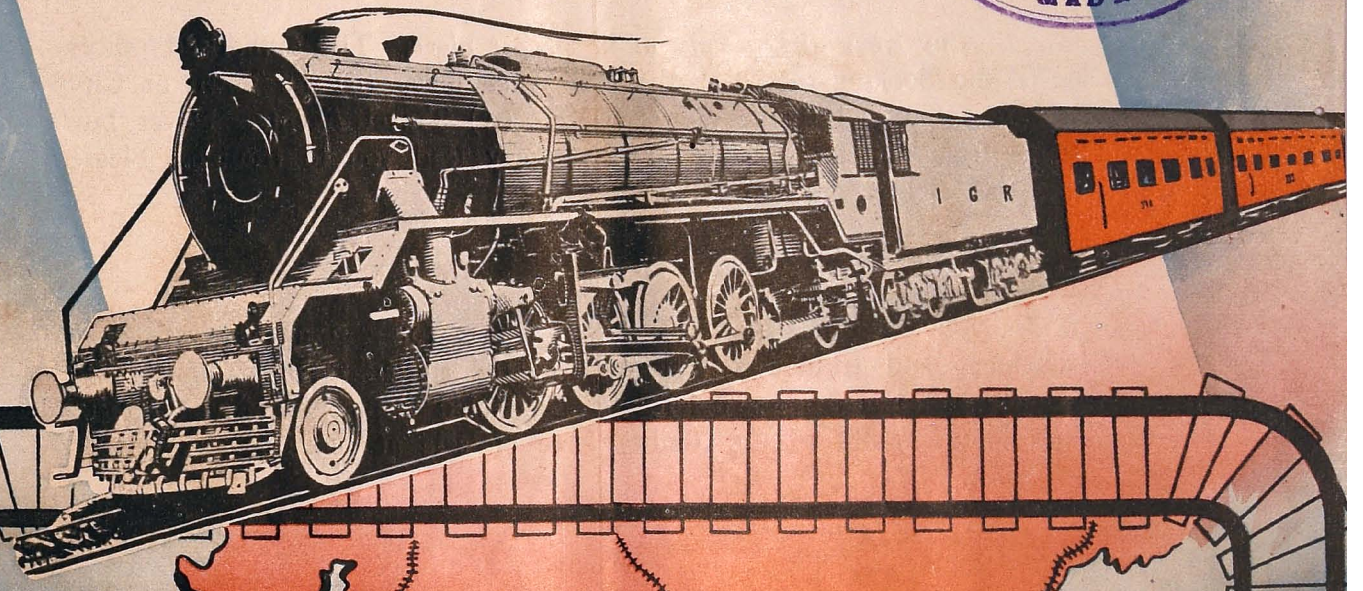
SOUTHERN RAILWAYS Magazine



June 1957

Price As. 4/-

IN YOUR OWN INTERESTS

HOW TO PURCHASE TICKETS

Buy your tickets only at the proper place. The authorised offices are (i) the Booking offices at the railway stations, (ii) the Town or City Booking Offices, (iii) the out-Agencies, (iv) Travel Agents. Never buy tickets from any other source as that may lead you to trouble. Please note that tickets are not transferable.

Buy your tickets in the proper time. You can avoid unnecessary excitement and trouble if you come to the station in good time, that is at least half an hour before the scheduled departure of your train. The Time Tables of the Railway are on sale at Booking Offices and Bookstalls.

Buy your tickets in the proper manner. Queue up at the Booking Window and you can get your ticket easier and quicker than by crowding at the counter.

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Check up your ticket and money before leaving the counter and draw the attention of the Booking Clerk to any discrepancy you may notice.

(Inserted in the interests of Travelling Public)

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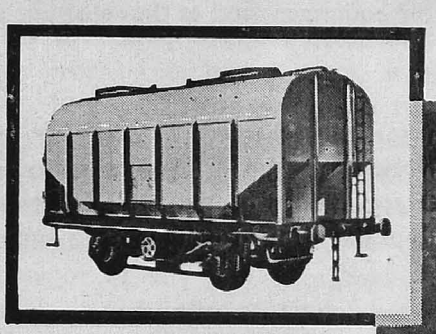
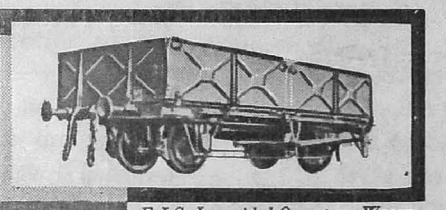
The strength of steel pays valuable dividends. In length of service. In fewer running repairs and maintenance. In longer operative life. In overall economy. From the Scottish factory of Pressed Steel Company Limited, steel wagons *many thousands strong* pass year by year to the railways of the world . . . for a hard *and long* life of service.

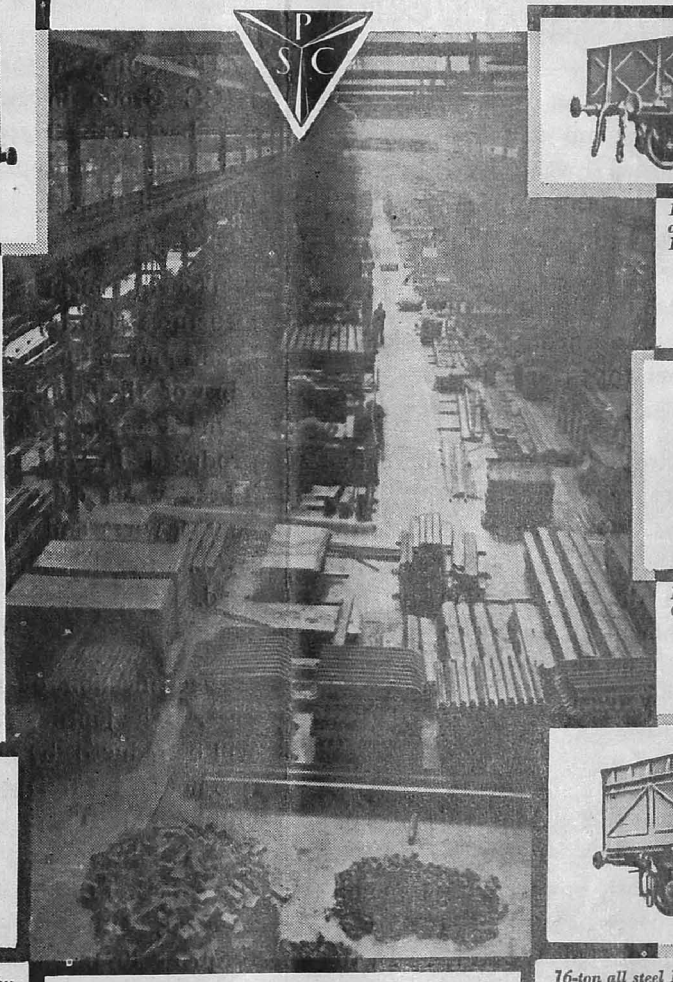


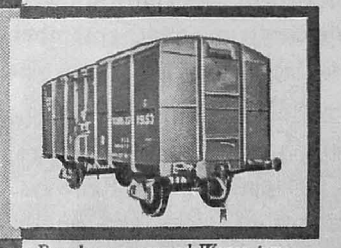
20-ton capacity Bulk Grain Van to the order of British Railways.



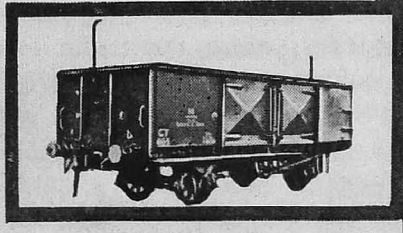
F.J.S. Low-sided Open type Wagon as used by Queensland Government Railways, Australia.

their service is world wide

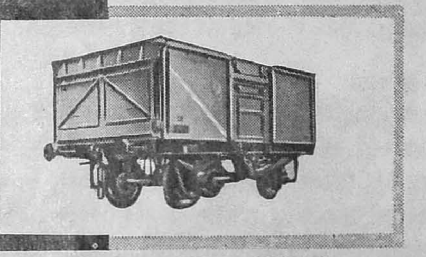




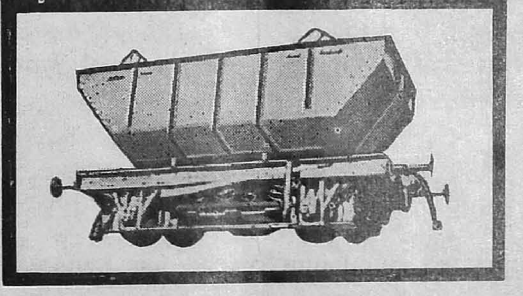
Broad gauge covered Wagon type C.R. as used by Indian Railways.



22-ton G.Y. type Wagon as used by Victoria Government Railways, Australia.



16-ton all steel Mineral Wagon, 50,000 of which have already been built in our Paisley works to the order of British Railways.



V. J. M. Hopper type Wagon with Drop Bottom Door as used by Queensland Government Railways, Australia.

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New South Wales Railway Electrification

ELECTRIFICATION of the main line railway between Parramatta near Sydney and Lithgow in the Blue Mountains a distance 83 miles has been completed and was officially opened by the Premier of New South Wales The Hon. J. J. Cahill on Saturday, 22nd June 1957.

The contract for the supply and installation of the overhead equipment was awarded by the Department of Railways New South Wales to British Insulated Callender's Construction Co. Ltd., London, the work to be carried out in three stages. Stages 1 and 2 which run from Parramatta to Blacktown and from Blacktown to Penrith, were opened for service in February 1955 and September 1955 respectively.

Before deciding to electrify the route alternative methods of increasing the capacity were considered by the Department of Railways. One was to increase the number of tracks and another to carry out extensive civil engineering works on the construction of new tunnels and on the realignment of tracks to ease the curves and gradients. Both these schemes were rejected and electrification by means of overhead conductors was chosen as the most economical solution.

A 1500V D. C. System was selected for this scheme, stages 1 and 2 to be of the simple catenary type. For stage 3, from Penrith to Lithgow, however, a compound catenary construction was used because of the heavy currents demanded by the nature of the route. In the Blue Mountains the track rises to a height of 3,500 ft. above sea level and gradients are encountered of up to 1 in 33, while curves of down to 8 chains radius occur. These features presented special problems to the designers of the equipment and to the erection staffs in the field.

The equipment for this scheme was designed by the BICC Group in England and a team of experienced members of the Traction staff of the BIC Construction Co. went out from the United Kingdom to supervise the installation.

The equipment is supported in the main from portal structures fabricated in England from broad flange beams and a total of 7,000 tons of steel has been used. Most of the fittings involved have been manufactured at the Prescot Works of BICC, while the wires were produced in Australia by Metal Manufactures Ltd. These wires consist of .3 sq. inch cadmium copper contact wires and stranded hard drawn copper catenary wires. In all some 2,300 tons of copper have been used.

Electrification of this line will provide many advantages. The journey times between Sydney and Lithgow will be reduced by one hour for passenger trains and two hours for freight trains, which the traffic capacity will be more than doubled. In addition to providing fast freight services linking the mining and agricultural areas of the Blue Mountains, in which Lithgow is situated, with the Eastern Sea Board, a quick and frequent local service from Sydney to Blacktown and Penrith will mean that these towns will become dormitory areas of Sydney.

UNPAINTED ALUMINIUM COACHES SAVE MONEY

The experimental use of unpainted aluminium coaches on London's Underground railway has proved a success, and future replacement rolling-stock will not be painted.

Although the initial cost is slightly greater than that of the usual red-painted steel coaches, railway engineers estimate that it will be offset by the savings on paint and maintenance, and lower current consumption because of decreased weight and technical improvements.

Capital saving by not painting a standard seven-coach train is about £ 800, and the consequent drop in maintenance, painting and cleaning is about £ 100 a year, so that, with a life of 30 years, there is an overall saving of some £ 3,800 for each train.

SAFETY OF TRAVEL ON RAILWAYS

[A resume of the Broadcast Talk by Shri M. Ganapati, General Manager, Western Railway, during Railway Week.]

AT the end of over one hundred years of railway working in our country, it should not have been ordinarily necessary to talk about the safety of travel on railways which had been practically taken for granted, especially compared with other modes of travel by sea and air. No one who undertakes a journey by rail would, for a moment, entertain the thought of any risk attendant on such mode of travel, as possibilities of fatal accidents have in the last hundred years of working been so considerably minimised that travel by rail is not looked upon as a hazard" said Shri M. Ganapati, General Manager, Western Railway, in a broadcast from the All India Radio, Bombay, during Railway Week.

" It is indeed most unfortunate that three very serious accidents should have occurred, the first in September, 1954, the second in September, 1956 and the third in November 1956. The causes of these accidents have been the subject of very thorough enquiries. Adequate steps will be taken by railway administrations to follow up the recommendations of the Enquiry Commissions and prevent a recurrence of such accidents to the utmost extent possible. What, however, I intend to detail in my talks to you this evening are the steps taken by railways in preventing the incidence of accidents of all descriptions."

" Accidents on railways may be broadly classified into six different heads viz., collision, derailments, failure of locomotives and rolling stock, i. e., carriages and wagons, failure of permanent way, i. e., the track on which the trains run, fires, and lastly, other accidents which do not come under any of the above five classifications. Coming to the causes of these accidents on railways, they can be broadly put down to failure of staff, failure of track, failure of mechanical equipment, trespass including collisions of motor transport with trains at level crossings and other miscellaneous causes, such as falling from trains, etc."

" Every accident that occurs on railways, no matter how insignificant it may be, and no matter what damage to property and life it may cause, is thoroughly investigated with a view to ascertaining the precise nature and extent of the accident and its causes. The findings and recommendations of the Enquiry Committee as well as the findings and recommendations of the Government Inspector of Railways in the case of major accidents, are given the most careful consideration by railway administrations and prompt action is taken not only in enforcing adequate punishment to any staff who may be found responsible for the accidents through neglect of duty, but also in taking immediate and effective steps to remedy the causes which gave rise to the accident and thus prevent as far as practicable a recurrence."

" In regard to the day to day maintenance of railway track, the failure of which also tends to cause accidents, it is perhaps not widely known that every mile of running track of over 38,000 miles on the Indian Railways, is examined every day by foot by experienced gangmen, called the keymen and that every 3 or 4 miles of track, as the case may be, is under the charge of a gang of men headed by a Mate, who systematically overhaul the track and ensure that the rails, sleepers and ballast on which the sleepers rest are all examined and maintained in a good condition."

" With regard to bridges, big and small, they are inspected thoroughly once a year, by Engineering Inspectors, and again by Assistant Engineers and Divisional Engineers with a view to take note of any deterioration in their condition and set them right. Besides, they are constantly watched by the maintenance gangs, in whose beat they are located as well as by the Engineering inspecting staff during their numerous inspections every month."

" Bridges which are found defective during the routine inspections and bridges which have any history of being badly affected during floods are also inspected by Senior Engineers from Headquarters so that a quick decision can be taken regarding steps to be taken to repair any damages noticed. Besides periodical inspection of bridges, a special watch is kept during the monsoon season of such of the bridges that are prone to flooding. Day and night watch of such bridges is maintained throughout the monsoon periods so that any danger to a bridge which might be caused by unusual flood conditions could be detected promptly

(Continued on page 11)

Standardisation of Stores Practices

By A. Deb, B.E.

IN the wake of the Audit report on Defence Stores, suggestions have been put forward in a section of the press for Stores Enquiry Committee. May be, we cannot discuss such suggestion glibly, but it offers an opportunity for introspection. We had in recent years Railways Stores Enquiry Committee, Stores Purchase Committee. Suggestions for another enquiry committee may set all store-keepers a thinking, as to what's wrong.

Stores are sinews of any project or industry. Just as in any house, you can assess the prosperity of the family and the ability of the housewife, by a casual peep in the storeroom, so also in a big establishment, one can assess the shape of things by inspecting the Stores Depot. A capable housewife would arrange her stores in a nice and decent fashion like an artist. She would never allow ants or cockroaches to eat up stuff and would recoup stores just in time, with scientific acumen, so that no one in the family is inconvenienced. A capable store-keeper cannot do more than emulate the ideal of a capable housewife. In his case the constituents are comparable with family members. Heterogenous nature of constituents warrants alertness on Store-keepers. Some have compared store-keepers to fond mothers who keep their babies well fed and always anxious for their progress. Others have compared store-keepers to teeth, service of which is recalled only when it fails to serve. When all teeth are functioning no one thinks of them. With such compliments at their back, store-keepers are a category of people who should never fail in service. Without drawings engineers are blind. Without stores Engineers are lame. Stores are, therefore, sinquanon for the progress and Store-keepers too. With such importance for their service, is there any trend for developing the vocation of Store-keepers? Storekeepers have been declared as technical personnel, but little technical knowledge is now imparted to them. Their know-how has no standard. The primary needs for developing the vocation of Store-keepers cannot therefore be too highly exaggerated.

A store-keeper procures and distributes stores for his constituents. Planning for procurement, inspection of supplies, storage of stock, accounting for expenditure — all these are essential to good storekeeping. The profession of store-keeper demands that an incumbent in the post, like an engineer, knows specifications and methods of inspection of the materials he handles; like an accountant, knows the process of accounting for expenditure; like a scientist, knows how to protect his stock from deterioration, like a factory manager, knows how to handle labour and equipments.

This underlines the need for trained men, as in other countries. But to set standards for the profession, it would be necessary to draw up a syllabus of studies somewhat on these lines:

Basic education—A higher secondary school leaving certificate. Vocational training—(a) theoretical: inspection, specification, care of materials, preparation of catalogues, handling of material—six months. (b) practical: ledger-keeping, accountancy, passing of bills, preparation and disposal of vouchers—six months: works training: millwright, toolroom, electric repairs, foundry, smithy—12 months.

Activities of a stores organisation are divided under two main divisions namely Procurement Division and Distribution Division. There are various names or phases in each division but the principle of operation is the same, whether railways, or ordnance or private concern.

The procurement division invests money by purchase of stores for the constituents. The commitments are for and on behalf of the constituents—a fact, very comfortably forgotten by the constituents themselves. It has aptly been said that stores are not only cash in kind but more than this. Cash in bank earns interest but cash in kind depreciates and herein the constituent should bestow a little thought before placing their demand on stores. Critics of stores often find it convenient to forget this aspect. Utility of stores is manifested through transactions and transaction is always bilateral involving store-keeper and consumer. Any criticism on stores is incomplete, if it does not review the performance of the two parties, in the transaction. Should, however, the constituent fail to exert the degree of care expected of them, before they place their indents on stores, the store-keepers should not fail to exercise their prerogatives and revise the indents, for the best interest of the constituent. Of the many ways for prevention of wastage in stores, the first step is the indentor's care and the second step is the store-keeper's scrutiny. The consumer should consume stores according to pre-planned programme, in right time and in right quantity.

Whenever we think of purchases, we take into consideration, the time lag for the purchase and we

always lay by, the quantity to cover the time lag for purchase. This quantity is called the stores margin in the Ordnance Department and the minimum in the Railway Department. Such fundamental nomenclature should be standardised and more rational one universally adopted. Just as quality control is now a days, indispensable to manufacturer, so also stock control is indispensable to store-keepers and stock control is effected by controlling the stores margin. (Details available in the book 'Stores Manual' by the author). Whether in public sector or in private sector store-keepers should know the technique of stock control by controlling the stores margin and the technique is not difficult to standardise.

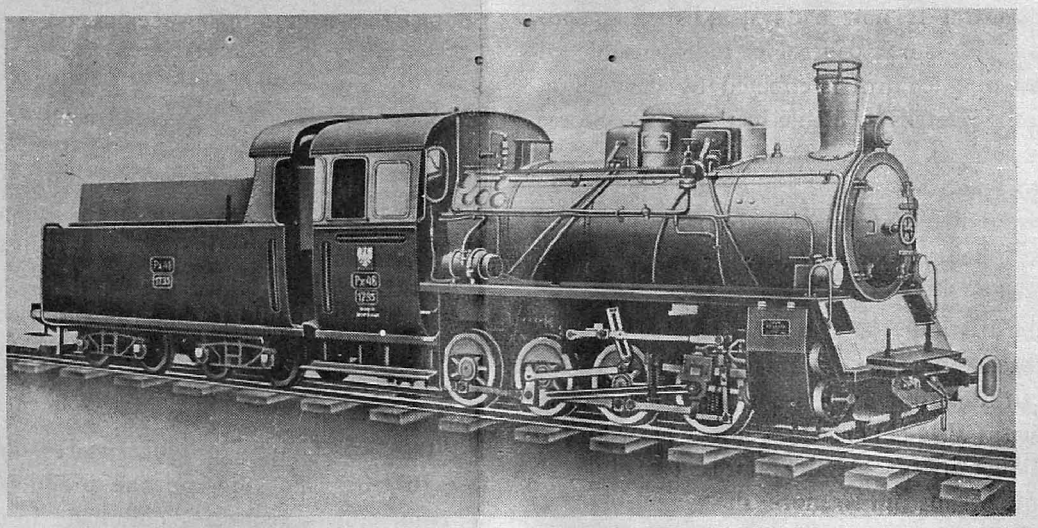
Lack of standardisation of stores practice is very apparent among store-keepers of various industries. Even they do not call one item by one name. The Indian Stores Department (W.H.S.) classifies stores according to trade group. The railways classify stores according to purpose. One item thus finds more than one place in stores. How the stores should be classified—whether according to purpose or trade group—should be determined and the standard classification introduced. The Indian Railways may compile one catalogue or catalogues with identical part number and description. Similarly it is for the ordnance to compile one catalogue and items of general purpose stores may again be similar. Nothing will be more helpful to store-keeper than a standard catalogue of stores he holds. The co-operation of Industry is necessary to evolve standard catalogue. The absence of attention in this respect can be illustrated. In the Steel Industry, there is no discrimination between pipes and tubes. What one store-keeper will call pipe, one constituent will call tube and they never know what to indent for or where to look for the stores. Wire, rod, bar, beam, joist are very flexible nomenclature. Compilation of a standard catalogue is, therefore, a herculean task and an impossible task unless the Industries themselves standardise the nomenclature of their products. In the Oil Industry what one calls petrol the other calls aviation spirit. You cannot discern the lubricating oils. Steel and oil have the largest resources and they have scope for research also. But these instances, illustrate the lack of attention, from store-keeper's view. Leave aside the lesser industries where such instances can be multiplied. Should the Industry offer co-ordination in standardising the nomenclature of their product, it would greatly help storekeeping all over the country. If the larger industries take the lead, the smaller one will definitely fall in line. The Indian Standards Institution may also take it on themselves for standardisation of nomenclature of commercial products, keeping in view the store-keeper's predicaments. With the co-ordinating efforts of Industry, I.S.I. and the Store-keepers, it would be possible to relegate the non-standard nomenclatures, now in vogue, in stores. Equally important is the interest of the consumers to know the standard nomenclature and their specification.

It is very common place to comment about wastage in stores. It calls for efforts to evolve means to prevent wastage in stores—effort on the part of consumer as well as on the part of store-keeper. Standardisation of practice can reduce to a great extent the chance of wastage in stores. Standardisation of classification of stores, standardisation of nomenclature of stores are some of the points which should receive the attention of store-keepers and last but not least is the development of vocation itself.

The manufacturer produces stores, whether it is a toy or turbine, and puts up the products in the market. Manufacturing processes culminate in creation of stores. Commercial concerns deal with them to cater for public needs. The laws of demand and supply guide the outturn of stores by manufacturers and procurement by Stores Department. If the stores are given rational nomenclature, then it may attract sufficiently, the attention of consumer. It is not that such attempts are sometimes 'overdone'. Some manufacturer have not yet appreciated the need for interchangeability. In the ball bearing industry, whether the bearing is manufactured in Italy or England or Sweden or India, each manufacturer gives a table showing the corresponding numbers of other makes to facilitate interchangeability. Manufacturers of grinding wheels also furnish tables equating their products to other makes. Makers of tool steel also gives composition of the steel to enable the buyer to select the steel. In the lubricating oil industry, interchangeability of make has not been noticed. However advantageous this may be to the producer, it has no advantage to the consumer beyond binding him to one make and not offering the latitude to interchangeability.

Commercial agents or producers themselves, tender material to the Stores Department against fulfilment of contract. All supplies by contractors are accompanied by a forwarding document which according to commercial terminology is invoice. It is curious that seldom any contractor use the term invoice. They use the term Despatch Memo or Delivery Note or Challan or Packing account or Delivery receipt etc. It passes one's comprehensions why they cannot use one standard nomenclature. Standardisations from Store-keeper's point of view have not yet received the attention it merits in our Industries.

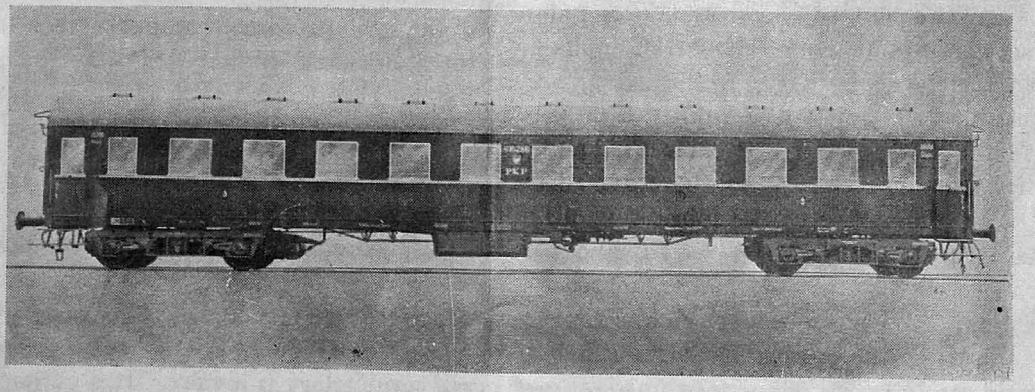
What Metalexport of Poland Can Offer to Indian Railways?



Narrow-Gauge Steam Locomotive

Type 0—8—0 – Series Px-48

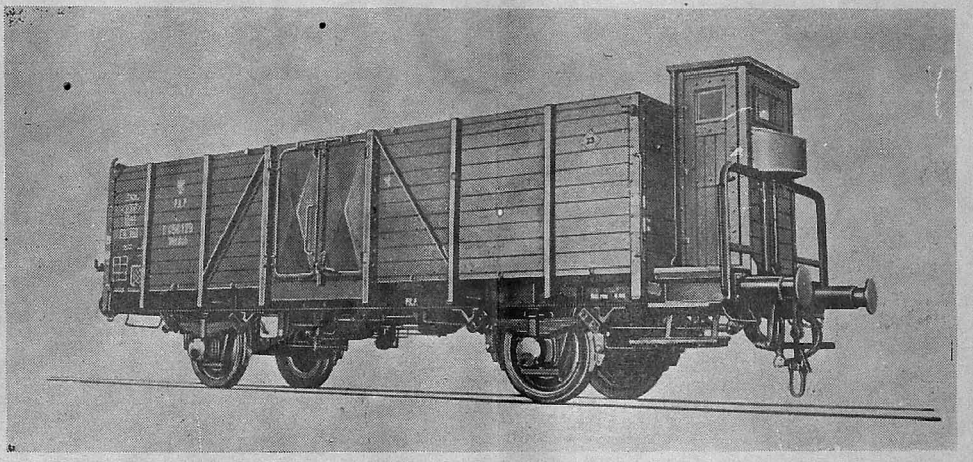
Gauge	2 ft. 5½ in.
Working steam pressure	185 lbs./sq. in.
Maximum speed	21.7 miles/h.
Maximum axle load	5.4 tons
Water capacity of tender	1320 galls.
Coal capacity of tender	3.9 tons
Total length of locomotive with tender over buffers	42 ft. 10 in.
Total wheel base of locomotive with tender	30 ft. 5¾ in.
Weight of locomotive and tender, empty	27.6 tons
Draws at 9.3 miles/h. a loaded wagon-convoy of maximum	445 tons



Third Class Coach

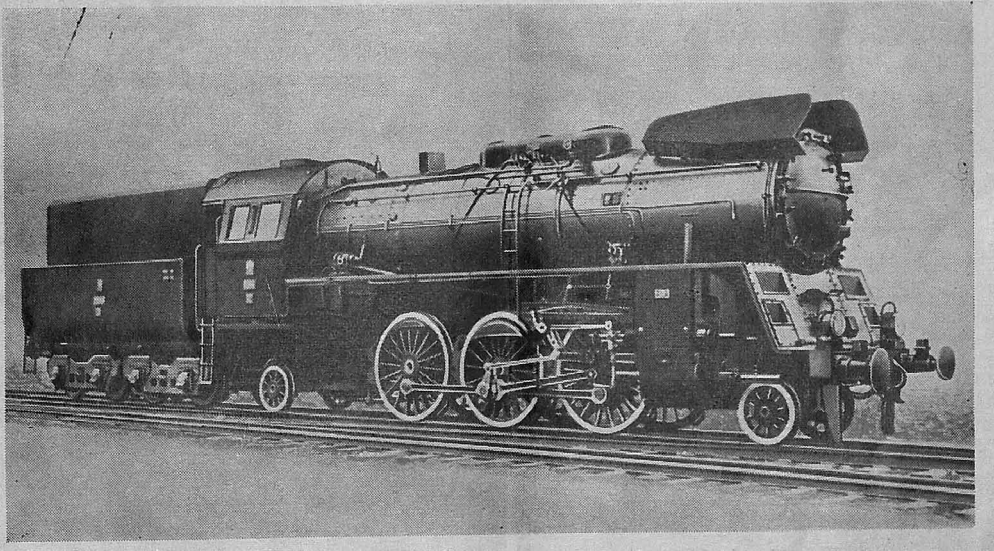
Type 2A

Gauge	4 ft. 8½ in.
Number of compartments	10
Total seating capacity of compartments	80
Total sleeping capacity of the coach	60
Weight of coach, empty	37.4 tons
Length of coach over buffers	73 ft. 7 in.



Coal Truck with Brakeman's Cabin
Type 10W

Gauge	4 ft. 8½ in.
Loading capacity	22.6 tons
Loading surface : length	26 ft.
width	9 ft.
Cubic capacity	1194 cu. ft.
Max. clearance of open door	4 ft. 11 in.
Weight of empty truck	10.1 tons
Total length of truck over buffers	32 ft. 7 in.



Passenger Steam Locomotive
Type 2—6—2 - Series 01-49

Gauge	4 ft. 8½ in.
Working steam pressure	228 lbs./sq. in.
Maximum speed	62 miles/h.
Maximum axle load	16.7 tons
Water capacity of tender	5500 galls.
Coal capacity of tender	11.8 tons
Total length of locomotive with tender over buffers	67 ft. 10 in.
Total wheel base of locomotive with tender	56 ft. 8 in.
Weight of locomotive and tender, empty	98.5 tons
Draws at 37 miles/h. a loaded wagon-convoy of maximum	740 tons

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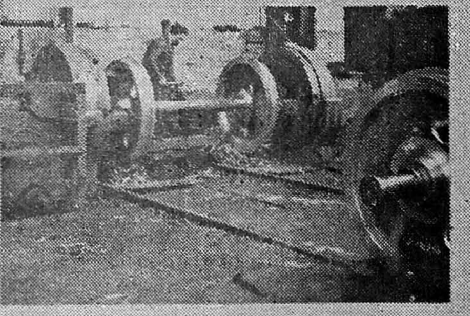
Railway wheels tyres and axles for the Indian railways



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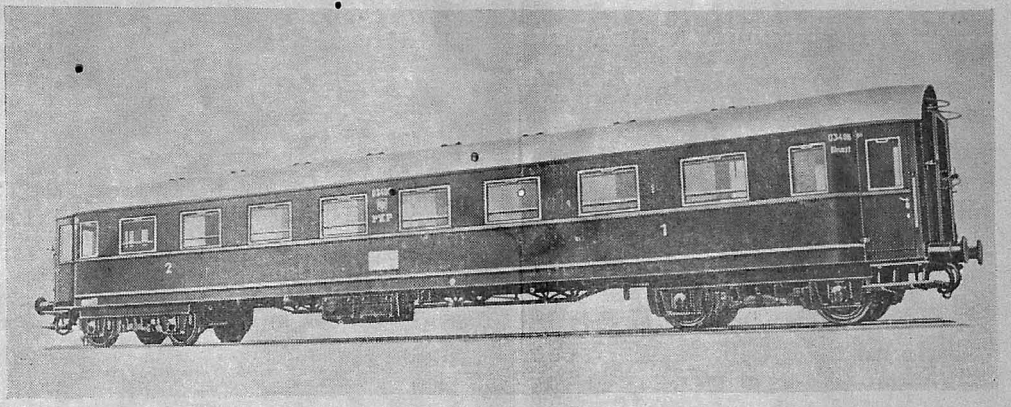
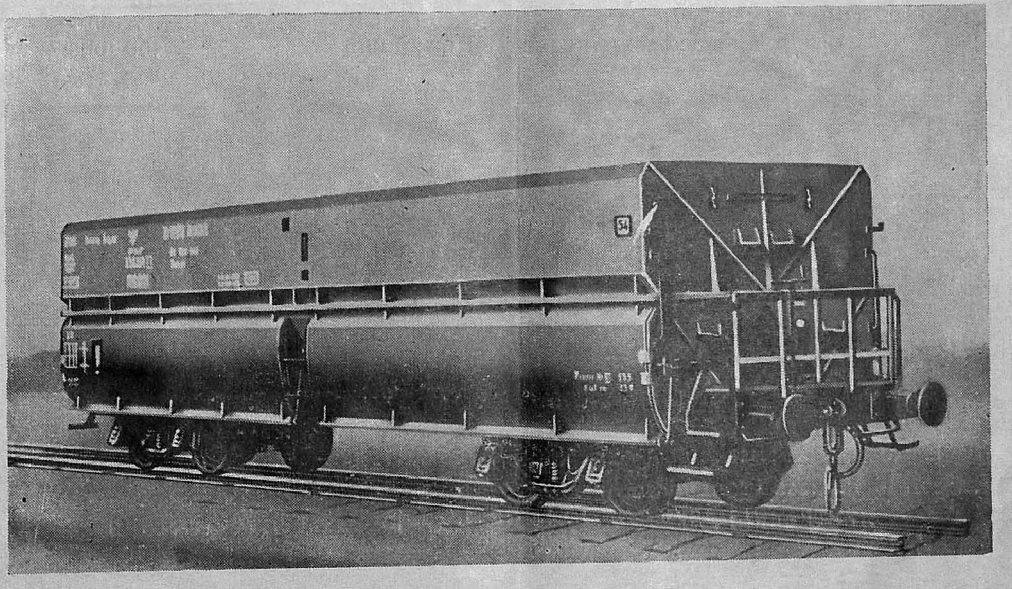


Composite Coaches

Types 5 A and 6 A

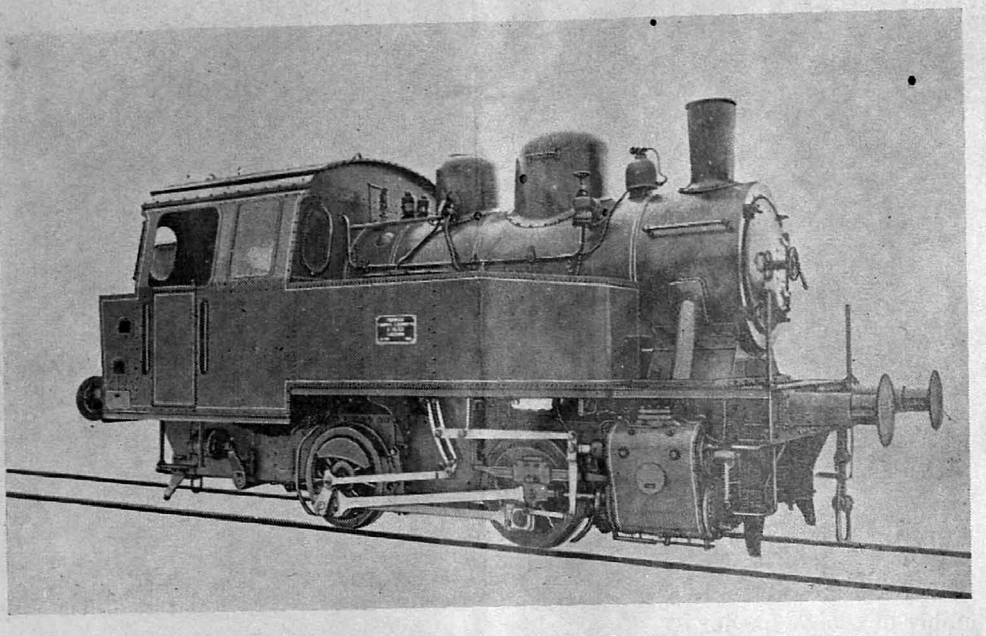
	5 A			6 A	
	1st class	2nd class	3rd class	1st class	2nd class
Number of compartments	2	2	4	2	6
Seating capacity of the compartments	8	12	32	8	36
Number of sleeping berths	4	8	24	4	24
Gauge	4 ft. 8½ in.				
Weight of coach, empty	36.4 tons				
Length of coach over buffers	73 ft. 7 in.				



Self-Clearing Truck

Type 20 W

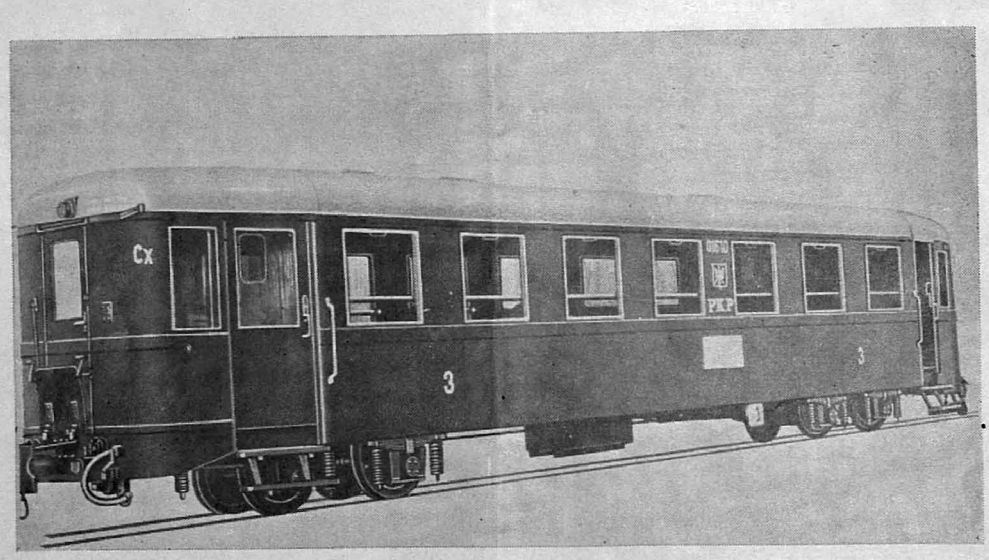
Gauge	4 ft. 8½ in.
Loading capacity	53.1 tons
Weight of empty truck : for coke	23.6 tons
for coal	23.1 tons
Cubic capacity : for coke	3178 cu. ft.
for coal	2472 cu. ft.
Total length of truck over buffers	47 ft. 11 in.



Steam Tank-Locomotive

Type 0—4—0 – Series BA

Gauge	2 ft. $11\frac{3}{8}$ in.—3 ft. $3\frac{3}{8}$ in.—4 ft. $8\frac{1}{2}$ in.
Working steam pressure	200 lbs./sq. in.
Maximum speed	21.7 miles/h.
Maximum axle load	12 tons
Water capacity	660 galls.
Coal capacity	1 ton
Total length of locomotive buffers	23 ft. 3 in.
Total wheel base	6 ft. 10 $\frac{11}{16}$ in.
Weight of locomotive, empty	18.7 tons.
Draws at 9.3 miles/h. a loaded wagon convoy of maximum	560 tons



Narrow-Gauge Third Class Coach

Type 1 AW

Gauge	2 ft. $5\frac{1}{2}$ in.
Seating capacity	38
Standing capacity/maximum/	62
Maximum total number of passengers	100
Weight of coach, empty	12.8 tons
Length of coach over buffers	50 ft. 8 in.

(Continued from page 3)

and traffic brought to a stop over the bridge in question."

"Non-availability of materials for replacing worn out assets such as track, which is assuming alarming proportions these days, causes the railway engineer a considerable amount of frustration, but even here no risks are taken. If the condition of track cannot be improved for want of materials, the engineer-in-charge chooses the alternative of imposing a reduction in the speeds of trains which are permitted to travel over such track. If likewise, bridges or culverts develop some defects, immediately a restriction is imposed for trains travelling over them until such time the defects are remedied. The motto under all circumstances is "SAFETY FIRST".

"As regards the failure of locomotives and rolling stock which is responsible for very nearly 50% of the accidents, the utmost care is taken not only in the manufacturing technique and the means and method of testing materials which are employed in the manufacture of rolling stock, but in the day to day maintenance and periodical overhaul of all kinds of rolling stock such as locomotives, carriages and wagons. If in spite of these precautions, materials reach a state of fatigue and escape attention before they are replaced, it can only be attributed to the stress and strain caused by the incessant use to which locomotives, carriages and wagons are put to on the railway systems, an idea of which can be gathered when I state that on all Indian Railways a total of about 250 million train miles are being run per year at present."

"As regards failure of staff, including the engine crew, station staff as well as staff entrusted with the maintenance of track, bridges, and rolling stock, the most careful and constant attention is paid to the proper recruitment and to the training of staff for their respective duties before they are actually put in charge of their work. The attention of staff is also drawn to salient features of safety rules and to the cases where such safety rules are breached resulting in accidents. With all these prophylactic steps which are taken all through the year, occasions do arise when failure of human element causes an accident.

Trespass in which human beings or transport vehicles carrying passengers are involved, also accounts for a number of deaths. In the case of transport vehicles getting involved in accidents, more often than not such vehicles attempt to cross railway lines at unmanned level crossings and thereby face considerable risk to life and property. Not all level crossings are manned, quite a number of them are left unmanned as the traffic across these level crossings does not justify their being manned all the 24 hours. With the increase in road traffic, it does become necessary to review the position now and again and arrange to man some of the level crossings, if the traffic has increased, at the request and cost of the local State Government.

Nothing but the most constant minute and unflagging attention to all matters connected with accidents can ensure in their gradual reduction to negligible numbers, and I can confidently say that all railway administrations look upon the prevention of accidents and the reduction of risks in railway working as their paramount duty.

AIR-CONDITIONED TRAIN SERVICE BETWEEN BOMBAY AND DELHI PROVES VERY POPULAR

The bi-weekly Air-conditioned De Luxe train service between Bombay and Delhi is proving very popular with the travelling public and is now running to more or less full capacity.

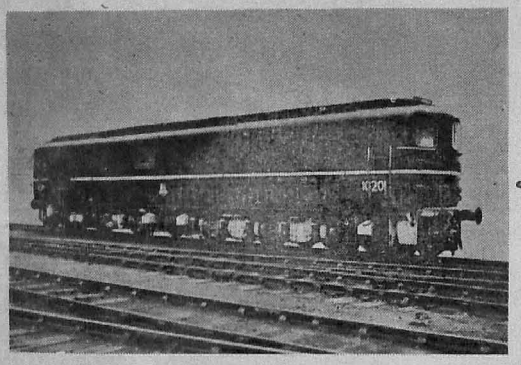
Apart from the air-conditioning of the entire train, which provides comfortable travel both in summer and in winter, this service affords maximum comfort to third class passengers. The chairs provided for third class passengers are so designed as to give restful comfort. The train is vestibuled giving freedom of movement to passengers from one end to the other. Specially designed air-conditioned Dining Car has been provided where cheap and wholesome food is provided by Departmental Catering of the Western Railway. Overcrowding is avoided, as only tickets to the extent of the number of seats available are issued.

Public are requested to have their luggage brought to the stations about an hour before the departure of the train to ensure that all luggage is loaded into the luggage compartments of the train in time. Passengers are not permitted to take heavy packages into the compartments as this would cause inconvenience to the other passengers on the train.

* * *

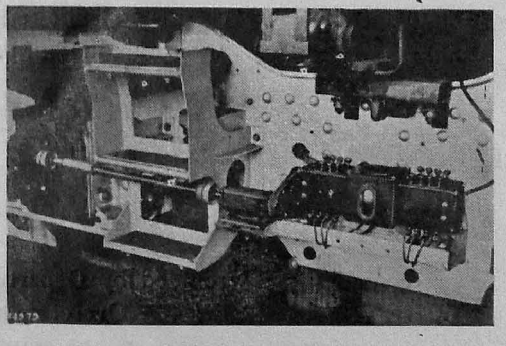
Diesel-Electric Locomotive Lubricated by Tecalemit

THE attached photographs are of the standard Type 1 C. O.—C. O. 1 British Railways Diesel-Electric Locomotives, the end bogies of which are automatically lubricated by a Tecalemit Brentford Oil Pump.



Diesel Electric Locomotive No. 10201

This interesting locomotive weighs 135 tons and is capable of a speed of 90 M. P. H. The fuel capacity is 1,150 gallons. The diesel car unit is a 16-cylinder Vee-form engine operating on the 4 stroke cycle and rated at 1,750 B. H. P. The engine is pressure-charged by 4 exhaust gas turbo-blowers. Within the interior of the locomotive, the engine and generator rooms are separated by a partition. On the latter is a filtered air compartment. A self-contained boiler compartment



This shows the British Railways Diesel-electric Locomotive which has Tecalemit Automatic Lubrication fitted to the mechanism of end bogies. The Tecalemit Automatic Pump can be clearly seen here mounted on the left-hand side of each bogie and driven from the end of one axle on a British Railways Type 1 C.O.-C.O. 1 Diesel Electric Locomotive.

houses an automatically-controlled oil fire boiler, which provides steam for train heating, and for the convenience of the crews is installed an electric cooker, a tip-up wash basin fed by hot and cold water and also a water closet. The driving compartments at both ends are double-panelled throughout to reduce noise and provide heat insulation. Two automatic alarm systems are embodied in the control equipment, one for fire protection, and the other to give the crew a preliminary warning of an impending shutdown of the power unit due to operation of one or other of the safety devices. A Tecalemit Brentford Mechanical Pump is mounted on the left-hand side of each bogie and driven from the end of one axle. These two multi-feed pumps provide lubrication for the suspension links, etc. on the leading axles.

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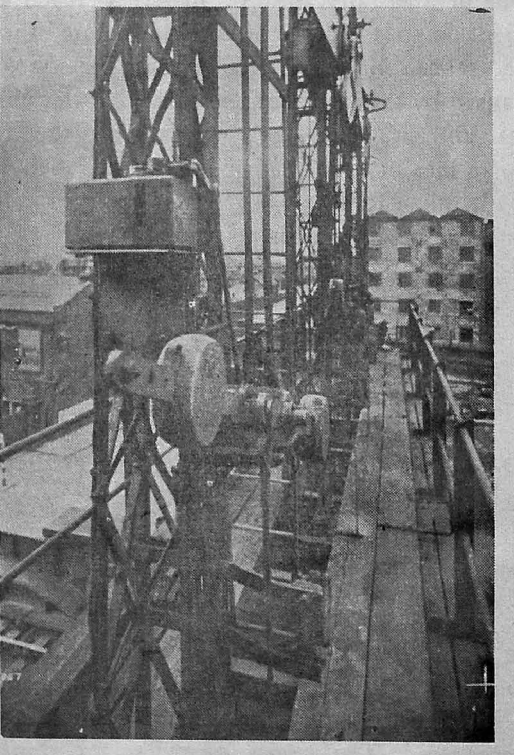
LUBRICATION OF SIGNAL GANTRY

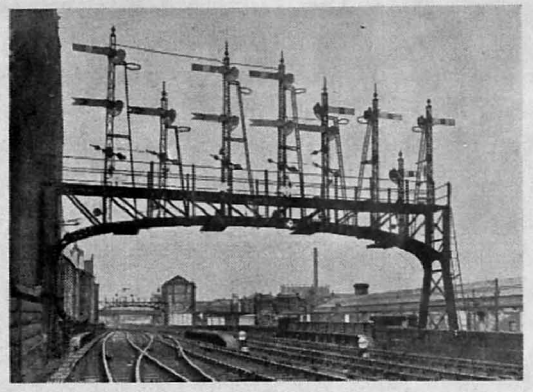
It will be appreciated that the number of bearing points in wire rope pulleys and point rod cranks between a signal box and the ultimate bearing points on semaphore signals is large, and unless these bearings are



The Tecalemit Mechanical Oil Lubricator can be clearly seen mounted on one of the signal lattice frames on this signal gantry in use by British Railways.

properly lubricated, much wear and tear of pins and bushes takes place.

To lubricate such bearings, British Railways installed on a bridge signal situated on the main line junction at Bridge Street, Glasgow, Tecalemit Automatic Lubrication. It is interesting to note that 55 bearing points are lubricated from a central point by means of a mechanical oil pump, actuated by a lever link from the balance lever of one of the signals.



This bridge signal on the main line at Bridge Street, Glasgow, has a Tecalemit Mechanical Lubricator fitted to it, which has been marked.

A main pipeline is run from the pump along the side of the gangway. From this main pipeline distribution pipes are run up the various signal lattice frames and branched to each of the signal bearings which are fitted with meter valves to allow a calibrated quantity of oil only to be passed in a given time.

Each time the lever is operated for the particular signal on which the pump is mounted, a definite quantity of oil is discharged into the system.

The definite advantage of this system is at once apparent when it is noted that less than two pints of oil are required during a period of two week to lubricate the signal gantry and the entire system is furthermore insulated against the ingress of foreign and abrasive substances. All bearings, therefore, automatically receive a regular quantity of oil and the danger of overlooking them is eliminated. The time factor is also another important feature as apart from filling the oil reservoirs at a scheduled time and routine inspection, no further attention is required.

AUTOMOTIVE DIESEL ENGINES

One Hundred and Sixteen years are but a moment in the long history of the ancient land of India.

Travel along any of the shady roads of the mofussil and you may see how short these one Hundred and Sixteen years are, for in the space of an hour or so, the history of road transport in the century rolls before you.

Through the dappled light and shade of the dusty roadway comes the coolie, tramping along on his bare feet, his bundle on his head. Creaking past him in a covered wagon, the bullock driver sits his patient bullocks plodding along slowly with an occasional spasmodic effort at speed as the driver applies his stick or gives their tails a twist. Nearing a temple town, an elephant slouches along—the transport of the ancient and still used on occasions of ceremony and splendour. Passing these age old transporters comes the modern streamlined internal combustion engine powered motor coach, speeding along in safety with its passengers. Diesel Trucks also roll along, all these methods of transport linking up village to village.

And so, in a short hour, more than a century's progress in road transport is bridged over, and we see the ancient and modern side by side.

The firm of Simpsons, Madras, has had the proud privilege of living through these one Hundred and Sixteen years of India's life, beginning with the manufacture of the Howdah, Litter and Palanquin, then Travelling Vans, State Carriages, Pony Tongas, Landaus, Victorias, etc., always keeping abreast with improved methods of road transport.

The year 1903 ushered in a new era in road transport in India with the introduction of internal combustion engine propelled vehicles and since that time, the firm specialised in Automobile Engineering, including Motor Car, Motor Coach and Motor Truck body building, in which field they have achieved and maintained an excellent reputation throughout India.

The advent of the Diesel Engine for Road Transport Vehicles was one of the most important developments in recent years and as Simpsons realised the popularity diesel transport would quickly gain, they entered into

ANNOUNCEMENT

We have pleasure in announcing to all our Readers and Advertisers that we propose to bring out a special Supplement to our Magazine entitled "ALLOYS, FERROUS & NON-FERROUS METALS" sometime in October 1957. For the first time in the history of Indian Railways such a splendid Supplement is being published by us.

EDITOR.

an agreement with F. Perkins Limited, Peterborough, as Distributors for the whole of India for the famous Perkins "P" Series Diesel Engines Subsequently, they entered into a manufacturing agreement with the approval of the Government of India, following which a Phased Manufacturing Programme was submitted to the Government of India and on June 5, 1955, the Chairman of Simpson & Co., Ltd., Shri S. Anantharamakrishnan, the noted South Indian industrialist, gave an assurance to Government that by December 1956, i. e., in the remarkably short period of 18 months, Simpson & Co. would achieve complete indigenous manufacture of the Perkins P6 Automotive Diesel Engine to a capacity of 3,000 Engines per annum.

This was a tremendous task and under the able direction and control of the Company's Director & General Manager, Mr. A. J. Lund, a Chartered Engineer, possessing considerable administrative, organising and production ability, the programme was fully completed.

The utmost co-ordination and co-operation of all administrative staff, draughtsmen, jig & tool designers, other technical, managerial and general staff, Workers' Union, and every employee of the Company was most essential for such an undertaking, and it is undoubtedly a great credit to all that a project of such magnitude was accomplished in the very short space of 18 months.

Specifications and capacities of all plant and machinery had to be worked out to suit all machining operations for each and every component part of the Engine. Orders then had to be placed for deliveries Madras to suit the respective phased periods of the Manufacturing Programme. Complete factory layout plans for positioning of the machinery for flow-line production had to be prepared, excavations made and machinery foundations laid ready for installation of machinery on arrival. Additional electric power supply had to be provided including purchase and installation of additional Transformers, new electric power cables and feeder lines together with distribution boards and switch gear. The entire lighting arrangements throughout the factory had to be re-planned.

Jigs, Fixtures and special Toolings had to be designed and manufactured at their Madras Works to the tune of nearly 3 lakhs of rupees value. Simultaneously, necessary labour force had to be trained, especially for the manufacture of high precision work involved in the production of Jigs and Fixtures. And high tribute should be paid to Indian labour for their remarkable adaptability and progress in this specialised sphere of engineering.

SIMPSONS' WORKS

A massive modern construction, double-storied building houses the Administrative Offices, Financial and Cost Accounts, Drawing and Design Office, Sales Department, Central Stores, Purchasing Department, Material Control and Planning Office. And behind this building is the spacious and most modern Workshop. The factory area covers approximately 2,50,000 sq. ft.

THE PERKINS P6 AUTOMOTIVE DIESEL ENGINE

This is a 6-cylinder unit, having cylinder bore 3.1/2" and stroke of 5". Swept volume is 4.73 Litres (2 88.6 cu inches) and develops a maximum commercial vehicle rating of 83 b. h. p. at 2,400 r. p. m. Maximum torque is 202 lbs. ft. (27.9 Kgms.) The weight of the Engine with electrical starting equipment but without flywheel and starter ring is 696 lbs. In its power range, Perkins P6 is unquestionably the most popular diesel transport engine in the World and in India alone about 40,000 of these engines are operating with extreme reliability and efficiency.

THE MANUFACTURING PLANT

The Perkins P6 Diesel Engine consists of nearly 1,800 component parts, and, of these, 20-odd items are still not manufactured in the country, viz., Proprietary items consisting of Motor Starter, Dynamo, Fuse Box, Venturi, Timing Chain, Starter and Heater Switch Assembly, Etc.

PLANNING FOR PRODUCTION

The organization of the Planning Department has been done on the modern lines, using very extensively the Graphdex Board Charting System and with this the day-to-day stock position of the various engine components and also the flow of the manufacturing programme can be gauged at a glance.

Job Control Boards are operated by the Loading Section of the Planning Office and this method ensures very proper loading of the various production machines and also helps to keep an effective eye on the planned and actual production hours for doing various machining operations. The efficient organization of the Planning Department and co-ordination with the Works and the Cost Office facilitate accuracy in determining the manufactured cost of the component parts day to day.

PLANNING OF CUTTING TOOLS

The various cutting tools required by the Machine Shop are planned and procured, taking into consideration the tool life and the monthly tool consumption. The tools are properly numbered and as per the Operation Sheet, these are stocked in the Tool Stores for easy delivery. The procurement of tools has become a very important function to keep the Machine Shop running uninterruptedly, especially in view of the country-wide shortage of and import restrictions for various cutting tools. In the selection of various cutting tools, factors governing maximum production and tool life, and also the materials to be machined are taken into consideration.

MATERIAL CONTROL DEPARTMENT

The different types of raw materials required for the production of P6 Engines are procured through the Material Control Department. This Department is responsible for the location of suitable materials and ordering them as required. They take very suitable steps to contact various suppliers and ensure that only the right type of material as specified in the designs are procured. All raw materials received at the Works are bonded until material and chemical analyses as required have been taken. This procedure is rigidly followed to ensure that only approved materials to specification are used for the production of the Engine.

This Department also looks after the procurement of various purchased components and also maintains a close liaison with Messrs. F. Perkins Ltd., Peterborough, England, and their Resident Chief Inspector, for obtaining their approval for these items. In the case of completely machined purchase items, a rigorous inspection is instituted in our inward goods section and these goods, like parts manufactured in Simpsons' Works, are constantly under review by F. Perkins Ltd.'s Resident Chief Inspector and his assistants.

MACHINE SHOP

The Machine Shop is broadly divided into two sections: one section manufacturing miscellaneous component parts and the other is laid out for flow-line machining of Cylinder Blocks with Main Bearing Caps, Cylinder Heads, Connecting Rods, Camshafts, Crankshafts, Lubricating Oil Pumps, Water Circulating Pumps, etc. The arrangement of Plant and Equipment has been carried out with a view to obtain a good deal of flexibility in production. Various Capstan Lathes and Automatics have been grouped in one section and several Radial and Pillar Type Drilling Machines in another and in this manner general purpose Milling Machines including Gear Hobbing Machine and SS & SC Lathes have been arranged in different groups.

Four of the Machine Shop bays extend lengthwise within the buildings and this arrangement enables very effective supervision and easy flow of components from machine to machine to be achieved. Manual handling of the components is minimized by necessary mechanization and goods, wherever possible, are palletised and the movement of components at various stages of machining is carried out by the employment of a large variety of specially designed pallets.

CYLINDER BLOCK BAY

The rough castings are delivered at one end of the bay and these are first washed with paraffin in a cleansing tank.

Gravity Roller Conveyors are arranged all along the bay and the castings travel on these from machine to machine, thus reducing to the minimum physical handling. This also helps to avoid 'stock piling' of components on the floor at the various machine stations.

After fettling and washing, the castings are inspected with necessary inspection fixtures to ensure the correct locations of cores, jig location points and machining allowance, and placed on the roller conveyor.

From these the work is loaded directly into the fixture on the first machine, this being a Duplex Miller provided with 2 Nos. 16" dia. inserted tooth carbide cutters. After this operation the work is moved on the roller conveyor to the next operation, i. e., drilling of sump and head faces. In this operation two locating holes are drilled and reamed on the same face for jig location purposes for subsequent operations.

In the Cylinder Block Bay there are several special purpose machines of the modern type such as 6-spindle Snout Borer specially designed for the rough boring of all the cylinder bores, Special Horizontal Drilling Machine for drilling the pressure rail hole in one setting and the wide base Miller for straddle gang milling the Crankshaft bearing sides and alao for form milling the Crankshaft bore. 2 Nos. specially tooled Borematics are stationed for finish boring the parent bore of the Block and the Liners with hydraulically-operated 3 station fixtures. The Honing Machines are positioned next to the Borematics for rough and finish honing the Cylinder bores after finish machining of the Liners.

Most of the other operations are carried out on general purpose machines including Radial Drilling Machines, Vertical and Horizontal Milling Machines, Radial Arm Tappers, etc. All machines have been tooled up for doing particular operations through suitably designed jigs and fixtures.

The Crankshaft and Camshaft bores are finish bored in a Horizontal Boring Machine after fitting the main bearing caps which are processed alongside the Block and brought over to a fitting station. When the machining operations on the Block are completed, the Main Bearings are fitted and line bored.

At every stage of machining, strict inspection is maintained by well trained stage Inspectors to ensure that only correctly machined Blocks are allowed to move forward to their next operations.

Before line boring the Blocks these are water tested and also the pressure rail paraffin tested to ensure that the Blocks are leakproof in every respect.

Completely machined Cylinder Blocks before delivery for assembly are inspected by Final Inspection Department, although rigid stage inspection has already been done at different stages of production.

CYLINDER HEAD BAY

The various machines for processing this component are arranged operation-wise. The rough castings are fed from one end and the completely machined heads are delivered to assembly from the other end. The work travels on roller conveyors and arrangements have been provided for lifting the work from machine to conveyor and conveyor to machine with the help of overhead lifting gear. For the machining of Cylinder Heads Vertical Milling Machines, Radial Drills, Radial Arm Tapping Machines, etc., are used, all of which are specially tooled and jigged for rapid production and interchangeability of the component. As in the case of Cylinder Block, rigid stage inspection is maintained and the completely machined Heads are delivered to Assembly only after passing 100% final inspection.

Before commencing the first machining operation, the castings are thoroughly inspected on the production line itself for jig location points, machining allowance and to detect any casting defects.

After completing the machining operation, the Heads are also hydraulically tested and steam-cleaned.

CONNECTING ROD AND CAMSHAFT BAY

The Connecting Rod stampings, made out of Nickel Chrome Molybdenum steel, are first inspected very thoroughly in the materials inspecting wing of the Inspection Department to detect twists and other stamping flaws. Only approved stampings are then released to the production line and before the commencement of the first machining operation, the stampings are fettled and crack detected on a Magnetic Crack Detector.

In this bay also the machines are stationed on operation basis and, therefore, the Connecting Rods move from one machine to the other in perfect sequence resulting in the least amount of handling.

Specially designed pallets are used for this bay instead of roller conveyors and the components are placed vertically on these pallets by the operative after completion of each operation.

The various milling operations are done by employing negative rake milling cutters as the material has over 65 tons tensile strength.

After the rods are completely machined, steel backed small-end bush is press fitted and then finish bored to size on a precision specially-tooled Fine Borer. On completion of all operations the rods are again crack detected and demagnetised before delivery to final inspection where these are individually weighed and matched. Specially trained Stage Inspectors vigilantly watch for any process variation at different stages of production.

P6 Engine Camshafts are machined on journals which are ground to micro-finish. The Cam Lifts are profile ground and a specially designed Cam-o-matic Grinding Machine, specially tooled, give correct profile of all cam lifts. Cam contour and respective cam lifts are checked on a specially designed fixture during process of manufacture.

CRANKSHAFT

The P6 Crankshaft is machined from high tensile Nickel Chrome Molybdenum steel drop forgings. This most important component has been tooled up with utmost care as the efficient performance of the P6 Engine depends to a very great extent on the precision of the Crankshaft.

Most modern equipment is installed for the production of Crankshafts, the general sequence being crack

detection of Crankshafts before passing into Machine Shop, centering for turning operations, rough and finish turning main bearing journals and crank pin journals, rough grinding all journals, drilling lubrication oil holes, induction hardening all journals by a special induction hardening plant, tempering after hardening, finish-grinding, balancing the Crankshafts and final crack-detection before being passed for assembly. Very rigid inspection is employed throughout the various machining and grinding stages and 100% inspection is carried out after all the operations have been completed.

GENERAL SECTION

In the General Section in the Machine Shop, various component parts such as Water Pump, Fuel Pump Drive, Lubricating Oil Pump, Starter Ring, Timing Case, Exhaust and Induction Manifold, Sprockets, etc. are manufactured. The Starter Rings are electrically butt-welded and passed through the Crack Detector before going forward for machining and cutting of teeth. The Starter Rings are again crack detected before 100% final inspection and utilisation in assembly.

Two special Hobbing Machines are utilised for cutting teeth in all Chain Sprockets, Spiral Gears, and all gears are tested by means of a Goulder Gear Testing Machine fitted with chromium plated master gears.

TOOL ROOM

The Tool Room is equipped with excellent high precision machinery, including a Jig Borer. Special grinding machines are used for maintaining necessary supplies of correctly ground milling cutters, reamers, drills, taps and other small tools. All jigs and fixtures are periodically checked for wear and are carefully maintained to ensure absolute interchangeability and maintenance of very close machining tolerances.

ASSEMBLY OF ENGINES AND TESTING OF ENGINES

The Engines are assembled in the well laid out Assembly Section on a line assembly basis and every Engine, after complete assembly, is subjected to very rigorous functional tests utilising Hydraulic Dynamometers. Fuel and Lubricating Oil Consumption figures are checked to ensure that each and every Engine complies with the very rigid standards laid down. Each engine averages 5 to 6 hours of actual functional test. After test, each and every Engine is very carefully examined, after finish painting and packing prior to despatch from the Works.

The production of an automotive type diesel engine of the Perkins P6 type calls for very efficient technical planning, extreme skill and supervision and also the adoption of modern production methods. The Perkins P6 Engine is world famous for its simplicity, rigidity, accessibility, economy and high quality. and Simpsons have taken every care to ensure that each and every component fitted into the Madras-manufactured Engine is, in every respect, equal to, if not better than, the previously imported product. From the manner in which the various machining operations on the several components of the Engine are produced in Madras and the excellent administrative co-ordination, one can very boldly state that the Perkins Engine being produced in Madras is not, in any way, inferior to the foreign product.

A Wagon Every 20 Seconds — India's Largest Rail Yard Creates A Record

India's largest railway marshalling yard at Moghalsarai, near Banaras, in April set up a record of operating performance, which has never before been achieved in its long history.

Daily during March, an average of 2,082 wagons were despatched to a multitude of destinations on the Northern, Central and Western Railways, marking a 17 per cent increase over the performance in March last year, and a 24 per cent increase over March 1955.

In the opposite direction to the Eastern Railway an average of 2,101 wagons left Moghalsarai daily during March, an increase of nearly 20 per cent over the daily average for March last year.

During the last 11 days of March, an average of one wagon left Moghalsarai every 20 seconds. This process continued all round the clock.

HOW TO RESERVE ACCOMMODATION

Unless you reserve your berth (I Class) or Seats (II and 3rd Class long distance) in advance, you may not be sure of getting accommodation on the train you wish to travel by.

Application should be made to the Station Master of your starting station at least 3 days in advance specifying the date and train by which you intend travelling and the tickets must be bought in advance. The reservation fee leviable is 8 Annas per seat or berth.

Reservation by I and II Class from intermediate stations by Express trains can also be made similarly, but reservation ticket can be issued only after getting an advice from the Reservation Centre that the reservation has been made.

Tickets will be issued only if accommodation is available.

If the reserved seats or berths are not occupied at least 5 minutes before the booked departure of the train the reservation will be cancelled and the seat or berth given away to another.

Reservation fee is not refundable.

III Class seats are also reservable on Express and certain other important trains for long distance passengers from the train-starting stations on payment of a reservation fee of 4 Annas per seat.

Do not occupy a berth or seat reserved for another, as you are liable to be displaced at the last moment.

If you find another person occupying the berth or seat reserved for you and if he will not vacate it on demand, report it to the Guard or Station Master. They will help you.

(Inserted in the interests of Travelling Public)

CLEANLINESS LEADS TO HEALTH AND HAPPINESS

Clean orderly habits contribute to general health and welfare and as such to happiness and prosperity; they are more important than medicines.

Cleanliness prevents disease; medicine only attempts to cure.

Cleanliness of the person, of the houses and colonies, reflects discipline in the individual and the community. Discipline is the foundation stone for progress of oneself and the country. Cleanliness is a good habit. It is also cheap.

All Railwaymen should set an example of cleanliness. This will help others and themselves.

Printed and Published by Sri T. S. S. Rao, at S. R. Press, for
" Southern Railways Magazine", Manojiappa Street, Fort, Tanjore.
Managing Editor: T. S. Krishna Rao.