountain	West of Penticton	----	----	2	1	1	----
25. Phoenix	East of Greenwood	----	----	1	----	----	----
26. North Star Mountain	Kimberley	----	1	2	----	----	----
27. Snow Valley	Fernie	----	----	2	----	2	----
28. Silver King	Nelson	----	----	1	----	1	----
29. Salmo	Salmo	----	----	1	----	----	----
30. Red Mountain	Rossland	----	2	----	1	1	----
32. Shuswap	Salmon Arm	----	----	----	----	2	----
33. Kamloops	Kamloops	----	----	----	----	2	----
34. Naksup	South of Nakusp	----	----	----	----	2	----
35. Smithers	Smithers	----	----	----	----	2	----
36. Prince Rupert	Prince Rupert	----	----	----	----	1	----
37. Bornite	Terrace	----	----	----	----	2	----
38. Kitimat	Kitimat	----	----	----	----	1	----
39. Glacier	Rogers Pass	----	----	----	----	2	----
40. Blue River	Blue River	----	----	----	----	1	----
41. Burns Lake	Burns Lake	----	----	----	----	2	----
42. Little Squaw Valley	North of Williams Lake	----	----	1	----	2	----
43. Dragon Mountain	South-east of Quesnel	----	----	----	----	1	----
44. Silver Tip	East of Hope	----	----	1	----	2	----
45. Nicola Valley	Aspen Grove	----	----	----	----	1	----
46. Prince George	Prince George	----	----	1	----	----	----
47. Fort St. John	Fort St. John	----	----	----	1	2	----
48. 100 Mile House	100 Mile House	----	----	----	----	1	----
49. Lac la Hache	Lac la Hache	----	----	----	----	1	----
50. Mount Arrowsmith	East of Alberni	----	----	----	----	1	----
51. Chetwynd	Chetwynd	----	----	----	----	1	----
52. Sicamous	East of Sicamous	----	----	----	----	2	----
53. Fruitvale	Fruitvale	----	----	1	----	1	----
54. Mount Last	Westbank	----	1	1	----	1	----
55. Grandview Ski Acres	South of Kamloops	----	----	1	----	1	----
56. McBride	McBride	----	----	----	----	1	----
57. Clearwater	Clearwater	----	----	----	----	1	----
58. Golden	Golden	----	----	----	----	1	----
59. Burke Mountain	North of Coquitlam	----	----	----	----	3	----
60. Mount Diadem	Powell River	----	----	----	----	1	----
61. Zymoetz River (B.C. Telephone)	South east of Terrace	----	----	----	----	----	1
63. Portage Mountain	Hudson Hope	----	----	----	----	1	----
66. Purden Mountain	East of Prince George	----	1	1	----	1	----
67. Salmo (B.C. Telephone)	Salmo	----	----	----	----	----	1
68. Stawamus River Intake	Squamish	----	----	----	----	----	1
69. Azu Lift Co.	Pine Pass	----	----	1	----	1	----
72. Fairmont Hot Springs Resort	Fairmont Hot Springs	----	----	1	----	----	----
73. Kamloops	Kamloops	----	----	----	----	1	----
74. Mount Baldy	North of Rock Creek	----	----	1	----	1	----
75. Hells Gate*	Boston Bar	1	----	----	----	----	----
76. McDame Mountain	Cassiar	----	----	----	----	1	----
77. Mackenzie Ski Hill	Mackenzie	----	----	----	----	2	----
78. Mica Creek	Mica Creek	----	----	----	----	1	----
79. Boston Bar	Fraser River	1	----	----	----	----	----
80. Hemlock Valley	Harrison Lake	----	1	----	----	1	----
81. Winterside Recreations Ltd.	Vernon	----	----	1	----	1	----
83. Granduc Mines	Tide Lake	----	----	----	----	1	----
84. Blewett Ski Club	Nelson	----	----	----	----	1	----
85. District of Stewart	Stewart	----	----	1	----	----	----
Totals		4	18	41	6	83	6

* Proposed.

PIPE-LINES

The petroleum industry continued to be quite active during 1969 in the construction of gas- and oil-gathering systems, mostly in the field of connections into the major transmission-lines. The engineering plans and specifications covering the construction of all pipe-line projects under the *Pipe-lines Act* are submitted to the Department and if in order are approved. Inspectors check all pipe-lines during construction and supervise and witness the final acceptance pressure test in the field. A complete record of all engineering data pertaining to the construction of the pipeline, including highway crossings, railway crossings, and river crossings, is maintained in the Department files.

Water-flooding and gas-injection installations are on the increase and prove to be very effective in the recovery of gas and oil before the field pressure has been depleted to any extent.

The annual inspection of compressor and pumping-stations was carried out during the year by Department Inspectors. Due to the heavy demand on the main transmission-lines, the pumping and compressor facilities have had to be increased by the addition of more stations, some of which have a capacity in excess of 16,000 horsepower.

Approximately 223 miles of oil and gas pipe-lines were constructed during the year. Application for construction and specifications regarding the proposed construction of the lines, together with testing and final approval for operation was processed through the Department and test procedure carried out in the field by our inspectors.

All tank farms were inspected during the year to make certain they conformed to the Fire Marshal's regulations as well as being approved by the Department.

In the lower mainland area the British Columbia Hydro and Power Authority made numerous extensions to the existing distribution lines. The main gas transmission-line between Coquitlam and Huntingdon, a distance of 57.8 miles was retested under the supervision of the Department to upgrade the operating pressure from 550 pounds per square inch to 585 pounds per square inch.

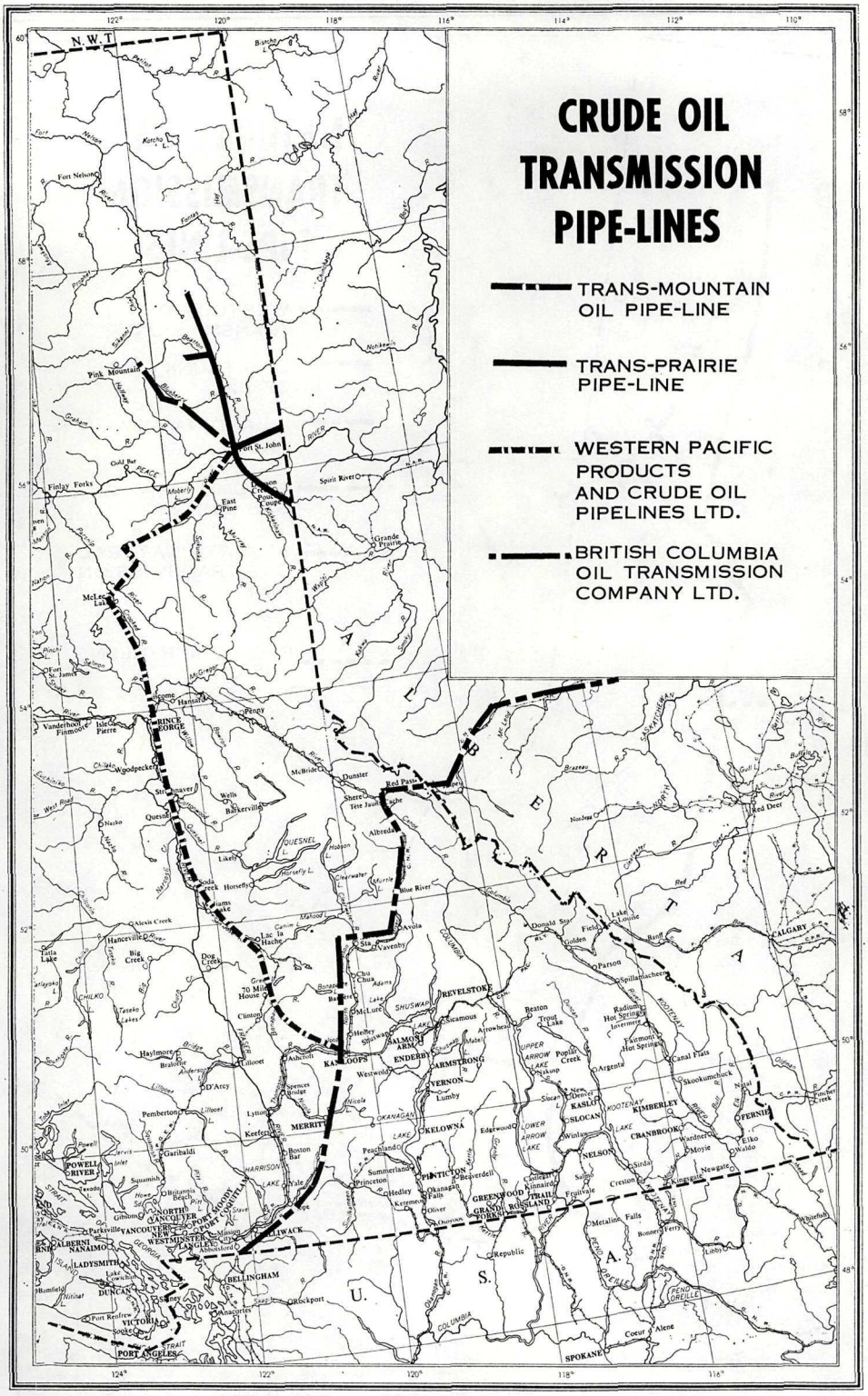
The Trans Mountain Enterprises of British Columbia Limited completed the installation of a jet-fuel line between Burnaby and the Vancouver International Airport. The testing and final approval for operating the line was carried out by the Department. In addition, Western Refueling Installation Services Ltd. constructed 4.1 miles of 12-inch jet fuel pipe-line for Air Canada and 2.8 miles for Canadian Pacific Air connecting the terminal of the main transmission jet-fuel line to the fueling facilities of the airlines. Their installations were also processed through the Department, including the final testing and approval for operation.

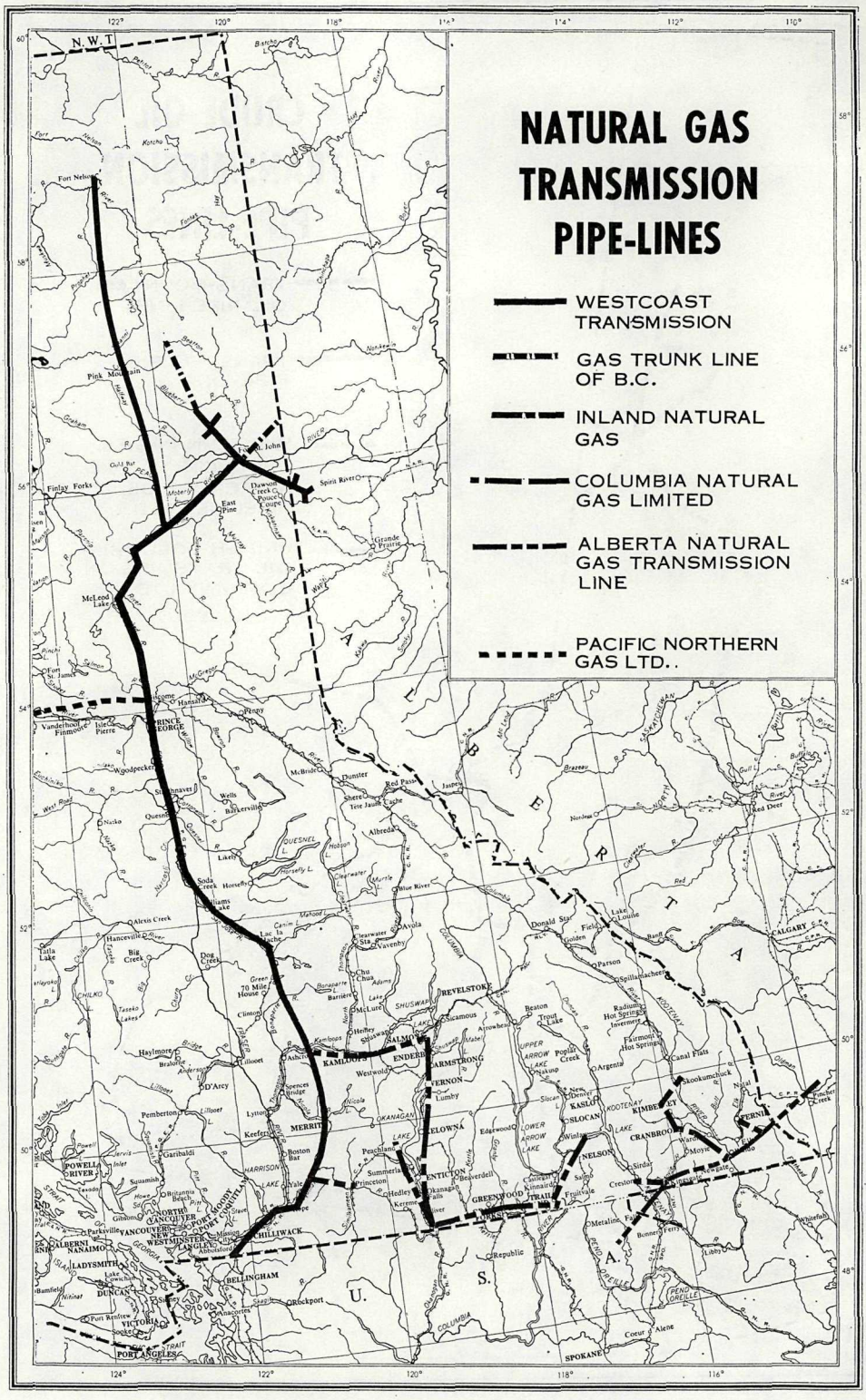
Inland Natural Gas Co. Ltd. extended its distribution systems by 47 miles of new lines in the Cariboo, Kamloops, and Southern Interior areas during 1969.

Columbia Natural Gas Ltd. are nearing completion of 10 miles of 4-inch line to supply the town of Sparwood with natural gas from their main transmission-line.

Pacific Northern Gas Ltd. completed laterals to supply natural gas to Houston, Terrace, and Fort St. James from the Summit Lake to Prince Rupert transmission-line during the year.

Five pipe-line companies were granted certificates for the construction of pipe-lines in British Columbia in 1969. They include Shawest Petroleums Ltd., Dawson Creek area; Atlantic Richfield Co., South Beg area; Apache Oil Corporation, Stoddart Field; Mesa Petroleum Co., Blueberry Field; and Texaco Exploration Co., Boundary Lake Field.


CRUDE OIL
TRANSMISSION
PIPE-LINES
TRANS-MOUNTAIN
OIL PIPE-LINE
TRANS-PRAIRIE
PIPE-LINE
WESTERN PACIFIC
PRODUCTS
AND CRUDE OIL
PIPELINES LTD.
BRITISH COLUMBIA
OIL TRANSMISSION
COMPANY LTD.
N.W.T.
ALBERTA
U.S.A.
PRINCE GEORGE
KAMLOOPS
KELOWNA
PENTICTON
NELSON
CRANBROOK
CALGARY
SPOKANE
VANCOUVER
VICTORIA
NEW WESTMINSTER
PORT ANGELES
BELLINGHAM


NATURAL GAS TRANSMISSION PIPE-LINES
WESTCOAST TRANSMISSION
GAS TRUNK LINE OF B.C.
INLAND NATURAL GAS
COLUMBIA NATURAL GAS LIMITED
ALBERTA NATURAL GAS TRANSMISSION LINE
PACIFIC NORTHERN GAS LTD..
N.W.T.
ALBERTA
U.
S.
PRINCE GEORGE
QUESNEL
KAMLOOPS
VERNON
KELOWNA
PENTICTON
TRAIL
NELSON
CRANBROOK
KIMBERLEY
CASTLEGAR
REVELSTOKE
VANCOUVER
VICTORIA
NANAIMO
BELLINGHAM
SPOKANE
CALGARY
Fort Nelson
Fort St. John
Dawson Creek
Grande Prairie
Hudson Hope
Mackenzie
Williams Lake
Quesnel
Prince George
Kamloops
Vernon
Kelowna
Penticton
Trail
Nelson
Cranbrook
Kimberley
Castlegar
Revelstoke
Vancouver
Victoria
Nanaimo
Bellingham
Spokane
Calgary

The administration of the *Pipe-lines Act* by this Department requires that inspectors are called upon to supervise construction and tests on pipe-line installations in all areas of British Columbia from the Prince Rupert and Fort Nelson areas in the north to the Kamloops and Crows Nest area in the southern part of the Province. However, due to excellent co-operation from all the pipe-line companies from the time a project is anticipated until the final test and approval of the line has been completed, the Department is able, in spite of the heavy demand on the inspectors, to give good service. This quite often requires that an inspector may have to attend to other facets that are under the jurisdicition of the Department, such as aerial tramways, railways, etc. which are in the area where pipe-line construction is under way. It is easily apparent that good liaison between industry and the Department is essential in order that the very large area involved may be covered to the satisfaction of all concerned.—*J. H. Carmichael.*

PIPE-LINES CONSTRUCTED DURING 1969

Company	Location	Length (Miles)	Type
Trans-Prairie Pipelines Ltd.	Fort St. John	1.50	Oil
	Peejay	3.50	Oil
		5.00	Oil
British Columbia Hydro and Power Authority	Richmond	3.63	Gas
	Burnaby	0.59	Gas
	Tsawwassen	0.97	Gas
	West Vancouver	1.10	Gas
	Mission Bridge	0.47	Gas
	Vancouver Airport	1.70	Gas
	Surrey	0.20	Gas
		8.66	Gas
Imperial Oil Ltd.	Huntingdon to Coquitlam 12 inches to 18 inches. Retest to upgrade for higher MOP	57.80	Gas
Shawest Petroleums Ltd.	Boundary Lake	2.80	Gas
Air Canada and Canadian Pacific Air	Dawson Creek	10.30	Gas
Inland Natural Gas Co. Ltd.	Vancouver Airport	6.18	Jet Fuel
Pacific Petroleums Ltd.	Cariboo, Kamloops, and Southern Interior	46.95	Gas
Tenneco Oil & Minerals	Stoddart Creek, Jedney, Clarke Lake, Inga, Yoyo	26.82	Gas
Union Oil Company of Canada Ltd.	Weasel, Inga	7.90	Gas
Atlantic Richfield Co.	Fort St. John, Milligan Creek	45.80	Gas
Apache Oil Corporation	South Beg	1.20	Gas
Pacific Northern Gas Ltd.	Stoddart	11.40	Gas
Columbia Natural Gas Ltd.	Houston, Fort St. James, Terrace	30.07	Gas
Plains Western Gas & Electric	Crows Nest, Fernie	10.00	Gas
Western Pacific Products & Crude Oil Pipelines Ltd.	Fort St. John Field	4.36	Gas
	Installation of heavier wall pipe between Miles 443.15 and 444.15	1.00	Oil
Imperial Oil Ltd.	Rigel Field	3.80	Gas

Total mileage=222.24 miles; Re-test total=57.80 miles.

COMPRESSOR AND PUMPING-STATIONS

Compressor and pumping-station flow capacity requirements continue to increase in response to consumer demands and new gas and oil field developments.

Flow rates within the oil fields are being increased through additional well completions and new gas-injection and water-flood systems. The movement of this oil through major pipe-lines has required extensive increases in pumping-station capacities and the resulting increase in operating pressure has required the upgrading of pipe-lines and auxiliary equipment. New pumping units and communications and control equipment are being selected to attain the optimum in reliability and

Western Pacific Products and Crude Oil Pipelines Ltd. have recently completed extensive revisions and additions to their entire oil-pumping system. These changes included the relocation and addition of many gas-turbine and electric motor driven pumping units and included in all cases the most modern remote control and safety protection facilities.

Recent revisions together with the necessary upgrading of auxiliary components now provide continuous throughput capacity of 72,000 barrels per day.

Additional field-pumping sets, oil treaters and auxiliary equipment, together with bulk-storage tanks, retaining dykes, etc. have been installed in many areas and most of the widely dispersed wellhead treater equipment is being replaced with modern " Central Battery " installations.

Drawing, specifications and design calculations must be approved and progress and operating inspections made at completion of all the above pumping stations, field batteries and water-flood installations. These inspections include the checking of all mechanical equipment, piping, pressure vessels, fire protection, first aid, chlorine and poison gas handling and all equipment essential to safe operating standards.

Simultaneous with the oil-flow increases, there has been an even heavier demand on compressor-station capacities throughout the year and with similar trends to remote controlled installations and the most modern communications and safety-protection systems. Here, as in the oil industry, the Department is required to do extensive field work and operating inspections, which demand a full knowledge of all new equipment, controls, and safety systems.

Pacific Northern Gas Limited has installed two new compressor stations, one at Summit Lake and one at Burns Lake, to cope with the rapid load increases throughout the length of their line which is now serving all major communities from Prince George to Prince Rupert.

Alberta Natural Gas Company has added one 12,000-horsepower turbine-driven compressor to their Crowsnest plant and are installing additional downstream units, including one completed 12,000-horsepower compressor at Moyie Lake.

The Westcoast Transmission Company's natural-gas transmission system, now comprising more than 1,480 miles of transmission and gathering pipe-lines, has recently completed several new compressor stations bringing their total installed capacity up to over 290,000 horsepower. Throughout their phenomenal expansion programme, the most excellent safety standards have prevailed in all areas of operation. These high standards have assisted greatly in the efforts of this Department in its full coverage of these installations wherein the attainment of good safety standards is of paramount importance.

Adequate inspection coverage of the major equipment in gas-compressor stations, oil-pumping stations, gas-injection and water-flood systems places an ever-increasing demand on field inspection requirements.—*A. W. Turnbull.*

Printed by A. SUTTON, Printer to the Queen's Most Excellent Majesty
in right of the Province of British Columbia.
1970

630-270-1715