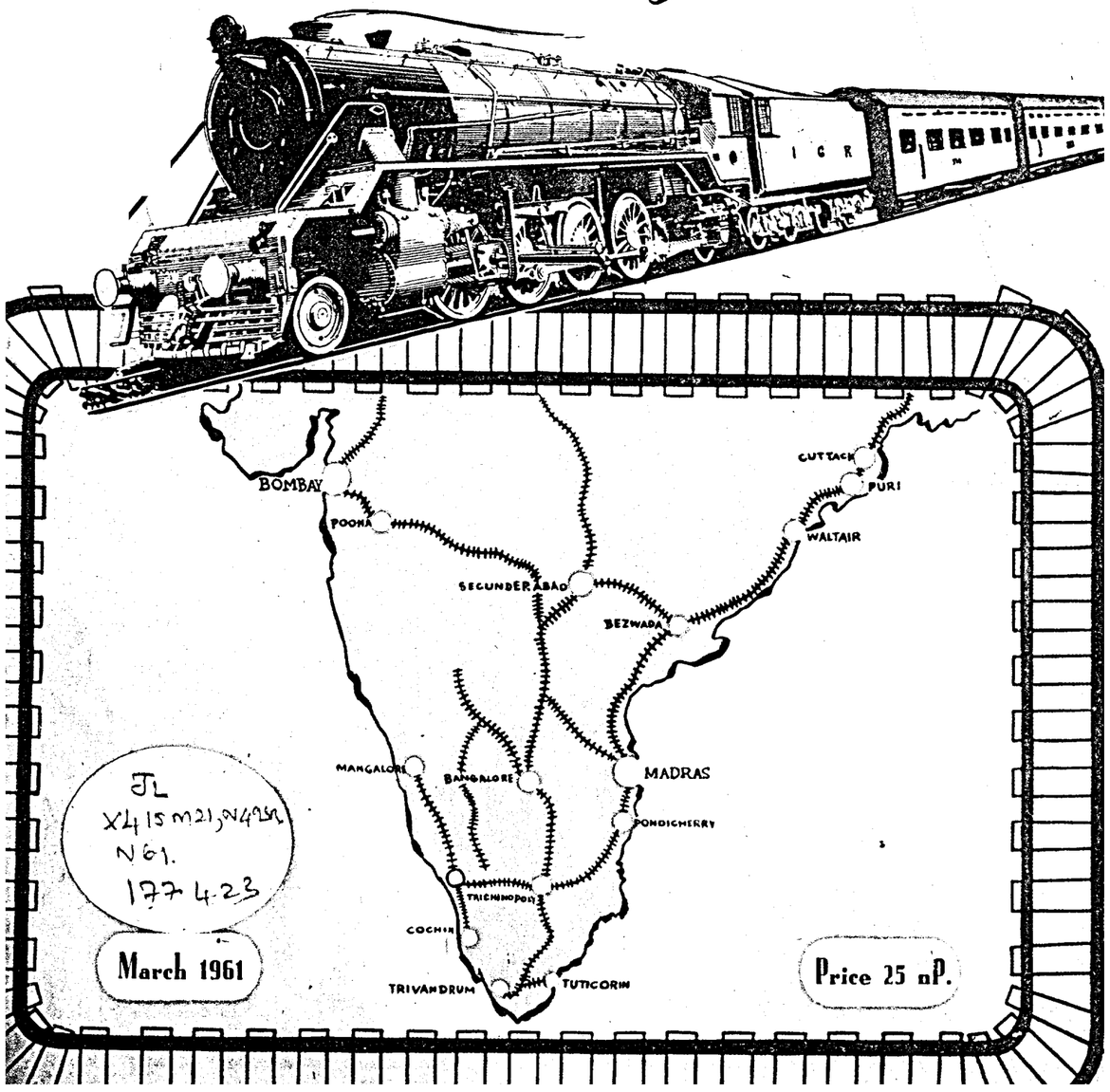
SOUTHERN RAILWAYS

Magazine



March 1961

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GOLDEN RULES OF CONDUCT FOR RAILWAYMEN

1. Do you plan your work daily? Get the more essential things done first and do not neglect the important ones sidetracting them to the fag end of the day.

2. Do not express casually careless opinion. Never venture forth an opinion unless asked for it.

3. Remember that most of our mental worries come either from trying to fight life hard or from trying to run away from life. Do neither.

4. Learn to accept people as they are, love them, respect them, praise them, encourage them, differ with them, but above all, learn the priceless art of give and take.

5. Cry neither for the moon, nor over spilt milk.

6. Accept the things that you cannot change; have the courage to change the things that you can, and possess the wisdom to know the difference.

7. Do not drive too hard a bargain with yourself.

8. Accept life as it is—its wonders, changes, disappointments, frustrations etc., etc.

Worthington Corporation enters Transportation Field announces New Self-Starting Automatic Unit

WORTHINGTON Corporation (U.S.A.), one of the nation's largest suppliers of air conditioning, refrigeration and heavy industrial equipment, has announced its entry into the transportation field with the introduction of a refrigeration-heating unit engineered for truck, railroad and trailer use.

The unit is also adaptable for use on smaller boats carrying fish or other perishable commodities.

Export sales of Worthington's new transportation equipment will be handled through the firm's International Operations Air Conditioning Products department.

The new truck unit incorporates a number of attractive benefits, according to Worthington sources. It is provided with a self-starter and thus requires no external starting power. It is exceptionally light in weight, weighing as much as 300 pounds less than other units of similar capacity. It requires 50 percent less space than other units.

The Worthington refrigeration-heating unit is completely automatic. Temperatures anywhere from minus ten degrees (F) to 75 degrees above can be automatically maintained regardless of changing ambients. The unit was completely tested for a year prior to its introduction.

The entire unit consists of a diesel-engine-driven condenser section and a separate evaporator section. A Mercedes Benz 108 cu. in. 1,800 r.p.m. high speed—1,200 r.p.m. low speed engine is used. A 40-gallon fuel tank is standard equipment and a 75-gallon tank is available.

The whole condensing unit including the diesel engine can be removed from its housing for ease of servicing. The unit slides out on rails.

The condensing unit can be mounted below a trailer body longitudinally or transversely on either the curb or road side. It may also be mounted internally for container-type applications. The evaporator unit is mounted at the front of the trailer.

Air circulation is provided by two fans with separate 12-volt DC motors assuring high volume under all conditions. The dual fan design also provides a safety factor. Failure of one fan or motor will not affect the other fan.

An automatic defrost system is controlled by thermostat setting and is triggered by frost build up on the evaporator coil. When it goes into operation, the fans are stopped and the refrigeration system works as a heating unit until the frost is melted.

All components are designed to give the lowest possible center of gravity when installed. This eliminates the need for special trailer reinforcements to carry the additional weight.

The new Worthington unit can also be used independent of a trailer as a stationary, emergency or temporary source of refrigeration for cold storage facilities.

Purchase of Rail Sleepers from Kashmir

It is a fact that the Northern Railway has negotiated with the Forest Department of Kashmir for the purchase of 10 lakh sleepers, said the Deputy Minister of Railways, Shri S. V. Ramaswamy in a written reply to a question by Shrimati Krishna Mehta in the Lok Sabha on 23rd November, 1960.

The Deputy Minister added that the Railway Board had approved of the proposal to purchase 10 lakh broad gauge units from Jammu and Kashmir during the period November 1, 1960 to October 31, 1961 at the existing rates. However, formal approval of the Jammu and Kashmir Government was awaited.

Tests to determine the most suitable Type of Air Filter for Electric & Diesel Electric Railway Locomotive use in Industrial Areas

By An Engineering Correspondent

ELECTRIC and diesel-electric locomotives possess many characteristics making their use preferable to that of steam traction but their introduction has raised certain additional problems. Not the least of these is the necessity to supply a considerable volume of clean air for cooling and intake supply. Preliminary assessment of the requirements suggested that a number of aspects of the problem were not fully understood and the best approach seemed to be a series of controlled tests in service conditions with filters of varying characteristics.

It was necessary to narrow down the field, firstly on the basis of a theoretical assessment, and secondly, to those types shown by Laboratory tests to hold most promise. These aspects will be covered briefly in this report before proceeding to describe the field trials which were conducted on a series of electric locomotives running over the recently electrified Manchester-Sheffield-Wath extension.

THEORETICAL CONSIDERATIONS

The dust arresting performance of an oil wetted filter is dependent on two processes:

(a) effective impingement of dust on a large area of oily surface, and

(b) adequate retention properties to obviate subsequent re-entrainment of particles as the oil is "dried up" by collected solids.

If the oily surfaces are separated by relatively small passages, accumulation of dust causes appreciable reduction in flow area; ultimately the spaces will be occupied by a porous bed of solids having the effect of maintaining filter efficiency even after the oil has been absorbed, at the cost of increased pressure loss.

Such filters are termed the "constant efficiency type", and possess the advantage that solids "carry-through" does not occur, and need for servicing is positively indicated by increased back pressure.

However, it may not always be convenient to effect servicing immediately, and alternative filter arrangements are possible in which the spaces between oil wetted surfaces within the filter medium are purposely increased. Usually steps are taken to maintain adequate wetted area despite the increased voids by disposing the collecting surfaces in greater depth. It is possible to devise such filters with internal surface spacing sufficiently large to ensure adequate flow passage without this "bridging" tendency. During this process, the rise of pressure loss is small, at the expense of steadily reducing efficiency until ultimately the air passes through substantially uncleaned.

Although this may be advantageous where maintenance of full airflow is more important than transmission of solids if servicing is delayed or overlooked, dangers exist in that dislodgement of "cakes" of previously arrested dust may occur under conditions where vibration can accompany sudden surges of air flow, as for example when entering a tunnel at speed. Consequently, the use of filters with such "reducing efficiency" characteristics cannot be recommended.

The "herringbone" crimped wire mesh panels referred to later represent an improved version of this type, but even a short period of running following servicing suffices to show a marked reduction in efficiency, this continues progressively during subsequent running. This was later confirmed by the relatively dusty internal condition of the locomotive after test.

A prime aim of these tests was to ascertain the feasibility of combining both characteristics to a degree permitting full protection to be afforded in emergencies, over service intervals double that normally recommended. For a given pressure loss, more positive arrestation of particles is secured by employing the minimum possible spacing between wetted surfaces, and then securing maximum total open area by deploying the filter medium in deeply pleated formation. Oil wetted filters of this type include the

Vokes 3-ply and 5-ply panels and so these both figured in subsequent tests.

Other types of filter which held promise employed various configurations of oil wetted surface, including knitted wire, variable density woven wire, herringbone crimped sheet metal, and neoprene bonded hair. All these were submitted to Laboratory testing as described below:

Laboratory Testing

Panels were made up of suitable dimensions for test, employing the following arrangements:

1. *Vokes 5-Ply:* The medium consists of three layers of wire mesh interspersed with two layers of cotton gauze. The latter serves the dual purpose of decreasing the average air passage dimensions, and acts as an absorbent to increase the effective mass of oil the panel can accommodate. The whole is deeply pleated to increase the total developed area to a maximum.

2. *Vokes 3-Ply:* Similar to 5-Ply but with only two layers of wire mesh and a single layer of cotton gauze between.

3. Wire mesh screens of variable bulk density, the more open mesh being upstream.

4. Neoprene bonded hair.

5. Woven wire screen; material similar to conventional oil bath scrubber pack.

6. Herringbone crimped wire; alternate layers with flutes in opposition.

7. Herringbone crimped sheet, with similar arrangement of layers.

Complete discussion of the Laboratory results is outside the scope of this report, but the following figures, indicating efficiency on test dust to B.S. Specification 1701 will indicate the trend:

Filter Medium	Efficiency %		Pressure Loss ins. W. G.	
	initial	600 gms/ft.² load	initial	600 gms/ft.² load
Vokes 5-ply (oil wetted)	99	98.9	0.13	0.73
Vokes 3-ply (oil wetted)	99	98.8	0.06	0.48
Variable Density wire	93	74	0.13	0.62
Neoprene bonded hair	99	98.5	0.18	0.32
Woven wire	97	82	0.22	0.50
Herringbone Crimped wire	99	55	0.04	0.05
Herringbone crimped sheet	75	50	0.08	0.09

Inspection of these figures, indicates a marked variation in performance up to a considerable dust load, but it is possible to observe the fundamental differences between the virtually constant efficiency media such as the 5-ply and 3-ply, and the reducing efficiency types such as the herringbone crimped wires and sheets. Some types obviously possessed poor overall performance, and so were deleted from further work.

SERVICE TESTS

Although not covered in the Laboratory tests, some past experience on the 5-ply filter had been obtained in the dry state, and it seemed logical to include a number of these.

Practical limitations on service tests and desirability of obtaining fullest information on those chosen, made it necessary to exclude certain types with intermediate performance, such as the woven wire screen. However, from the service results it is possible by interpolation to estimate the performance to be expected from this pattern; efficiency would be considerably lower than with the 3-ply type but better than the herringbone crimped wire. Dust load capacity on the other hand would normally be rather inferior to either of the other varieties, but good pressure loss regulation would be achieved, in conjunction with substantially non-clogging characteristics.

Finally, therefore, the following were chosen for test:

(a) The Vokes 5-ply filter (dry).

(b) The Vokes 5-ply filter (oil wetted).

(c) The Vokes 3-ply filter (oil wetted).

(d) Oil wetted Neoprene bonded hair panels.

(e) Panels consisting of layers of wire mesh corrugated in herringbone formation with channels of adjacent layers running in opposition.

The prime aim of the investigation was to ascertain the most suitable type of filter for use in average conditions including those experienced in highly industrialised areas of the United Kingdom. Past experience in certain overseas markets had proved the 5-ply dry filter to be capable of satisfactory performance in conditions where dry inorganic dust predominated, but application of this type of filter for use in industrial areas had not met with such complete success and conventional reducing-efficiency oil wetted panels were equally open to criticism on account of low dust separating efficiency.

For the purpose of the tests, the recently electrified line between Manchester, Sheffield and Wath was chosen as this encountered a fair cross-section of conditions including areas where much soot and potentially corrosive contamination would be experienced. The tests were carried out on four locomotives of the Bo+Bo type used for both light goods and passenger transport. Each locomotive requires 18 panel filters passing a nominal 600 c. f. m. each, 17 being installed in the side walls and one to the H. T. compartment, which is an internal unit.

One type of filter only was fitted to a single locomotive but in some cases, opportunity was taken to employ alternative wetting oils and with the 5-ply filters, four dry units were employed with 13 of the wetted variety, to act as controls. Previous running had already been effected with the 5-ply filters in their dry state and criticism incurred through corrosion and difficulty in cleaning. It was in order to compare directly these effects with those experienced on the various oil wetted panels that the four dry filters were employed. Examination of used dry 5-ply panels had indicated that corrosion of the metallic parts had occurred and this assisted in the formation of a bond between the metal gauze and the tarry deposits, which was difficult to break down by normal solvent cleaning. There is little doubt also that this effect was aggravated by the inefficient performance of water separating louvres in front of the filters which had allowed rain to penetrate and assist in corrosion effects, particularly when other atmospheric agents were available.

Attempts were made to check the performance of the filters in terms of depression inside the locomotive at monthly intervals and in most cases, the filters were removed after operating for 60 days and returned to the Laboratory for individual pressure loss testing and assessment of collected solids. In certain cases, through service limitations, it was necessary to carry out this exercise at an earlier or later stage with the result that occasionally filters were left in situ for as long as 150 days.

Previous experience on the dry type 5-ply panels was largely reproduced in that rise of pressure loss with solids accumulation occurred more rapidly than with the oil wetted version of the same filter, and servicing by normal solvent processes was considerably more difficult. Also, performance of the bonded hair fibre panels showed a marked tendency in the same direction regarding pressure loss increase with dust load.

The oil wetted 5-ply panels exhibited quite good characteristics in respect of pressure loss rise and this has previously been proved due to the considerable quantity of oil which can be absorbed by the two layers of cotton scrim, allied to the large developed area of the deeply pleated 5-ply panel. These tests have proved that the oil wetted version is capable of retaining a larger quantity of solids than the dry version for a given rise in pressure loss.

Of all the types tested, the 3-ply oil wetted panel stood out as possessing the best combination of characteristics, with an efficiency assessed on the basis of locomotive cleanliness very little short of the 5-ply but with the capacity to operate for a considerably longer period without excessive rise of pressure loss. In one case, service contingencies made it impossible to clean the filters on the 3-ply fitted locomotive for 150 days and over this period the depression inside the cabin increased only from 0.09″ w.g. to 0.28″ w.g. Perhaps of even greater interest is that up to 120 days, only a very small increase to 0.12″ had occurred.

Assessment of dust arresting efficiency was not directly possible but on the basis of internal cleanliness of the locomotive, these tests have shown that the 5-ply and 3-ply oil wetted filters maintained a cleaner condition than that possible with the other varieties of which the Neoprene bonded hair was considerably better than the herringbone wire.

DISCUSSION OF RESULTS

The Vokes 5-Ply (Dry) Filter

Past experience has shown this type to give good performance in certain overseas conditions, but this series of tests has confirmed that difficulty in servicing may be experienced with a combination of industrial pollution and rain ingress to promote corrosive bonding of contaminant to the filter.

Furthermore, whereas the oil wetted versions of this filter could retain over 200 grams of atmospheric contaminant for a pressure loss rise (on average) from 0.16″ w. g. to 0.20″ w. g. the dry 5-ply showed an increase from 0.13 to 0.46″ w. g. under the same conditions.

This indicates that the presence of oil on the filter assists rather than inhibits the formation of a highly porous bed of solids.

Experience showed that on an average, between 3,000 and 4,000 grams of solids (up to 9 lbs.) would be collected by the 17 main filters on a locomotive in 60 days average running.

If 60 days is accepted as a satisfactory filter servicing interval, the 5-ply *dry* filter would be excluded on grounds on excessive pressure loss increase, allied to difficulty in cleaning.

The Vokes 5-Ply Oil Wetted Filter

A few figures were quoted as comparisons under "5-ply dry filter", and it has been shown that this filter, despite its "constant efficiency" characteristics, can accommodate a remarkably large dust load for a modest increase in back pressure. Regular 60 day servicing by the means described later would ensure satisfactory performance under any circumstances likely to be experienced in other than dust storm conditions, and some latitude would exist to accommodate limited abuse due to delayed servicing.

The extent of this could not be determined, as the one extended test with the 5-ply filters to 130 days was rendered abortive through servicing having been effected on site without the filters first being returned to our Laboratory for testing in the loaded condition; however, a final depression in the loco of 0.7″ w. g. was recorded, and this is considered excessive. We would suggest the maximum emergency interval with 5-ply oil wetted filters should not exceed 90 days.

These filters maintained the locomotive interior in exceptionally clean condition throughout.

The Vokes 3-Ply Oil Wetted Filter

Owing to operating contingencies, it was not possible to effect servicing of the 3-ply filters until 150 days operation had been completed. Over this period, a solids weight of 8,580 grams was recorded on return of the panels to VOKES' Laboratory and as some would inevitably be lost in transit, the total collected must have been considerably greater.

This represents a loading of approximately 500 grams, or well over 1 lb. of solids per filter, and it is interesting to record that the locomotive depression only rose from 0.09 to 0.28″ w. g. over the whole period. At 120 HRS. a depression of 0.12″ w. g. was recorded, suggesting that approximately 1 lb. of atmospheric solids per panel can be accommodated on each oil wetted 3-ply filter panel for a very small increase in restriction. Allowing for contingencies, a normal servicing interval of 60 days would provide at least a 2 : 1 factor of safety against neglect or inability to service at the correct time.

The locomotive cabin condition was but little inferior to that noted following the 5-ply oil wetted filter tests.

The Neoprene Bonded Fibre Filter

Performance on laboratory tests had suggested that this type was a good intermediate between the constant efficiency 5-ply on the one hand and the reducing efficiency herringbone crimped types on the other. It was disappointing therefore, to record on the field trials, that these hopes were not borne out in practice.

Unfortunately, the first series of tests over a period of 60 days proved inconclusive due to a tendency for the expanded metal facing to the hair pack to choke prematurely; as a consequence, an unduly rapid restriction rise was recorded, being 0.23 to 0.61″ w. g. for a period of 60 days and dust load of 3,337 grams (7 lb.).

The test was repeated with the offending facing replaced by a suitably open mesh, and results improved considerably over the ensuing 60 days. For some reason not fully understood, the weight of dust collected during the second period fell to just under 2,000 grams (4.5 lb.), for which load the restriction rose from 0.21″ w. g. to 0.27″ w. g.

Test results for later running periods of longer duration are not yet complete, but the indicated pattern to date is similar.

The conclusion to be drawn so far is that this type of filter possesses a reasonably flat pressure loss/dust load characteristic, but this is at a generally higher level—over double—that recorded for the 3-ply type filter.

Examination of the locomotive interior during and after test revealed that more solids had penetrated this filter than was the case with the 3 and 5-ply varieties, and the overall balance was considerably in favour of the latter types.

It was subsequently learned that use of this type of filter would be excluded from locomotive wall service on account of excessive fire risk from hot cinders, etc.

The Herringbone Wire Panels

Although a considerable running period has been effected with these panels in situ (115 days), unfortunately servicing had been effected on site, and it was not possible to carry out the usual inspection and pressure loss tests at our Laboratory.

However, a surprisingly rapid locomotive depression rise was recorded, from 0.10″ w. g. initial, to 0.7″ w. g. at 115 days. This was considerably in excess of that noted for the 3-ply filters after 150 days, despite the positive retention characteristics of the latter. In view of the markedly dirtier condition of the locomotive during and after test, this type of filter is definitely not favoured, especially as the hoped for non-clogging characteristics were not realised in practice to an extent justifying the observed rapid efficiency reduction with increasing dust load.

FILTER SERVICING

For the purpose of these tests, the filter panels were returned after use to VOKES Laboratory so that inspection and pressure loss tests at standard airflow could be effected before cleaning; washing off and re-oiling were then carried out in a special machine devised to facilitate these operations. One such machine has now been installed at Reddish Depot, Manchester, by British Railways, and is in regular use.

The machine includes suitable washing and wetting tanks disposed around a centrifuge to accelerate drainage of excess fluids from the panels. The most effective cleansing agent has proved to be "Liquid Solvex", a product of the Fletcher Miller Company, and one tank contains this hydrocarbon base, water soluble solvent, and emulsifying agent.

A second tank contains hot water (60—70°C.) for the purpose of wetting out the solvent and removing the collected solids, and the third tank holds the wetting oil.

WETTING OILS

Opportunity was taken of the field trials to compare two wetting fluids, a straight mineral/vegetable blend oil in wide use for the purpose, and a water soluble emulsified oil of generally similar characteristics.

Performance of these two fluids as filter wetting agents proved to be very similar, and no conclusions can be drawn to favour one or the other. However, the water soluble oil proved of great advantage for servicing as soaking times in the solvent and water tanks could be usefully reduced for equal effectiveness. We tend therefore to favour use of the soluble oil for wetting filter panels for this service.

A word should be added regarding the special air filter wetting oils recently made available in Great Britain. Test results have been quoted by the sponsors indicating a usefully improved performance when applied to "reducing-efficiency" filters in certain overseas service.

The special oils were not available in time to permit inclusion in the field trials, but Laboratory tests have been carried out by us in co-operation with the suppliers. Briefly, the object of these fluids is to secure at once the good wetting and wicking characteristics of a light mineral oil, together with

anti-draining properties offered by the presence of a semi-soluble additive. The effect is to increase substantially the mass of oil a given filter can retain after servicing, and so provide good surface wetting of the accumulated dust pack beyond the point at which a conventional oil would be fully absorbed.

The advantages are greatest with the "reducing efficiency" type of open pack filter which is enabled to operate for a longer period before serious deterioration of collecting performance sets in. Applied to filters such as the 5-ply and and 3-ply however, which are themselves designed to possess good wicking and anti-draining properties, the advantages are not so marked, and unless due precautions in draining at an adequately high temperature are observed, a possibility of excessive oil retention exists, which could cause abnormally high back pressure. Experimental work is continuing in cooperation with the suppliers. Advantages are greatest when applied to filters possessing poor retention characteristics.

EXCLUSION OF RAIN WATER

Comment has already been passed on the effects experienced due to water ingress on the dry 5-ply filters. Presence of water on any dry or viscous panels is obviously disadvantageous and if the recommended water soluble wetting oils are employed, long term performance would be affected due to removal of wetting fluid.

The VOKES "Monsoon" type louvre has been expressly designed to exclude rain water, which it does most efficiently, and irrespective of the type of filter employed, fitment of these or equivalent louvres is highly desirable to secure optimum filter performance.

CONCLUSIONS

The field trials show one type of panel filter, namely the VOKES 3-ply (oil wetted) to be markedly superior to all the alternatives, and using the ratings applied during these tests—i. e., a face velocity of approximately 300 feet/minute—excellent performance, with neither efficiency fall off nor premature choking, can be achieved over a period of 120 days average operation under industrial conditions in the U. K.

Allowing for emergencies and service contingencies, a nominal service interval of 60 days, would provide a factor of safety of over 2 : 1. Such performance could not be achieved with any of the other filters, including the herringbone crimped wire mesh and Neoprene bonded hair panels.

(Vokes Limited wish to express their gratitude to Mr. K.J. Cook, O.B.E., Chief Mechanical and Electrical Engineer, Eastern Region, British Railways and his staff for their co-operation during these tests.)

INDIA ORDERS MACHINE TOOLS FROM U. K. FIRM

Craven Bros. (Manchester) Ltd., the Stockport (England) firm of machine-tool makers, have been awarded orders from India valued at more than £600,000.

The firm were told by cable of the order, the precise value of which will not be known until they receive details of the additional equipment required with the machines.

Craven Bros. specialize in large, heavy machine tools for general purposes.

This latest order brings the intake of new work since the beginning of this year to well above £1,000,000, and further substantial contracts are at present being negotiated.

Craven Bros. have already fulfilled a number of orders in India.

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ELECTRIC TRAINS— I. C. F. TO MAKE COACHES

The Integral Coach Factory, Perambur, have undertaken a new line of production—electric multiple unit coaches for the Calcutta Railway Electrification Project authorities.

The Railway Board have placed orders for the supply of 64 E.M.U. four-unit trains at a cost of about Rs. 15 crores and the first unit is expected to be delivered by the last quarter of 1962 or the beginning of 1963.

Mr. K. Swarup, Chief Administrative Officer, Integral Coach Factory, said that production of an electric multiple unit coaches was an entirely new line of production. With the help of the French collaborators of the Calcutta Electrification Project as well as the factory's own Swiss collaborators, they hoped to meet this urgent request on an emergency basis.

Lubrication of Rails and wheel flanges

By Hans Ablassmeyer, Munich

THE wear of flanges and rails through dry friction in curves is a source of constant and heavy expenditure to railway companies and, in addition, very often the reason for avoidable breakdowns and out-of-service periods of engines.

In order to reduce this wear by using suitable lubricating systems, a number of lubricating devices have been developed over the years, installed either on engines or on rails. The usefulness of these various lubricating means was however limited until, not long ago, a solution was found to the many and involved problems governing the efficient lubrication between wheel and rail.

The following report is a synopsis of the various solutions of these problems and of the experience gained from the use of a variety of lubrication systems for rail and flanges respectively. In addition, performance data available to date is included.

There is no fundamental difference between the lubrication of flanges and that of rails, as far as the ultimate effect is concerned, since both flange and head of rail are subject to the same friction which must be reduced by suitable lubrication. Judging from experience, it can be said that the lubrication of flanges. as compared with the lubrication of the rail itself, offers special advantages as regards economy, safety and efficiency.

In the following paragraphs two typical cases are described, illustrating the difficulties that have to be overcome when the system of direct lubrication of the rails or of the edge of the head of the rails is adopted.

The fundamental principle of the PAEHLER Lubricating System is based on the fact that the weight of the wheel, when passing the rail, causes a certain sagging of the rail. This sagging operates an oil pump that supplies oil to a brush which, in turn, is pressed downwards at the moment when the wheel passes over the rail, and in so doing, lubricates the head of the rail over a length of twenty inches. This device, when first installed, must be inspected once a day and subsequently once a week.

Some other systems, including some of foreign design, are based on the same principle. To ensure sufficient lubrication of the rail three complete lubricating units must be installed in each curve. Their satisfactory operation depends on the condition of the track, e. g. tight or loose sleepers etc. Furthermore, oil, pump, joints and brushes are all subjected to the influence of climatic conditions, e. g. water frost, cold, and the injurious effect of foreign matter e. g. dust, grit, stones. This equipment cannot be used where sand is employed to prevent slipping. In addition, initial expense and upkeep and maintenance costs are high. The Railway Company of Western Germany have limited the use of this system to a few applications only.

A British solution to the problem, operating independently of the track provides a closed-in lubricant container on the rail and thus obviates the use of brush or wiper.

This system too requires the installation of several units in each curve. There is no information available about the results obtained from its use.

Another method lubricates the rail by means of a lubricator installed on the engine. The extremely complicated mechanism is set in motion by the movement of a pendulum, which—in curves—swings and at the end of its swing touches an electric contact thereby causing electrically controlled distributing valves to spray, through a pipe of telescopic design, oil and compressed air on to the edge of the head of the rail. This system is used on a number of French Railway Lines. As already pointed out it is very complicated and in addition has the disadvantage of not lubricating the beginning of a curve.

On the question of lubrication equipment for flanges, for a long time no solution was found that could be used successfully under all conditions. The following report outlines these conditions and the requirements that have to be satisfied when an attempt is made to develop on efficient flange lubricator.

At the same time, a summary is given of the different methods, their advantages and disadvantages.

The older systems provide for the lubricating medium to be directly applied to the flange through rollers, balls or pins, which slide on the radius between tyre flange and tyre tread. The lubricant is fed either from a reservoir (by gravity) or by means of a pump.

If the lubricant fed from the reservoir is oil, the latter will also drip during periods of stoppage of the engine and is likely to spread on to the tread of the wheel.

All these systems however, did not successfully solve the problem posed. In the case of the pin, the oil groove filled with brake-dust; when the spring pressure exerted on the pin was too great the former mounted the flange; conversely, when it was too small the pin dragged on the tread. In the case of rollers and balls, these were worn flat and thereafter no longer able to revolve. All these designs therefore required continuous inspection by experienced men. Within this group of lubricating devices was one developed by the German Railway Company operating on the principle of a cartridge of stiff grease pressed against the flange of the wheel.

The results obtained by this method are given elsewhere in this article.

Modern lubricating systems, however, prefer the indirect transmission of the lubricant by means of compressed air. For this purpose nozzles are attached to the flange of the engine just in front of the wheels and are supplied simultaneously with compressed air and lubricant. The lubricant is atomised by the nozzles and is spurted on to the rotating flange in the form of a powerful jet. The jet is directed accurately on to the flange even in case of vertical or axial displacement of the axles. Vertical movement is of no consequence as the nozzle is installed approximately level with the axle, whereas axle movement only alters the length of the jet. Consumption of compressed air is low, and both cost and volume of compressed air are negligible.

To supply a lubricant to the flange, depending on the wheels passing over a curve, is obviously desirable. Some methods devised to meet this problem make use of the swing of the pendulum, or of the inclination of the engine bogie when travelling in curves, to operate the nozzle by means of a lever or similar system.

Such systems however, have the disadvantage of a time lag between the moment the engine starts passing over the curved rails and the application of the jet. As a result the considerable forces that are set up when, at the beginning of the curve, on engine alters its course, are taken up by ungreased rails and the friction thus created is the cause of comparatively heavy wear. In place of lubricating systems depending on curves the system in which the distance travelled by the wheel forms the basis for lubrication can be employed.

In this case, the lubricating pump is actuated by the driving mechanism of the engine or by a wheel axle. At intervals of a given number of axle revolutions, i. e. each time a certain track distance has been covered, the pump mechanism is set in motion and the flanges are lubricated, the process being therefore entirely independent of curves.

Each lubricating process takes place after the completion of a certain number of revolutions by the wheels, and the film of grease is therefore renewed at track distances of equal length. Furthermore, when the engine enters a curve the wheel flanges are already covered with an adequate film of grease. This ever-present film reduces also friction and wear on straight lines.

The leading engine wheels only are greased. Engines running always in one direction, e. g. engines with tenders, are lubricated on two flanges only, whereas four flanges are lubricated where engines often change direction, e. g. tank engines and electric locomotives. In the case of four flange lubrication provisions are made to cut out the lubrication equipment of the rear wheels.

In addition to the lubrication requirements, as discussed above, the actual lubricators must be of a design that embodies all the features which guarantee their satisfactory in operation service. They must be unaffected by frost, moisture, dust and dirt, and must also withstand the hard knocks and shocks of every day railway service. They must be fully automatic and require a minimum of attention and maintenance only. Above all however, they must prevent the lubricant from reaching the tread of rail or wheel as this inevitable results in slipping. The surface to be lubricated is a very small area and located immediately next to the tread. When oil is used to lubricate the flange there is a danger that it will spread to the tread; this is particularly likely on hot days or when the wheels are hot.

This potential source of trouble can be avoided by the use of grease as lubricant. Due to its highly adhesive quality, the film of grease adheres to the flange and to the side face of the rail and does not spread to the tread.

The use of grease lubrication of flanges is dependent on the existence of a grease pump which is capable of conveying, under high pressure, to the points of application, small and precisely determined quantities of comparatively stiff grease.

Railway line	*Total length of track in miles*	*Number of curves*	*Total length of curves in miles*	*Percentage of curves to track*	*No. of turns*	*Average dia. curves in yds.*
Schwarzach–St. Veit–Spittal	52	235	25	48%	18	388
Insbruck–Brenner	23	130	12	53%	8.5	396
Landeck–Bludenz	40	200	16	40%	12.9	344
Freilassing–Berchtesgaden	21	115	9	42%	8	308
Freiburg–Titisee–Seebrugg	31	180	11	35%	7	428

These requirements necessitated the systematic further development of existing grease pumps, as used on machinery.

As the grease pump industry in Germany had been in the forefront for some time, the conditions for the development of a special flange grease pump were very favourable. It soon became evident that the method of grease lubrication offered a number of important advantages as compared with that of oil lubrication, which had hitherto been adopted at home and abroad.

A system of flange lubrication which takes into account all the requirements mentioned above, from both technical and practical points of view, has been developed by Messrs. De Limon Fluhme & Co., Engineers of Dusseldorf. The design of this system is characterised by the following features:

1. The Lubricating Medium is Grease, which is supplied from a Pump and is squirted by compressed air on to the flange in the form of a jet.

2. The brief squirting process is regularly repeated at given track distances. The simultaneous supply to the nozzle of both grease and compressed air is controlled by the pump which is actuated by the driving mechanism of the engine or by a wheel axle.

3. During the lubricating process, compressed air is supplied from the small air receiver of the pump which is recharged after each application.

4. The pump is equipped with a micrometer feed knob.

5. The grease inlet of the nozzle is controlled by a spring loaded diaphragm valve which exerts a constant pressure of 335 lbs. per square inch on the grease, thereby ensuring a constant pressure supply.

6. The pump supplies two or four nozzles in rotation.

Before the end of the war German Railways employed the method of rail and flange lubrication to a limited extent only. As regards lubrication of rails, lubricating devices of the Paehler type were mainly used.

Some electric locomotives had been fitted with Heyder type flange greasing equipment. This applies the lubricating medium to the flange by a roller running on the wheel circumference between flange and tread. The lubricant is supplied by means of a pump. Stiff grease cartridges, previously described, were also used on BO-BO Engines, e. g. on the Schwarzach St. Veit-Spittal Line (Tauern Railway), Bludenz-Landeck Line (Arlberg Railway) Freilassing-Berchtesgaden Line and Titisee-Seebrugg Line (Hollental Railway). The above table shows the percentage of curved track on these lines which gives the reader some idea of the wear that must be expected.

Yet another system, called R. Z. A. Lubrication, employs a cylinder of stiff grease in a cardboard cartridge which is pressed against the wheel by means of a spring, thereby producing a film of grease on the flange. Both cartridge and spring are housed in a tubular holder which is attached to the locomotive frame. This device has the advantage of simplicity and low initial cost. In addition, the installation to already existent engines does not present any difficulty. The grease cartridges can be made from waste materials. The dimensions of the cylinder, cartridge casing included, are 2″ diameter by 8″ long. Each engine is fitted with four cartridges but the leading wheels only are greased. The cartridges require daily adjustment, and in the case of unfavourable track conditions, must be sharpened daily, for which purpose the cartridge cases have to be removed. It has been established that this system of flange lubrication operates efficiently only when it is attended by a man, specially employed to look after it, to inspect the grease cartridges and to replace them in good time. The effectiveness of the system depends entirely on the reliability of this man.

It must here be added that in winter when there is deep snow on the ground, the cartridge cases are liable to be torn off and it is therefore advisable to remove them during these periods.

After the war other means of lubrication had therefore to be adopted and flange greasing equipment of the De Limon type, as described above, was fitted on the Freilassing - Berchtesgaden Line. These Lubricators have now been in use for two years and have shown startling results. No attention to this equipment is necessary during service, except to re-charge the pumps with grease every 2,500 to 3,500 miles. The total cost for about 2,500 engine miles (including depreciation, maintenance and service) was found to be half that of the R. Z. A. System. It can be said that, without taking into account the saving in wear of wheels and rails, the initial expense of a complete installation will be recovered within four months.

The Freilassing-Berchtesgaden Line has a large number of curves. Previously, it was necessary to fit new tyres to the wheels every 22,000 miles on the eight engines in service on this line. After a trial unit of the De Limon Lubrication System had been installed and found satisfactory, four engines were fitted with this type of equipment. The result was an increase in mileage from 22,000 to 77,000 miles. A true comparison between engines with wheel flange lubrication equipment and those without is no longer possible as the latter benefit from the grease film which is already on the rails.

In order to reduce the wear of rails on this line, the Company decided therefore, to equip all their engines with flange lubricators which was found to be by far the cheapest method of greasing rails. Developed for the purpose of lubricating flanges, this lubricator turned out to be a combined flange rail lubricator; it was also ascertained that the engine wheel flanges did not show any wear at all. The tyres have to be removed solely on account of wear on the tread, which actually makes the flanges appear to increase in thickness. Investigations into the wear of rails are at present being conducted.

The primary condition for the satisfactory functioning of this greasing system is the use of a suitable grease. This grease must be of soft consistency, of short texture, and in addition must be atomisable. It should be suitable for temperatures from 4° Fah. to 140° Fah. in all respects. A lime base H. P. grease water-proof with a dropping point of approximately 210° Fah. can be used. Any addition of Graphite whether in flake or Colloidal form would destroy the pump.

The consumption of grease per engine varies between 5 to 10 lbs., per 1000 miles. It is advisable to keep checking the consumption of the grease, as this is the best way to ascertain the satisfactory functioning of the whole installation. As a further check, a sharp hissing sound must be heard in turn from each of the four nozzles when the pump is cranked.

Lubrication takes place at each nozzle, according to the adjustment of the pump gear ratio, after track distances between ranging from 390 ft. to 490 ft., in the case of a 50 diameter wheel it covers a length of approximately 27 ft., which is equivalent to two revolutions of the wheel. The consumption of compressed air per application is 0,265 cu. ft. at a speed of 19 miles per hour and 0,177 cu. ft. at a speed of 25 miles per hour.

The maximum output of the pump per stroke (No. 5 setting of the adjustment micrometer knob) is 0.012 cubic inches.

When the adjustment micrometer is set to zero no grease will be fed. The apparatus should be installed in such a way that both left and right hand curves

are lubricated where the head of the rail contacts the wheel flange.

The advantages of this system led to its introduction on other railway lines (all of which operate in mountainous districts) e. g., engines with this equipment are running on the Freilassing-Berchtesgaden line, the Traunstein-Ruhpolding line, the Muenchen-Garmisch line, on the "Geislinger Steige" railway, the "Hoellental" railway, the "Tegernsee" railway, the "Regentalbahn" and on some other privately operated railway lines.

Previously the life of the wheels on the engines operated on the "Geislinger Steige" varied from 9,000 to 34,000 miles, with an average of about 20,000 miles. After one out of the three engines had been fitted with this flange lubricating equip ment, the figure for this particular engine increased to over 69,000 miles; at the same time the figure for the two other engines that had not yet been fitted, was found to be 49,700 miles. Since then all three engines have been fitted with this equipment and it is expected that the figure for wheel life will be in the region of 125,000 miles.

Experimental tests have ascertained that the De Limon system works satisfactorily when installed on larger type engines and on high speed engines. It was found immaterial whether the supply pipe is of 6 ft. or 36 ft. length; or whether the engine is running at fast or slow speeds, the grease-air atomisation still being satisfactory at pump speeds equivalent to engine speeds of 124 miles per hour. No deviation of the jet was discernable even when the grease was spurted against a glass plate revolving at a speed of 87 miles per hour.

In conclusion, it must be mentioned that this greasing system has given good service in summer as well as in winter, and that in no case has a film of grease spread from the flange to the tread, which was always found free from grease, and on no occasion was wheel-slip observed, as a result of grease on the tread. At the same time, the grease film on the rail was found to be in the form of a small band only.

The problems of a satisfactory method of flange lubrication can, therefore, be regarded as having been solved.

[By Courtesy: DE LIMON FLUHME & Co., Dusseldorf.]

TENSILE TESTING OF STEEL PRODUCTS

The latest addition to the series of Indian Standards for mechanical testing of metals is IS: 1608-1960 Method for Tensile Testing of Steel Products other than Sheet, Strip, Wire and Tube. This Indian Standard is based on the draft ISO Recommendation No. 133 Tensile Testing of Steel which represents the consensus of international opinion on the subject. This standard applies only to products of diameters equal to or greater than 4 mm (or 0.157 in.) or thicknesses equal to or greater than 3 mm (or 0.118 in.) For the tensile testing of other products, such as sheet, strip, wire and tube, other standards are under preparation.

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Signature of Publisher

High-Speed Diesel Engines for Industry

By An Engineering Correspondent

THE LICENCE AGREEMENT signed two years ago with Maybach Motorenbau GmbH, to enable Bristol Siddeley to manufacture the Maybach MD range of diesel engines, has brought together two Companies which have each earned a world-wide reputation for the quality of their products. Maybach Motorenbau have over 40 years' diesel experience and Bristol Siddeley also have an extensive background of diesel engine design and manufacture.

Maybach high-speed diesel engines are well known to rail traction engineers both in the United Kingdom and overseas, and British Railways' Western Region have chosen Bristol Siddeley Maybach engines to power the new locomotives which form a substantial part of their modernisation programme. Encouraged by their experience with the first of these in service, British Railways have placed additional orders for over 200 Bristol Siddeley Maybach engines.

The operational requirements of industrial and marine engines differ considerably from traction applications in that they have long periods of continuous running at high loads, whereas a railway locomotive rarely operates for more than 18 hours a day and then only at full power for a part of the time.

The ability of the Maybach MD range of engines to meet the exacting conditions of continuous running at full load was well demonstrated during tests carried out in 1955. In the town of Minden, an aqueduct carries the Mitteland canal over the river Weser and this canal must be continuously fed with water from the river in order to maintain the level. Normally this is done by a series of electrically driven centrifugal pumps, but for the purposes of the tests a 6-cylinder Maybach engine delivering 600 HP at 1500 rpm took over the work of the electric motors.

From May to October 1955, the engine ran at full load and, apart from periodic oil changes, was only shut down on one occasion for maintenance. The only trouble experienced was caused by the hardness of the engine's cooling water and by an eel which had found its way into the cooling system and blocked the flow!

After 3500 hours' running, the engine was stripped and a full inspection carried out. Wear was imperceptible and the unit was re-built and run for a further 2500 hours on a lower grade of fuel. Even after the total 6000 hours had been run, all at full load, inspection again showed that component wear was, in the main, insignificant—the highest measured wear being about 0.1 mm on the lower portion of the exhaust valve guides.

The official report on these tests makes very interesting reading. Most of the criticism is levelled, not at the engine, but at the hardness of the Mitteland canal water and at the salinity of the river Weser. At one point, in his summing up, the test engineer reported, 'As far as the behaviour of the engine is concerned, it should be pointed out that no trouble whatever arose of a mechanical nature or in connection with combustion'.

Since these tests a number of ships, such as the ferry *Theodor Heuss*, the trawler *Zephyros* and the coaster *Walter Korte*, have been built which use Maybach diesels as their main propulsion units. In each case the engines have performed well.

The small dimensions of Maybach diesel engines means that the floor space needed is very much less than that required for lower speed industrial or marine, engines, and furthermore installation is simpler and quicker. A lightweight mounting, with rubber pads to damp out the very small amount of vibration generated by the engine, provides an adequate foundation without resort to special beds with reinforced flooring.

The use of a simple foundation is a remarkable feature of the Maybach engines, as it reduces the cost of marine and industrial installations and also makes them ideally suitable for mobile power units. In this latter respect it is now possible to construct electrical generator sets, compressors, and auxiliary power units of over 1700 HP which really are transportable.

The design of the engine is such that all components are readily accessible and so may be inspected and, if necessary, replaced during the periodic checks. The Bristol Siddeley Maybach diesel engine is operated on the principle of regular routine maintenance and overhaul, the work being carried out at set periods in relation to the number of engine running hours. This maintenance ensures the regular examination of parts and reduces the likelihood of trouble. Each part can be easily handled without the use of cranes and the small overall dimensions of even the largest engine makes it a simple matter to remove the entire unit for a complete overhaul. An exchange engine may, therefore, be substituted and the shut-down associated with slow and medium-speed engines, which are invariably overhauled in their working position, may be avoided.

The sale of Bristol Siddeley Maybach diesels is backed by a highly efficient spares organisation. Large stocks are maintained of all components, each of which is fully interchangeable. Spares are, therefore, immediately available, and, if stocks are not held locally, they can be flown to any part of the world within hours of a requirement arising. Service engineers, too, are always on call to operators.

The design of the Maybach MD series permits a large number of parts to be interchanged between engines throughout the range. Cylinder heads, valves, pistons and cylinder liners, to mention only a few, are identical on all engines, regardless of their size and power.

Component interchangeability is not confined to Bristol Siddeley built engines. Components, whether manufactured in Britain or in Germany, are mutually interchangeable.

The Bristol Siddeley Maybach MD engines for industrial applications cover a power range of between 445 and 1728 HP. They are available as either 4 or 6 cylinder in-line engines or with 8, 12 or 16 cylinders in Vee formation. Each is pressure charged and an intercooler can be incorporated if required.

The pressure charging is effected by a turbo-blower driven by a turbine in the exhaust stream. This has the ultimate effect of reducing the cost per horsepower at little additional cost to the engine. For example, the 16 cylinder MD 870 would, if normally aspirated, deliver 1055 HP. In its two production forms, however, it delivers 1382 HP if pressure charged, and 1728 HP if pressure charged with intercooling. This represents a horsepower increase of 31 per cent from the unblown to pressure charged unit and a further 25 per cent when intercooling is introduced. The increased power from the same basic engine is not accompanied by any significant increase in wear.

The MD 870, pressure charged and intercooled, weighs as little as 13,162 lb. At the lower end of the power range the MD 225 weighs 6220 lb and delivers 445 HP.

The size, power/weight ratio and high speed of these engines represent a revolutionary step forward in diesel design and their record in service, and on the special tests at Minden, furnish conclusive proof that for reliability they are in no way inferior to the best slow running engines.

The success of the Maybach represents many years of painstaking development and the present state of the engines is not, in any way, indicative of the final stage. To take an example, the MD 655 engine has been developed from 800 HP to 1400 HP over the past 8 years and the potential for yet higher powers is still considerable.

Close technical collaboration is maintained between Bristol Siddeley and the Maybach centre in Friedrichshafen, which ensures that the British manufactured engines are of the very latest standard. The Maybach MD series are generally acknowledged as being in the forefront of high-speed diesel engine design and unceasing development ensures that this position will be maintained.

[By Courtesy: Bristol Siddeley Journal]

FURTHER CUT IN IMPORT OF RAILWAY EQUIPMENT

Preliminary reports regarding purchases made by the Indian Railways during 1959–60 indicate that the imported content was further reduced from 9.6 per cent to 8.6 per cent. The value of purchases made during the period by the Railways from Small Scale Industry amounted to Rs. 1,94,00,000. This was disclosed by Shri S. V. Ramaswamy, Deputy Minister for Railways, while addressing the eighth meeting of the Indian Railways Equipment Advisory Committee held at New Delhi on 26th November 1960.

Shri Ramaswamy expected further reduction in the imported content of rolling stock and equipment in future with the commencement of electric locomotives manufacture in the country as also the electrical equipment for electric multiple unit coaches.

Automatic Hydraulic Transmissions manufactured by Bristol Siddeley

By An Engineering Correspondent

TORQUE CONVERTERS

THE already wide range of Bristol Siddeley products has recently been extended still further with the signing of a licence agreement with Svenska Rotor Maskiner AB of Stockholm for the manufacture of a series of very high efficiency hydraulic torque converters.

The Swedish company, known briefly as SRM, is a design and research organisation of world-wide repute which exists solely for the development of advanced engineering ideas to the point at which a manufacturing licence can be granted to an engineering company. Apart from the necessary work to support development, SRM carries out no manufacture, its policy being to leave this to a small number of first-class licensees.

Bristol Siddeley are licensed to produce the whole range of SRM hydraulic transmissions for use in two principal fields: in town and cross-country buses and coaches, and in railway locomotives for both express and shunting purposes. The range includes units designed to operate at high speeds and to transmit from 80 up to 1800 horsepower.

The peak efficiency of all models has the very high value of 87 per cent. The units have a very small volume in relation to their power capacity; their weight, too, is low, although highly-stressed parts are avoided.

There are three elements which are essential to a torque converter: an input source, an output which is related to the input and which is dependent on their relative speeds, and a fixed reaction member. The principle is therefore analogous to the law of the lever, namely that a given load at a given distance from a reaction point, or fulcrum, can be used to move a larger load placed at a smaller distance from the fulcrum. The application of a load about a fixed reaction point produces a torque about the point. The loads and distances are interrelated: if the larger load is twice that of the smaller, its distance from the fulcrum would in theory be half that of the smaller load which just moves it. The speeds at which the loads move would be in the same proportion, that of the larger load being half that of the smaller.

A train of gears may be considered as a number of levers operating in series, with the difference that the proportionality now applies to the angle through which each turns and not to the linear speed of the engaging teeth. Each wheel is in fact a rotating lever whose radius represents the lever arm. The spindle on which it is mounted forms the reaction member. The output from one pair of wheels becomes the input to the next and in the case of reduction gearing this results in a corresponding decrease in the angle turned through. The cumulative effect of all the levers is to produce a notably larger torque than the original input, but to deliver it at a lower rotational speed.

The gear train is therefore a mechanical torque converter. Any given sequence of gears produces a fixed ratio of output speed to input speed, and provided 100 per cent efficiency is assumed, the same ratio of input torque to output torque. It is therefore easy to draw a graph of the torque ratio that can be achieved with a hypothetical drive which gives any specified speed ratio, and the upper curve represents these values over a suitable range of speed ratios.

Now in respect of torque multiplication a train of gears has certain disadvantages. The fact that the number of speed ratios obtainable is restricted—normally to three or four—is a severe limitation. If the load on the output shaft is increased while the engine is running the engine speed and hence the output speed tend to fall. To restore the original output speed, either engine torque must be increased by augmenting the supply of fuel or a lower gear ratio must be engaged to produce a higher multiplication of engine torque. This is a rather general statement of the conditions and assumes that the increase in the load is small enough to allow the desired conditions to be obtained. The significant fact is that fluctuations of load introduce the need for a clutch to disengage the engine from the transmission; this results in momentary interruptions of the drive and probably a sudden take-up of power on re-engagement. Its use also requires a certain dexterity and constant attention on the part of the operator.

A further disadvantage of the mechanical converter concerns the amount by which attainable efficiencies depart from the ideal line already mentioned. An engine operates most efficiently at only one condition for any of the transmission ratios and any change in land or engine speed will cause the engine to depart from the optimum point.

These disadvantages can be overcome by the use of a fluid to transmit the drive from an engine. A hydraulic transmission system relies on the fact that kinetic energy may be imparted by the drive shaft to the fluid and that this energy may then be reconverted to mechanical energy and used to drive the output shaft.

It is appropriate first of all to consider the simple fluid coupling, which utilises this hydro-kinetic principle to transmit torque. A fluid coupling consists of two similar bowl-shaped members, each of which contains a number of radial vanes that divide it into compartments shaped like the portions of an orange. The members are mounted coaxially face to face, one on the engine shaft and one on the driven shaft, and are enclosed in an oil-tight container. The container is completely or partially filled with oil, which forms the only connection between the input and output members. The two members are known as the pump and turbine respectively.

When a drive is applied to the pump its rotation causes the oil in the compartments to be thrown outwards by the centrifugal force acting on it. The oil is guided by the vanes on its outward path and then deflected by the configuration of the outer part of the member until the radial component of its velocity becomes an axial one. The oil is thus directed towards the turbine and, having also a strong tangential velocity component, it strikes the faces of the turbine vanes. In this way, the kinetic energy of the oil is reconverted into useful mechanical work by causing the turbine to rotate. The oil then flows inwards and back to the pump, whence it is recirculated.

The fluid coupling closely resembles the hydraulic torque converter without, however, actually being one. When the turbine is runing at a speed which is close to that of the pump, the coupling is transmitting the engine torque very efficiently, but multiplication of the torque is impossible because the coupling has no reaction member. In a torque converter this reaction member is normally supplied in the form of a row of stator blades.

The essential elements of a hydraulic torque converter are therefore: the pump and turbine, which are the input and output members respectively, the fluid which couples them together and the necessary reaction member. The SRM range includes a simple basic transmission of this type, having two turbine stages and one stator stage.

It will be seen that the curve follows closely the ideal line throughout much of the middle range of speed ratios but falls away at each extreme. Now it is convenient to assume that the engine input speed and torque remain constant, so that the speed ratio becomes a direct measure of road or rail speed and varies with the load. An increase in the load, therefore, will cause a decrease in speed which is compensated for by the increase in the torque multiplication achieved. The hydraulic transmission is thus a reduction gear having an infinite number of speed ratios, at each of which the maximum power of the engine is, in general, being used.

The hydraulic torque converter has therefore a number of clear advantages over the mechanical transmission. In the first place its operating line, at least over the middle speed range, remains consistently close to the ideal line and is automatically adjusted to the requirements of the vehicle; this could be emulated by a conventional gearbox only if the number of available speed ratios were large—seven or eight at least. Such a large number of speed ratios would create quite a serious practical difficulty in operating the engine at its optimum point for any vehicle speed.

By virtue of its great flexibility, the hydraulic transmission is able to cope with rapid fluctuations of load without introducing the necessity of changing gear. However, a simple transmission as described above operates most efficiently in the medium speed range. It is evident that when the speed ratio reaches a value a little below 0.8 the torque ratio has fallen to unity and any further increase in output speed results in a very rapid decrease in efficiency. At the other end of the range, when there is a large difference in the input and output speeds, the torque ratio curve attains a maximum value of about 4 : 1. It is in this lower range, representing heavy loads on the output side of the transmission, that the greatest torque demands have to be met.

The transmissions now being manufactured by Bristol Siddeley include additional features by which these difficulties are overcome. For optimum performance in the high-speed range a direct drive is provided by a multi-plate friction clutch which is engaged when the output speed has reached the point where torque multiplication is no longer being achieved. Once engaged, the drive maintains the transmission efficiency at the extremely high figure of 98 per cent.

For applications where it is especially desirable to obtain a high torque multiplication in the lower speed range a particularly elegant solution is employed in some models. In these, as in all the transmissions of the series, there are three rows of blades, the second row normally being the stators. In the high torque multiplication transmissions this row of blades is connected to the sun gear of an epicyclic reduction unit, the internal gear of which is splined to the output shaft. A pair of independently operating brake bands around the epicyclic unit enable either the sun gear or the planet carrier, or both, to be held stationary when desired.

In the medium speed range, the sun gear is retained by one of the brakes and the second row of blades act as stators. When the load increases and the output speed falls below a predetermined value, the sun gear is released and the planet carrier is held by the other brake. The blades of the second row now rotate in the opposite direction to the first and third row blades. The torque absorbed by the second row blades is reversed in direction through the epicyclic unit and fed into the output shaft, thus increasing the torque produced by the first and third rows alone.

It may perhaps not be immediately apparent that although the stator blades no longer form the reaction member during low-speed operation, torque multiplication is still possible. The reason is that the planet carrier, which is held stationary, now becomes the necessary reaction member.

The multi-plate clutch, for direct drive at high speeds, may also be incorporated in transmissions of this type, thus providing optimum conditions for operation in all three speed ranges. In this case, when the clutch is engaged at high speeds, both brake bands are released and there is no reaction member. Such a member is obviously unnecessary, however, since no torque multiplication would be taking place, the transmission now acting in effect as a solid flywheel. In this model, the change from one operating range to another is entirely automatic.

A feature of this series of hydraulic transmissions which is probably unique is that hydraulic braking may be achieved with direct gear engaged by allowing the second row of blades to rotate against the rest of the system. Continuous braking of up to 30 per cent of maximum input power can be obtained, thus relieving the vehicle brakes of a large part of the duty.

A hydro-static clutch may be used to operate in series with the direct drive clutch and so to provide a full hydraulic drive when direct drive is engaged. Another feature is that free-wheeling action is possible by releasing the direct drive and allowing the engine to run at its idling speed. Smooth re-engagement can be obtained when required.

There is great scope for the use of hydraulic transmissions in all kinds of traction vehicles, where frequent changes in load are encountered and where ease of operation is as attractive to the driver as a smooth ride to the passenger. Bristol Siddeley can offer transmissions to suit the requirements of high, medium and low speed operation over a wide range of powers.

(By Courtesy: Bristol Siddeley Journal)

Facilitating Movement of Oil from Assam

The Deputy Minister of Railways, Shri Shah Nawaz Khan, informed the Rajya Sabha during question hour on 29th November 1960 that the construction of a new broad gauge line from Khejuriaghat to Malda was nearing completion and its further extension up to Siliguri was likely to be completed some time next year, depending upon receipt of permanent way materials.

Replying to further questions, Shri Shah Nawaz Khan said that it was not a fact that a new alignment between Khejuriaghat and Siliguri had been made abandoning the old one. He added that the project had been undertaken to develop capacity for movement of oil from Assam. Incidentally, the new route was expected to be shortened by about 14 miles than the existing one via Sakrigalighat-Maniharighat.

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 50 nP. 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 25 nP. 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)

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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.

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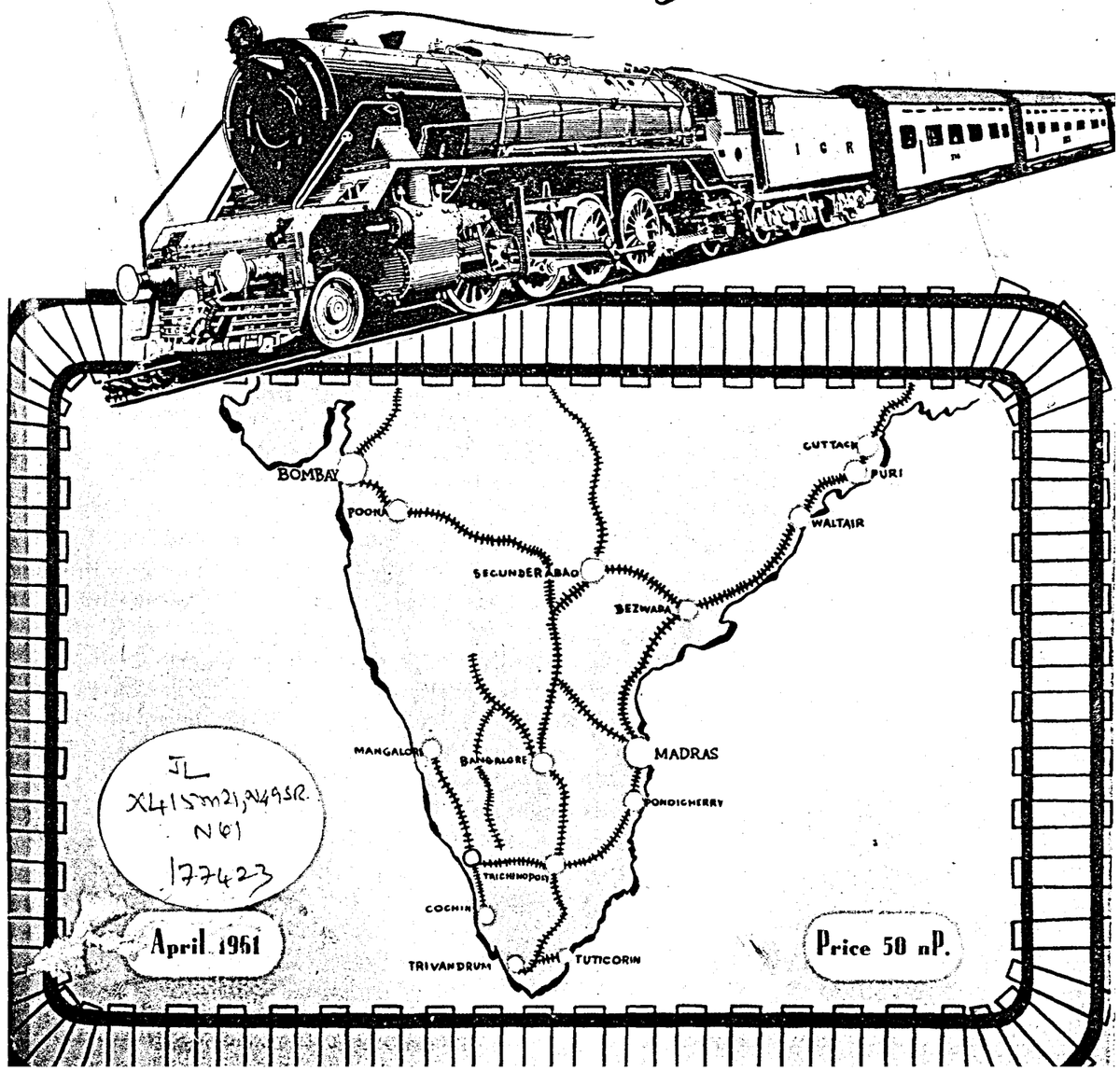

April 1961

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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.

By handling in the *exact fare in good coins or currency* you get the ticket easier and quicker, and save for yourself and the Booking Clerk time and trouble.

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)

CLAIMS SUPPLEMENT

CONTENTS

Our Circular Letter

We happened to send recently a *Circular Letter* to many of our clientele. We reproduce the same here for the benefit of those who have not received it :

"Our Magazine, SOUTHERN RAILWAYS MAGAZINE, is 12 years old. All these years we have been serving Railways and Rail-Users to the best of our ability and resources, and have won public approbation and patronage in a fair measure.

2. We have brought out several *Supplements* for the Magazine periodically, but never a CLAIMS SUPPLEMENT hitherto. The demand for a CLAIMS SUPPLEMENT from our Readers has become insistent. They add that it must be of *practical utility* to them in their *day-to-day Claims Problems.*

3. We therefore now propose to bring out a CLAIMS SUPPLEMENT to our Magazine in response to requests from our Readers and Clients, mostly men of trade, Commerce and Industry.

4. For the present it will be a QUARTERLY published in January, April, July and October of each year, the first of the series coming out in April 1961.

5. The language adopted is English, now virtually the common language of India. It is not practicable, as you can easily see, to have the SUPPLEMENT done in all the languages of India. But we have vowed that the English style adopted shall be the simplest suited to the subject——such as can be understood by the bulk of our people engaged in Trade, Transport, Commerce and Industry.

6. The surprising ignorance of their rights and duties under the provisions of the Railway Act and other allied or relevant Acts, as also of Claims Procedures, Rules and Regulations, on the part of the average run of both Transporters and Transports-Users in this country is our main justification for this new creation.

7. The end and aim of this SUPPLEMENT is to serve the needs of the Carrier as well as the Carried, the Transporter as well as Transport-User, whether the carriage be on land, air or water ; to remove ignorance, to educate, to create a knowing clientele for the Carriers, to create responsible carriers for the public and generally aim at the attainment of a claim-less state of harmony, throwing our entire weight on the rooting out of the causes of claims.

8. The subscription for this SUPPLEMENT is fixed specially low (Rs. 2/- per year), so that every Merchant, Commission Agent, Trader, Carrier or Industrialist, however high or low his status, may subscribe for and get a copy for study, reference and/or record. It will contain, we expect, very useful matter for both the Carrier and the Carried, even for current problems on hand.

9. The pages of the SUPPLEMENT are open to both the CLAIMANTS and the CARRIERS for news and views bearing on claims-matters, and to ADVERTISERS needing contacts with TRADE, TRANSPORT, COMMERCE and INDUSTRY all over India. Articles of value to the Community we cater for are invited. The CORRESPONDENCE COLUMN and the QUESTION BOX will be additional features.

10. We appeal to you to become *subscribers* as well as *Advertisers*, and persuade your friends also to do likewise.

11. *Advertisements* are essentially needed in these hard days to make the journal live—live long and serve well. We are eager to serve you all—do please help us to serve you, long and truly and well.

12. Your quick response will certainly encourage us. Farewell.

EDITOR

On this CLAIMS SUPPLEMENT

As far as we know there is no journal of this kind in the whole of India. There may be a few Railway Magazines here and there dealing with high subjects connected with Railway Engineering, Signalling, Operation (Train-running), Railway Accounts and Auditing, or even Railway Commercial Working, none of which is likely to be helpful for the community of readers, which we have in view ; none of which is likely to help the average Trader, Merchant, Commission Agent, Exporter, Importer, Industrialist or Commercial Man in his day-to-day Transport Problems or in his rights to get from his Carrier *compensation* for shortage, breakage, damage, etc. of his goods or parcels, caused by the Carrier, or *refund* of the excess freight charges, demurrage, wharfage, etc. collected by the Carrier by mistake or otherwise. Most of the people use transport of some kind or other. Most of the transport-users have at some time or other to claim on their Carriers either a *refund* or a *compensation.* There are Rules, Regulations, Procedures, Laws, etc. pertaining to these. Most of the common transport-users are ignorant of these. Just as they are ignorant of their rights and ignorant of how to get those rights met, so also are they ignorant of their duties by their Carriers, who often find it difficult to carry on with an unknowing clientele. Rules and Regulations, Procedures and Laws, are intended as much for observance by the transport-users as by the transporters. A perfect Transporter and a perfect Transport-User will certainly lead to the happy state of "NO CLAIMS". It may be an Utopian Ideal hard of attainment ; but yet it is up to us all (of both categories) to aim at and work for the attainment of that Ideal. This SUPPLEMENT is therefore intended to be a DEPENDABLE GUIDE AND COMPANION to all those who use transport on their rightful claims on the Carriers, as well as those who are engaged in transport to help them to avert claims and their causes.

We have come forward with a vow to serve you all. But the servant's vow to serve is not all. We want masters who need our services. And the huge body of transport-users in this country are our masters. So, we request you all to patronise us—you all, those who buy transport, and those who sell transport.

EDITOR.

IRON ORE EXTRACTION STARTS AT BIGGEST SOVIET MINE

A powerful blast which blew up thousands of tons of iron ore marked the beginning of the operation of the first section of the Soviet Union's largest Sarbaisk mine at the Sokolovsko-Sarbaisk ore dressing combine, Kazakhstan. The annual capacity of the first section of the new gigantic quarry is 15,00,000 tons of raw ore. The annual capacity of another—Sokolovsky—quarry of the same combine which is already in operation is 50,00,000 tons of raw ore.

Some Fundamentals — Defined or Explained

1. TRAFFIC—Whatever is carried for a consideration (fee) by a professional Carrier. The Railway considers it as composed of COACHING TRAFFIC and GOODS TRAFFIC.

(a) *Coaching Traffic.*— Passengers, Parcels and Animals, that are carried by Passenger Trains or Special Parcel Trains.

(b) *Goods Traffic.*— Goods of all kinds and Animals carried by Goods Trains.

N.B. Coaching Traffic is rated higher than Goods Traffic, because of the faster and better service afforded by the Passenger Trains. But on certain sections the Railways run Mixed Trains, which carry all kinds of traffic, owing to scarcity or poor traffic offering over that section.

2. CARRIAGE—may be over land, sea, or air. Overland carriage may be by road or rail. The different modes of carriage are:

(a) Roadways or Motor-Services by buses or lorries.

(b) Railways—Steam Trains, Electric Trains, Motor-Coaches.

(c) Shipping Companies—Steam Ships, Motor Ships, etc.

(d) Air-lines.

N.B. The Postal Dept. also carries for the public small packages with limitations.

3. FREIGHT—is the charge, fee or consideration paid to the carriers for their service. It usually defends on *Weight, Volume (Size), Number of Articles, Distance*, etc.

(a) *Weight*—used to be in Bengal Maunds, but now is in terms of Grams, Kilograms, Quintals, etc.

(b) *Volume*—used to be in Cubic Feet, but is now in terms of Cubic Centimeter, Litre, etc.

(c) *Distance*—used to be in miles, furlongs, feet, yards, etc., but is now in terms of metres, kilo-metres, etc.

N.B. Every one must now possess a copy of the Tables of the new units or a copy of the book of Conversion Tables, published by the Govt. of India.

Each Transport-User must be able to make his own calculations of the required *Passenger Fare, Parcel or Luggage Charges, Goods Freight Charges, Demurrage or Wharfage Charges*, and the like, so that he may check up if he has been charged correctly or more or less. If charged more, he may have to ask for refund; and if charged less, he may keep ready to pay the balance on demand.

To do so, one must know the distance between any two given points, and the basis of each kind of charges. The Railways have published and sell to the public DISTANCE TABLES and TARIFFS (both COACHING and GOODS). It will be profitable for large-scale users of transport to possess and use these books frequently. One should be careful in using only current editions of the books.

As the same rules, rates, and conditions are adopted by all the Railway Systems in India, the Tariffs are common to all the Railways, and are published by the Association of Railways (known as the INDIAN RAILWAYS CONFERENCE ASSOCIATION, Head Quarters—NEW DELHI—who may also supply the Rule Books in question). They also publish a *Railway Map* of India and a complete list of all railway stations in India, known as the ALPHABETICAL LIST OF STATIONS. Copies of these two also will be of great help.

Changes of the old, removal of the old or introduction of the new, often take place on the railways, which are also notified to the public through their *Rate-Advices* or *Rate-Circulars*, which also may be subscribed by the large-scale transport-users, with advantage.

OR one may ask for the required information from the Chief Commercial Superintendent of the Railway concerned.

4. RISKS.— Traffic is booked either at RAILWAY RISK or at OWNERS' RISK (RR or OR). The symbol 'RR' sometimes stands for *Railway Risk* and sometimes for the RAIL-RECEIPT. *Freight Rate* is slightly higher for carriage under *Railway Risk* than for carriage under *Owners' Risk*. It is safer to book under *Railway Risk* than under *Owners' Risk*.

5. CONDITIONS—With the sanction and authority of the Acts concerned, certain conditions have been prescribed for the packing of different commodities, with which the Owners have to comply. They are called PACKING CONDITIONS. They are about 30 in number and are indicated in Tariffs thus: P/25 (Letter P/ followed by a Number). Besides these there are certain Special Conditions applicable to certain specific commodities; they are also about 30 in Number, and are indicated in Tariffs thus: S/29 (Letter S/ followed by a number). These conditions are devised in the best interests of the consignments and their owners; the Consignors' must feel it their duty to co-operate with the Railways and comply with them. We will rever to this when dealing with Section 74-A of the Indian Railways Act.

6. CONTRACTS with Railways and other Carriers—When a Passenger buys a Ticket (a simple process ndeed), what actually happens is that a Contract of Carriage is struck between the Passenger and the Carrier, though unwritten and unsigned, the terms of which can be assumed to be that

(a) the Carrier shall give to the Passenger a SAFE, QUICK, COMFORTABLE lift or transport or carriage from the station at which he booked himself (i.e. bought the ticket) to the destination station (for which he bought the ticket, paid for, and shown on the ticket) by the route agreed upon and shown on the ticket. The contracting parties here are (i) the Carrier and (ii) the Passenger.

(b) the passenger shall obey and conform to all the rules and regulations of the Carriers, and conduct himself with average prudence and gentlemanliness all through the journey.

Similarly, when a Parcel or a Consignment of Goods or Animals is booked at a station and a

You are invited

We invite you to contribute articles for publication in our *Magazine* or in our *Claims Supplement*. Matters of general transport interest will go into the *Magazine*, and matters of special interest on claims will go into our *Claims Supplement*. Articles of merit from a constructive angle are requested.

You are also invited to write *Letters to the Editor* for our *Correspondence Column*.

You are also invited to use the *Question Box*; your questions will be answered through the columns of our *Supplement*, so that others also like you may benefit.

You are also invited to advertise your *Goods* and *Services* in our pages and get contact with people you want.

EDITOR

RAILWAY RECEIPT or other CARRIERS' RECEIPT is taken, what actually takes place is a CONTRACT between the SENDER (or CONSIGNOR) on the one part *and* the RAILWAY or other CARRIER on the other part, though the written Deed of Agreement be absent. By this Contract, the Railway or Carrier is bound to (a) carry *safely*, (without injuring the consignment in any manner) and *within reasonable time* the parcel, goods or animals to the destination stipulated, and (b) deliver the consignment to the *person authorised* or stipulated on the RECEIPT. It is therefore implied that the Carrier shall afford to the Consignment all necessary and reasonable protection and safe-guards, and shall remove all possible cause of loss of or injury to the Consignment.

The Sender shall comply with all the *conditions of booking*, the Packing conditions and Special Conditions, if any, stipulated, according to the RISK at which he seeks booking, and shall tender his consignment in sound condition too.

The terms of the Contract, which the Sender enters into, are normally binding on the Consignee also. If the liability or responsibility of the Railway or other Carrier is limited with the consent of the Sender (which fact will be found recorded by the Sender in the FORWARDING or CONSIGNMENT NOTE executed by the Sender and tendered with the Consignment to the Carrier, which fact will be found recorded by the Railway or Carrier on the RECEIPT issued in identical terms), then the Consignee must be content with that limited liability on the part of the Carriers and cannot demand more of the Carriers.

Strictly speaking, here there are THREE parties to the Contract, though only TWO actually create it :—

(a) the SENDER or CONSIGNOR, who tenders the consignment for carriage at the Forwarding End, and who is the Owner until the contract is struck, i. e. the RECEIPT is issued by the Carriers;

(b) the CARRIERS, who undertake the satisfactory carriage or transport (viz. the Railway, or the Lorry-Service, or the Shipping Co., or the Air-Line Co.); and

(c) the CONSIGNEE (the person to whom consigned, who under law becomes the Owner after the issue of the Receipt.

The SENDER and the CONSIGNEE often go together under the common name of OWNER; and it may be said that the Contract is between the OWNERS and the CARRIERS. Under law the SENDER commits the CONSIGNEE also to the Contract and its terms. The Consignee inherits from the Sender only the rights of the Sender, nothing more; for, the Sender cannot give the Consignee what he does not possess. So, it is the Sender that has to be very careful; he is the initiator of the Contract; his agreement with the Carrier becomes automatically binding on the Consignee. So, before ordering for goods the Consignee must instruct his Sender clearly and suitably what nature of Contract with the Carriers he may enter into.

7. LAWS OF CARRIAGE—The *conduct* of the three parties, as well as their *Rights* and *Duties* are described in, regulated and controlled by, and adjudicated upon by Law Courts according to, certain Acts Of Laws, such as THE CARRIERS' ACT, THE INDIAN RAILWAYS ACT, THE CONTRACT ACT, and certain sections of other relevant Acts.

—(To be continued)

MINIMISING TRANSIT DELAYS—ZONAL RAILWAYS TO SET UP COMMITTEES

The Deputy Minister for Railways, Shri S. V. Ramaswamy, said in the Lok Sabha on 18th November 1960, that a standing committee of two officers from the operating and commercial departments would be set up on each of the eight Zonal Railways to deal with matters arising out of transit delays in parcels and goods traffic.

Shri Ramaswamy, who was replying to a question of Shri Sanganna, said that the committee was to consist of two senior scale officers, one from the operating and the other from the commercial branches of each Railway.

The Deputy Minister added that *inter alia* the committee was required to review the period of passage of consignments on the various sections and take steps for improvement as might be necessary and further ensure that the steps taken were regularly and correctly enforced.

What is a CLAIM?

1. What is a CLAIM?

A claim is a *written demand* on a Railway or other Carrier for *Compensation* or *Refund*, of a *specified amount*.

1. *Compensation* for loss, damage, breakage, shortage, deterioration, destruction, etc. of parcels, goods, or animals entrusted to the Railways or other carriers for carriage.
2. *Refund* of Excess Freight charges (called 'Overcharge'), Demurrage, Wharfage, etc. considered unjust, in respect of parcels, goods or animals entrusted to the Carriers for carriage. Also refund of Excess Fares and Excess charges or Luggage, in respect of passengers and their luggage.

N. B. Note that the claim must be a *written or typewritten* one and *signed by the proper person or authority*.

2. When should the claim be preferred?

On Railways a claim must be made *within 6 months from the date of booking*, i. e. within 6 months of the date of issue of the Railway Receipt. This is fixed by Law. It is so laid down in Section 77 of the Indian Railways Act, which reads thus :—

"77. *Notification of claims to refunds of overcharges and to compensation for losses.*— A person shall not be entitled to a refund of an overcharge in respect of animals or goods carried by railway or to compensation for the loss, destruction or deterioration of animals or goods delivered to be so carried, unless his claim to the refund or compensation has been preferred *in writing* by him or on his behalf to the *railway administration within six months from the date of delivery of the animal or goods for carriage by railway*."

Note the underlined words. The claim must be *in writing*, to the *Railway Administration*, and *within six months* of the *date of delivery for carriage*.

Date of delivery to the railway for carriage *means* the date on which the animals or goods are entrusted to the Railway at the forwarding station for carriage, i. e. *the date of booking*. The date in question is *not* the date of delivery of the animals or goods by the railway to the consignee at destination, as is mistakenly understood by some people.

For example, if a consignment is booked and receipted on 10/4/1961 at the forwarding station A, and delivered to the consignee at the destination station B on 8/5/1961, the six months, within which the claim must be made, begin from 10/4/61 and not from 8/5/61. The claim must reach the Railway Administration on or before 9/10/61.

One should not wait until the last date; it is advisable to send it well in advance of the last date.

This Section must be strictly obeyed. Suits have been summarily rejected for failure to comply with this Section. Several High Courts have strictly stuck to this Section. Claims made after 6 months from the DATE OF BOOKING have been held invalid and cannot bind the Railway. Railway Administrations can repudiate, have repudiated, and will repudiate such belated claims without any other consideration.

3. How to serve a notice of claim on railway and on whom?

The claim-letter (i. e. the first demand in writing) should be sent per REGISTERED POST—ACKNOWLEDGEMENT DUE to the General Manager of the Railway, or to the Chief Commercial Superintendent (Claims) of the Railway, preferably to the former. The law governing this is Section 140, Indian Railways Act :—

"140. *Service of notices on railway administrations.*— Any notice or other document required or authorised by this Act to be served on a Railway Administration may be served
in the case of a railway

administered by the Government or a State, on the manager, and

in the case of a railway administered by a railway company,	on the Agent in India of the railway company—

(a) by delivering the notice or other document to the Manager or Agent; or

(b) by leaving it at his office; or

(c) by forwarding it *by post* in a *prepaid letter* addressed to the Manager or Agent at his office and registered under Part III of the Indian Post Office Act."

Strictly speaking, the claim notice must be served on the General Manager in such a manner as not to leave its receipt or its date of receipt a matter in doubt or dispute. Hence, it is essential to secure a dated acknowledgement for its receipt, and keep it safe for use when a suit becomes necessary.

But the Railway Administrations have agreed that they will not consider as defective notice, if the notice is served within the time-limit on their Chief Commercial Superintendents, who normally deal with claims, and who have been authorised by their General Managers to receive and acknowledge such claim notices.

Hence claims may be preferred either on the General Manager or the Chief Commercial Superintendent of the railway concerned. But the *first claim letter, with full details of the case, must be sent per Registered Post/AD* (the surest and safest of the three methods of service mentioned in the section) *so as to reach that Officer within the time-limit prescribed.* The AD must be received kept securely.

(to be continued)

SPECIMEN OF
A CLAIM LETTER FROM A MERCHANT TO A RAILWAY

REGD./AD.

Dear Sir,

Claim—Section 77, Railway Act

Re: Inv./PWB. No..... dated..... from Station A.. to Station B..

No. of packages..... commodity.....

Para. 1—stating the merchant's title to claim.

I am the consignee (*or* We are the consignees) who took delivery of the above consignment at station B, under Cash Receipt No..... of date.....

OR

Mr. or Messrs. So and So, who took delivery of the above consignment of the above consignment at station B, under Cash Receipt No..... of date..... have relinquished their Rights of Claims on the consignment in my (or our) favour. His (or their) Letter of Authority and Relinquishment is enclosed herewith.

Para. 2—stating the discrepancy or cause of claim (loss, damage injury, breakage, shortage, destruction, deterioration, or whatever it is.) with full details.

Mention "only so many packages delivered against so many as per receipt. Reweight so and so against so and so. Copy of shortage certificate attached" etc.

Or

Mention "so many packages damaged by breakage or water or oil—Open delivery effected by So and so—copy of Certificate of Damage attached.

Or

Mention "the consignment was delivered so many months late, only on date..... instead of about date....., having taken ..... time of transit instead of the usual and normal time of ..... during which interval, such and such deterioration or fall in price has taken place, etc."

Para. 3—Stating actual amount of compensation due and showing how the figure was arrived at.

Para. 4—Special reasons showing why the Railway should accept liability, such as "Booked at Railway Risk", "complied with all conditions of booking, S/29, L and U, P/25, Clear Rail Receipt, etc.

Para. 5—Conclude with a request for early enquiries necessary and payment.

Beejuck/puttial enclosed.

Yours faithfully,

signature

COAL SUPPLIES TO RAILWAYS

The Deputy Minister of Railways, Shri S. V. Ramaswamy, said in a written reply to a question by Shri Harish Chandra Mathur in the Lok Sabbha on November 15, 1960, that the overall loco coal stock position had improved to the extent that stocks had gone up from 6.0 days' consumption on June 1, 1960, to 11.2 days' consumption on October 31, 1960. Some improvement had also been made in the quality of coal supplied.

The Deputy Minister said that with a view to improve and ensure supply of right type of coal, a new organisation for coal inspection had been set up in the B & B coal-fields and Railway inspection introduced from August 10, 1960, for coal received from the public sector collieries situated in Karanpura and Bokaro coalfields. Similar inspection was proposed to be extended shortly to the coal coming from collieries in the private sector.

Asked as to what saving Railways estimated thereby annually and this year, the Deputy Minister said: "It is difficult to make any reasonable correct estimate of savings on account of this factor."

QUESTION BOX

Chandra Trading Co., Tiruchirapalli
sends us the following question :—

A consignment of 220 bags sugar is booked for us from a North Indian Station. A clear Rail Receipt is sent to us through a Bank by the senders. At this end we find on unloading 75 bags wet and damaged to varying degrees. We hesitate to take delivery of the 75 bags, heavy loss on which is sure and certain. The consignment has been booked at *Railway Risk* with all conditions of the railways fulfilled by the senders. The Railway at destination offers to survey, assess the damage and issue a certificate. The offer is accepted. The assessment of the damage is accepted. According to the Certificate we make a claim on the destination railway. But the Railway repudiates the claim on the plea that the wagon was visually and jointly tested by the sender at the booking end and found water-tight, which fact also was confirmed by Wagon-Examining staff (?) at destination. Please examine this case for and on behalf of both the owners and the railways.

Answer

It is not possible to give a final verdict on this case without more details, which the owners cannot furnish, but are known only to the railways, because of their privileged position as the carriers of the consignment.

So, get full particulars of passage or carriage from the Railway. There may have been transhipment en route either due to break of gauge or wagon going sick. It was the original wagon that underwent the famous visual test and found water-tight. The subsequent wagons were the railways' own choice. The particulars of passage, if furnished, will show where and how the damage occurred.

Damage to such a large number of bags as 75 could not have taken place, except and unless the wagon was defective, for which definitely the railways are responsible. The visual test is BIG BLUFF. So also the confirmatory test at destination unreliable. For, simultaneously with carriage of the consignment, there has taken place a GREAT TEST of the wagon, the SUGAR-TEST, than which there is no better test. The wagon did not survive the SUGAR-TEST, which has betrayed its real nature.

Above all, you did not want your sugar to be carried in such and such a particular wagon. Of what concern is it to you the particular wagon in question. You only wanted your sugar bags to be transported from station A to station B. The wagon, its choice, its virtues, etc. are all of no concern to you, but are the domestic concern of the railways. You are just acustomer of the Railways, even as a Boarder is the customer of a Hotel. What does the Boarder care for how the food is cooked in the kitchen, what vessel of what make the hotel uses in his kitchen, whether he cooks on firewood, or on kerosene stoves, and the like details. The Boarder is concerned only with the fare (food) served on his table. The fare must be the full worth of his money. Even so, you pay full freight, not for the any-how carriage of your goods, but for the safe, sound and undamaged carriage of your goods. Carry the Railway may in any manner it pleases, in any wagon it pleases. Your goods must be carried safe, sound, and delivered in due time.

Having booked at RAILWAY RISK, the Railway has no choice but to pay the compensation either according to the Certificate that the railway itself has issued or according to your accounts of purchase and sale of this consignment, if the certificate issued by the railway has been rather too conservative and does not compensate you adequately.

The Railway so "kindly" invited the Sender to share in the process of visual test of wagon at the forwarding end. Did the Railway invite you the Consignee at the Destination end to share in the Wagon test at the destination? No — why not? When were you first told of the wagon test at destination? Only in the repudiation letter that came to you some months later? So, you throw overboard the so-called tests.

But if the Railway can prove and establish that at the Booking end itself these 75 bags were already in a damaged condition, then the case takes on a new appearance. The Railway must take action against the senders.

CLAIMS ON CARRIERS

IT is sometimes said that the Police is a necessary evil. Because, if all the people in a State are honest and virtuous, there will be no need for the police at all. So also it may be said with equal truth that Claims on Carriers is a necessary evil. For, if all the three parties to a consignment do their duties correctly, cautiously and carefully, with forethought and suitable action to prevent mishaps, there may not arise any claim on the Carriers at all. (The three parties to a consignment are (1) the Consignor or Sender, (2) the Carrier, and (3) the Consignee or he who takes delivery at destination under proper authorisation.) But all the three parties, being only humans or human organisations—and imperfect humans at that—slips and mistakes, omissions and commissions, often occur and lead to loss of different kinds. These slips and mistakes, omissions and commissions may be on the part of one or more of the three parties. With earnest and sincere efforts, supplemented by knowledge and experience and forethought, these slips and mistakes, omissions and commissions can be reduced in number and gravity; with continued efforts minimised, and in due course can also be completely eliminated. All the three parties must have the will and desire to achieve this object.

When a loss occurs, such as damage, breakage, or shortage, each party tries to shove the responsibility or the authorship of the slip or mistake or omission or commission on to either of the other two. More often, the Consignor and the Consignee (who together go by the common name of OWNERS) shove the responsibility on the Carrier; not that the Carrier is always free from blame. The point is that one should have the courage to own up his slip or mistake, omission or commission, and be prepared to suffer the penalty. The maximum penalty may be only a matter of a few rupees, for the sake of which one should not forsake or sacrifice the great principles of life, such as Truth, Honesty, Justice, Fairplay (or call it what you like). One should protect his principles at any cost. When it is definitely known that the Sender has been at fault, no claim should be preferred against the Carrier, the Sender and the Consignee must settle up their differences amongst—themselves, if possible, or call in the Carriers for help, because the contract of the particular carriage was entered into between the Sender and the Carrier. Similarly, if it is definitely known that the Carrier has been at fault—this may not be known for certain by the Sender and the Consignee, but will be definitely known to the Carrier—the Carrier must own it up without any unnecessary wrangle and pay up the compensation or refund. Thereby, the Carrier not only sets a model and example for the others, but also enhances his dignity and prestige a hundred fold.

The Government of every country have legislated on the Rights and Duties of each of these three parties, such as the Carriers' Act, the Railway Act, as also some of the sections of other allied Acts, such as the Contract Act, the Limitation Act, etc. to regulate control and adjudicate (in case of disputes) on the transactions of carriage between these three parties. Many sections of these Acts, especially the Carriers' Act and the Railway Act have large bearing on Claims Matters.

Amist the vast community of our people engaged in Trade, Commerce and Industry, who have of necessity to make wide use of Carriers and Transport Systems, there is such a lot of ignorance or lack of fair-mindedness as to their Rights and Duties under the laws relating to carriage, that they often blunder in their claims and lose their just and good cases, or fight over rights that just do not exist under law, or allow losses to overtake them by mere lapses and inaction. Instances have been very rare where the vast clientele of the Railway in this part of the country have proffered their hand of cooperation to the Railway to check the evil of claims; nor does it appear that the Railway has earnestly sought it. An ignorant clientele is a stumbling block for Railways and other Carriers. A knowing clientele is on the other hand a very valuable asset to the Railways and other Carriers. Ignorance and lack of fair-mindedness also exists amongst the Carriers and their staff. Knowledge and Character are alone the keys to ward off all kinds of loss, and to avert claims no Carriers. Those who sell transport and those who buy transport must both have the ambition to work for and attain a better-ordered society, in which no man shall lose through the mistake of another, and there shall be no claim.

The Teacher rich in his knowledge of his subject and in his capacity to teach is automatically respected

by his students, even by the rowdy element in the class, but the teacher whose knowledge is shallow or whose teaching capacity is poor, is pooh-poohed, hissed and hooted out of the class. That is because students and children have an instinctive regard and reverence for knowledge and ability. So also with a Railway or other Carrier. If the transport manufactured and supplied to the country is of a poor quality, there is scant regard or respect for that Carrier. The quality of the transport offered certainly counts. The transport offered for sale must be SAFE, QUICK, COMFORTABLE and CHEAP for men and goods—SAFETY FIRST. There is this difference between a shop-keeper or Manufacturer of a consumable article *and* a Railway or Manufacturer of Transport. If one brand of goods is not satisfactory, one can go to another shop or manufacturer and get another brand of the same article. But in the case of the Railway, they hold the monopoly of rail transport; there is no alternative rail transport system, to which one can switch over. Whether I like or no, I have to use the only existing rail-transport system; hence all the greater need that the rail transport offered is of the very best kind. There must be no pilferage or theft in transit; there must be careful and cautious handling of goods, not resulting in damage or breakage; the wagons must be sound and really water-tight, not merely labelled W. T. several years ago, but not obliterated yet; there must be punctuality of trains, as men have to keep up engagements, esp. marriages, ceremonies, deaths, attendance at sick-beds, Court-Cases etc.; and above all there must be prompt and honest settlements and payments of Claims. These keep traffic to the rail; their opposites drive away traffic or crush it out of existence. Speaking of punctuality, one naturally remembers a Motor Bus Service now in full vigour in the South, by whose services many people on their routes set their watches to time, whose servants are courtesy and solicitousness incarnate; people deliberately miss other buses and prefer to wait for the buses of this particular service.

The Claims Office is akin to a Hospital. Just as the sick and the wounded go the hospital, even so the man whose goods have been injured goes to the Claims Office. A country's Health is to be judged by the number of hospitals and the number of beds in each; so also the efficiency of a Railway or Transport Undertaking is to be gauged by the number and strength of its Claims Offices and the number of Cases of claims dealt with per year, or the amount of money shelled out in a year. One Miss Mayo of the west some years ago visited our Hospitals, especially the venereal wards and assessed not only our physical health, but also our mental and moral health in her book named *Slaves of the Gods*, which became most controversial at the time and drew forth waves of protests and counter-books, *Mother India*, Father India, and so on. No Miss Mayo has ever come forward as yet to visit our Claims Hospitals with its Accident-Wards, Refund-Wards, Compensation-Wards, etc. and assess the worth of our transportation Health.

But we hear and read more frequently in papers about the Revision (most often enhancement) of Rates and Fares, and of the huge drain caused by ticketless travelling; rarely if ever on the analysis of claims—the various causes, the amounts involved, the nature of cases, etc. Perhaps because the former relates to methods by which incomes can be doubled or the cancer is with the public. The carriers' defects are not publicised. This does not mean that we or anybody condone the evil of ticketless travelling; it is much worse than the negligence or misconduct on the part of the Carriers which lead to payment from the public exchequers. Both have to be stopped with an iron hand—both Ticketless Travelling on the part of the public and Negligence or Misconduct on the part of Carriers. Both lead to loss. One should view both alike.

There is a greater aspect of claims caused by Damage, Breakage and the like. Through somebody's carelessness suppose a Machinery is mishandled in transit and is broken, or that wagonload of rice or gram is damaged in transit by rainwater entering the leaky wagon used. If the Owner is compensated by the Carrier, of course the Carrier loses. If the Carrier refuses to compensate the Owner, then the Owner loses. Viewed from the larger angle, the Carrier and the Owner are but two different limbs of the same Society, of the Country, of the Nation. Was the loss a loss only to the Owner or the Carrier? No, the Nation has lost—it is a permanent loss to the Nation. The Nation has lost for ever that much of industrial capacity or potency which the broken machinery indicates, or that much of food of the hungry nation, which the wagonload of rice or gram indicates, an irrepairable or irreplaceable loss to the nation and consequent sufferring, at a time when we are straining every nerve to increase our output of food and industrial output. The causation of such a loss to the Nation is almost criminal. It is this view point of national loss that should enter into the thoughts of Carriers and their operatives.

A MERCHANT'S LAMENT

To

All Railways Concerned

Dear Sirs,

Your No.....of date.....

Our No.....of date.....

Inv./PWB. No.....dated — Ex: ..... To.....

No. of packages..... Stuff.....

YOU have already told us several times "the matter is under enquiry", "under reference with foreign railways concerned", "under special attention", and *so on and so forth*. It is exceedingly late and oppressingly slow on your part to deal with our claim case at this snail-pace—excuse us telling so. We request you again to please take more interest in, and pay more attention to, our claims case, and take such decisive steps as will result in quick finalisation.

2. The amount involved is a large slice of our capital, and we cannot afford to have it locked up away from us. Its function is to be in our business, and get turned over again and again, to our mutual benefits. You must certainly be knowing the effect of such delays. To start with the first offence,

(a) Defective carriage results in claims;

(b) Delayed payments of Refund or Compensation result in locking up capitals of merchants;

(c) Capital for turn over is restricted;

(d) Number of transactions by the merchants per year is reduced;

(e) Merchants lose business and profits; Railways get only less number of consignments to carry; Railways lose freights;

and a host of evil effects result in the chain of reactions set up by the initial defect or defective charge by the Railways.

3. For example, in this case Rs. 5000/- lost and therefore claimed, is a big part of our capital, which remains locked up with your railway for the last 5 years. Assuming we turn over this part of our capital 4 times a year, or 20 times in 5 years, we would have made 20 transactions of Rs. 5000/- each (or several transactions aggregating to a business volume of ONE LAKH) and paid to the Railway freight 20 times or more. First, our business has been crippled, for want of this part of our capital; secondly, we have lost business and profits, and you have lost freights, that would otherwise have come to both of us. And to that extent, the trade of India has suffered, in addition to the loss to the Nation of Rs. 5000/- goods, due to the defective carriage, which started the chain of losses.

4. May we therefore suggest that, apart from finalising this particular case quick, it be impressed upon all your staff that

(a) the importance of avoiding the first offence, viz. defective carriage; and

(b) the importance of quick disposal of claims—not at the expense of truth and justice—but without sacrifice of fairness and equity.

Yours faithfully,

Merchant Aggrieved

For the Column "Letters to the Editor"

ON a case of damage to a wagonload consignment of peas the Chief Commercial Superintendent writes:—

"..... The consignment in question was carried with all care and caution required under law." (*How much care, caution etc. is not known to us, but certainly it was as much as did damage the consignment in the nett result*)

"Besides the goods in question was received in a regular through wagon with both sides seals and rivets intact, and without interference en route. "(*Mr. Rainwater had no business or right to enter into a through wagon, had no business or right to enter sealed and/or rivetted wagons*!)

"Further, the wagon holding the subject consignment was also examined and certified as 'WATER-TIGHT' by the Train-Examining staff at destination." (*Readers, do not imagine that this examination was defective, the bags of peas must have damaged themselves—a case of suicide! It is India, the land of sanyasins, who torture their own flesh and self-immolate.!*)

"The alleged damaged bags in this case were found in the corners of the wagon, not near doorways. The bags near doorways were found sound and not damaged. This fact eliminates the possibility of water entering through door-crevices and damaging the contents inside corners of the wagon".

"There was no negligence or misconduct on the part of the Railway Administration or its servants." (*The wagon was water-proff and no railway servant ever brought bucketfuls of water aud splash it over the pea-bags.*)

"In the circumstances I regret your claim is inadmissible and therefore cannot be entertained."

N. B. The italics are ours.

Now, here is a perfect riddle—a tiger, a cow, and a bundle of green grass to be transported across the ferry; how is the ferryman to transport, if he can carry only one at a time, lest the boat should sink, and if (i) tiger and cow, or (ii) cow and grass should not be left together on the same bank for the obvious reason. Can any of your readers solve the riddles, esp. the railway riddle? A prize awaits him.

Achilles.

MOVEMENT OF TRAFFIC TO STEEL PLANTS

A new marshalling yard is being constructed at Bhilai at an approximate expenditure of Rs. 3,22,67,948 comprising the following facilities: (i) reception yard, (ii) classification yard with a hump, (iii) despatch yard, (iv) loco yard, (v) steam loco shed and (vi) exchange yard.

This information was given by the Deputy Minister of Railways, Shri S. V. Ramaswamy in a written answer to a question by Shri Ajit Singh Sarhadi in the Lok Sabha on 28th November, 1960.

Asked whether such yards were also being constructed at Durgapur and Rourkela, the Deputy Minister said that a marshalling yard at Bondamunda, about five miles east of Rourkela was being provided to deal with traffic to and from Rourkela Steel Plant.

Shri Ramaswamy added that the Durgapur Steel Plant would be served from the Andal yard which was being suitably remodelled. In addition, an exchange yard was being provided to the east of Andal yard to deal with traffic from and to the Durgapur Steel Plant.

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 50 nP. 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 25 nP. 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)

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