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

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

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

Tickets will be issued only if accommodation is available.

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

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(Inserted in the interests of Travelling Public by the Public Relations Officer, Southern Railways Magazine)

April 1956

SOUTHERN RAILWAYS MAGAZINE

1

Tyre Profile—its influence on the behaviour of a Locomotive

By M. S. Surma, Indian Railways Testing & Research Centre, Alambagh, Lucknow.

THE tyre profile has some influence on the stability of a locomotive. A good contour of the tyre raises the critical speed, at which instability in riding tends to appear.

Lot of literature, mathematical as well as descriptive is available on the subject, and the contributions of M/S. Davies, Carter and Cain are commendable. Mr. Nadal has dealt with the subject relating to the slope of the flange at the wheel. The formula, $\frac{1}{2} \sin \theta$ of analysis followed by him, has been found to suffer from a discrepancy, which has been removed by Mr. R. G. da Costa in his papers entitled "Riding of pacific locos" and "Notes on wheel flange profile".

The tyre profile may be divided into two sections.

- (i) Tread profile and
- (ii) Flange profile

TREAD PROFILE

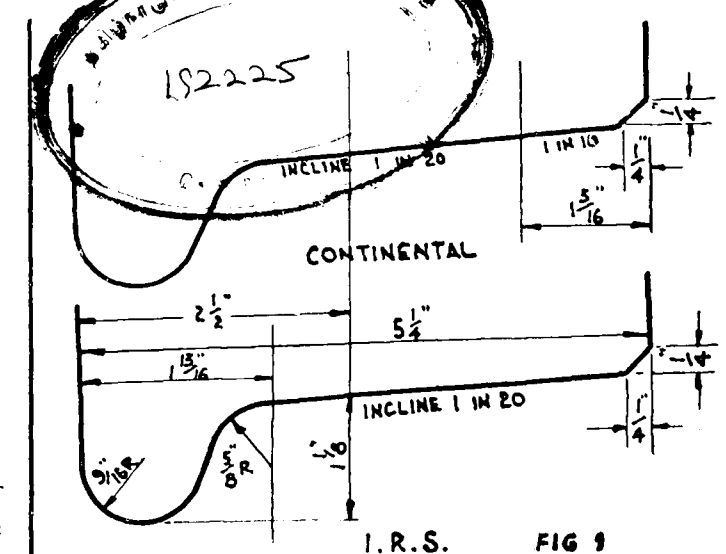
In the earlier days of locomotive practice, the tyres of the railway vehicles were provided with parallel treads, but later on coning was introduced. An inclination of 1 in 20, for the tread, was adopted by all the railways, with one exception i. e. The New York Central* Lines which preferred 1 in 38 to the standard coning.

The counter of the tyre is a disputed item and the railway engineers have divergent views on its optimum taper. Though 1 in 20 taper has been adopted, with the rails canted to suit, cylindrical tyres have also been tried by investigators in different countries. It is claimed in certain quarters, that cylindrical tyres afford better riding qualities—a fact which has yet to be established.

The riding of a vehicle depends upon so many factors and the influence of the tyre profile is one of them. Tyre profile affects the riding characteristics in so far as the sinous motion in the track is concerned. If by the adoption of a particular tyre profile, the wave length of the sinous motion can be increased and its amplitude decreased, there will be found a considerable improvement in the riding. Both the objects stated above can be achieved by reducing the inclination of the coning and by having a suitable slope and thickness of the flange.

Wear on the tread is another important factor affecting the riding qualities. In normal practice as the rails are canted to suit the standard taper of the tread, a tyre with an angle of inclination other than the standard, will start developing wear and before long will get the taper to match the rail cant. Experiments on L. M. S. Rly. have shown that in the duration of this period the riding is seriously affected and as the wear approaches the rail cant there is a gradual improvement. A second flange, on account of this wear is, therefore, formed towards the outer edge of the tyre. This second flange may, to some extent, reduce the amplitude of the sine wave (this cannot be said definitely) but is sure to set up a vertical periodic vibration, and if, at any time, the frequency of this vibration coincides with that of the natural frequency of the "rolling" the vehicle will be subjected to a violent oscillation.

The tendency of the formation of this second flange is found on cylindrical as well as on coned tyres, but to a greater degree on the former. Its depth on the wheels, having no brakes, is still greater. The French Railways have got over this trouble by having a taper of 1 in 10 for a distance of 1—3/16" from the outer edge of the tyre. Figure No. 1 shows the profiles of the treads adopted by the Indian and French railways.



Another draw back in the cylindrical tyres is the unavoidable difference in the diameters, ever so slight, of the pair of wheels fitted on to a single axle. The normal

* Report of Japanese National Railway Int. Rly. Cong. Buln. 1933.

difference allowed in the shop practice is of the order of $1/32$ ". If, therefore, the tyres are coned, the wheels will adjust themselves in the track, but if cylindrical some degree of relative slipping must occur. On the curves, the wheel running on the outer rail has to travel a greater distance, than that running on inner rail. Here again excessive slipping of the wheel in the case of cylindrical treads, cannot be avoided. It was probably due to this reason that the cylindrical wheels made way for the coned wheels.

CONING OF THE TREADS

Effect of coning on a straight track:—Two wheels of equal diameter having coned tread, when rigidly fixed onto a single axle, if undisturbed by an external lateral force, will run central in the track, the diameter at the points of contact being the same. When disturbed, they will run on different diameters. The wheel running on bigger diameter will try to go ahead of the one running on smaller diameter. The axle will then no longer be running normal to the track but will make an angle with it. A stage will then be reached, when the axle is forced to rotate and get a skew, until the opposite wheel starts running on a bigger diameter. The result is an oscillatory movement and nosing of the vehicle on the track. The wave length of this nosing oscillation, as given by Klingel is,

$$D = 2\pi \sqrt{\frac{r \cdot a}{i}} \quad \dots \dots \dots (1)$$

Notations are given in appendix I.

Fig. 2 shows the behaviour of an axle as stated above.

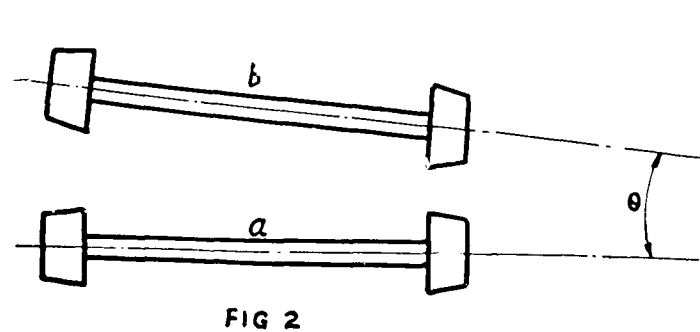


FIG 2

If a number of pairs of wheels, fitted on axles, and grouped together under a common chassis, are moving on a track they will also behave in a similar way, if the conditions given below are fulfilled.

- (i) Weight on all the wheels must be equal
- (ii) Diameters of all the wheels must be the same
- (iii) All axles must be parallel to each other

- (iv) No longitudinal play exists between the axle box and the guides
- (v) Taper of all the tyres must be identical
- (vi) No lateral control exists except the unavoidable tread friction
- (vii) No irregularity exists in the track

Any departure from the above conditions will affect the wave length of the motion. No data is available, as to the extent of the influence of the above said items, individually or collectively. Some amount of modification of this wave length will positively occur as none of the above considerations can be rigidly fulfilled.

Uptill now the investigators have conducted experiments on single and double axle trucks. Klingel was probably the first to publish data (Year 1883) for a single axle truck. Since his time the subject has been under the investigation of some of the eminent engineers of the world and the behaviour of these trucks has been reduced to mathematical equations.

The equation for a single axle truck evolved in 1883 has been accepted as 'perfect' by all the investigators but there is no consensus of opinion in formulating the equation for a double axle truck. All the investigators differ with each other. In the case of a double axle truck the form of equation for the wave length, given by various investigators is:

$$D' = D \cdot K \quad \dots \dots \dots (2)$$

Where K is a multiplying factor.

For a bogie having 8' wheel base the value of K according to different investigators is:

- | | |
|------------------------------|--------|
| (i) According to Bedecker K | = 1.75 |
| (ii) " " Davies and Cain K | = 1.8 |
| (iii) " " Heumann K | = 2.1 |
| (iv) " " Recard and Carter K | = 2.5 |

The problem of trucks having axles more than two in one chassis, for example, the coupled wheel truck of a locomotive, have not been taken up by any of the investigators, and nothing can be said about the influence of the coning in the stability of these trucks.

The effect of coning on the heavy vehicles is small on account of heavy moment of inertia about a vertical axis, and higher damping effect due to greater friction between rail and tyre. But its effect on the light weight stock is pronounced.

Dr. Davies in his paper "Some experiments on the lateral oscillations of rail vehicles" has dealt with this subject and states, that nosing oscillation once started, goes on building up on account of the action of coning, unless there is sufficient damping action. Mr. B. S. Cain in his paper "Notes on the dynamics of the electric locos." has investigated the influence of coning on the critical speed of a locomotive. The method adopted by him is based on the calculation of energy input on account of disturbing forces and energy dissipated by the damping forces. He states that the coning reduces the critical speed by about 8% on straight or nearly straight track, in the case of larger wheels. His formula is given below:

$$v_c = \sqrt{\frac{g \cdot r}{1 + a \cdot i}} \cdot \frac{1}{\sqrt{f}} \quad \dots (3)$$

For the meaning of symbols please see Appendix I.

Effect of the coning on curves:—On curves two wheels of one axle, will run on different diameters, the outer running on bigger. This is an advantage as the outer has to travel a longer distance than the inner wheel. This is what is generally said. But there is another thing to mention, that the inter wheels which generally guide against the inner rail also run on bigger diameter. The above stated advantage is lost in the case of these wheels.

At the speeds, say, about 40 M. P. H., taking the case of a Pacific locomotive, the bogie wheels and the leading coupled wheel bind against the outer rail, and driving and trailing against the inner. In the case of turn-outs, the bogie wheels being against the outer rail and the coupled wheels against the inner. The coning, therefore, in the case of these wheels which bind against the inner rail, defeats its purpose.

In my opinion the coning in these cases (where wheels bind against the inner rail) helps the locomotive to screw itself round the curve, thus giving relief to the leading wheel which is subjected to the maximum amount of guiding force. At speeds well over 45 M.P.H. the locomotive under the influence of centrifugal force and heavy control at the front is screwed round the curve, even without the help of coning.

It will be clear from the foregoing that the profile of the tread, whether cylindrical or conical, has merits and demerits, and there is little to choose between the two. Certain railways have tried different tread profiles, but none has given definite decision in the favour of any

* Dynamics of electric locos. by B. S. Cain.

inclination. However, some investigators have recommended 1 in 100 taper. But unless the cant of the rail is changed to match this taper, little advantage will be gained, as the tread will soon wear to the rail cant. In the case of this taper, or any other reduced inclination of the coning, the flange rail contact will be below the root of the flange. This is undesirable from the riding point of view and will be discussed later. Figure No. 3 shows the flange rail contact in the case of standard and cylindrical tyres with the rails canted to suit the former.

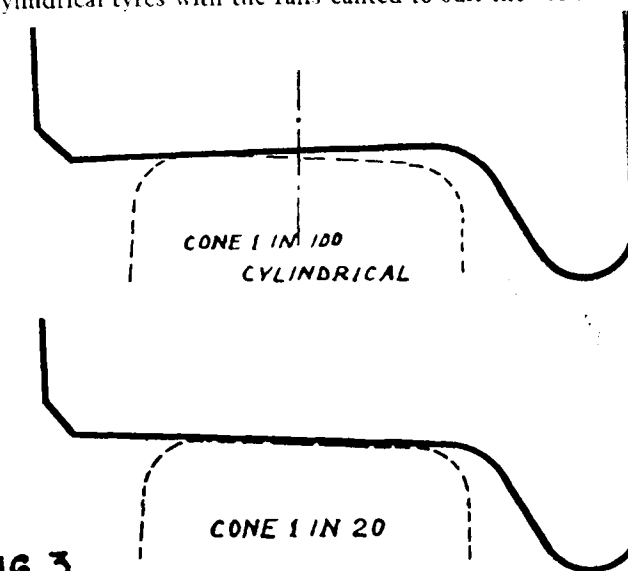


FIG 3

FLANGE PROFILE

The profile of the flange may be divided into two parts.

- (i) Thickness of the flange and
- (ii) Slope of the flange at the gauge face.

Indian investigators have recommended that for better behaviour of the locomotives the thickness of the flanges should be,

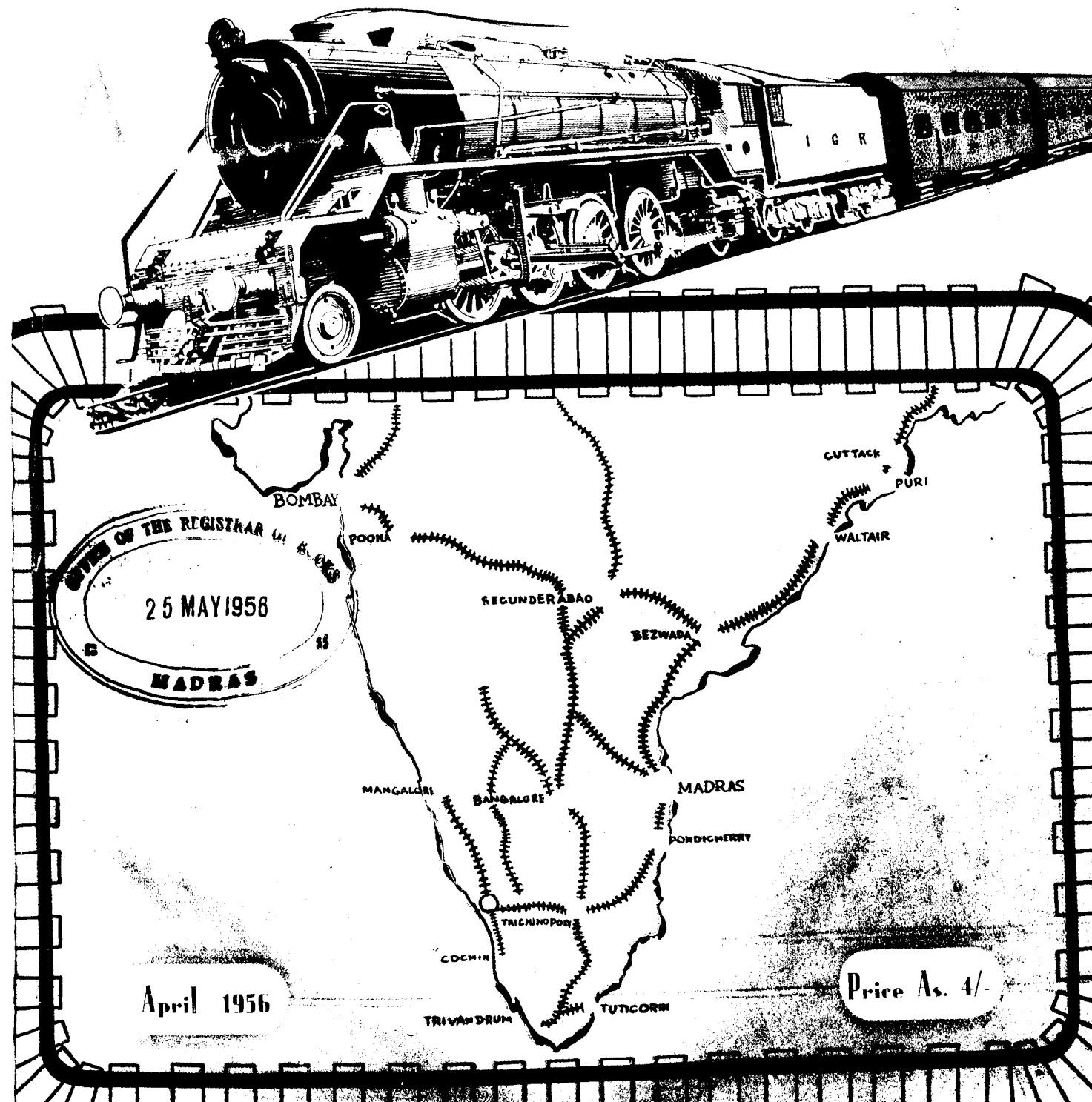
- (i) Greater at the extreme wheels.
- (ii) Standard at the leading and trailing wheels.
- (iii) Smaller at the inter wheels.

There are two effects of this set of flanges. The first is that the angularity of the wheel base in the track is deduced due to the reduction in the lateral clearance at the extreme wheels. This results in lower flange impacts on the rail. Secondly when we consider a locomotive entering in a curve, it is found, that the first wheel to come in contact with the rail is the outer leading wheel of the front truck. In the case of a bogie, when the forces acting on it attain a certain

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magnitude the trailing wheel also comes in contact with the outer rail. If the centrifugal force is sufficient, the outer leading coupled wheel will also shift towards the outer rail; but before it could make a contact with the outer rail, the control mechanism comes into action and the intensity of the wheel impact is reduced.

The reason for the thin flanges on the inter wheels is that as they are quite near the centre of gravity of the locomotive, they do not perform any guiding work. Therefore it is better that they do not come in contact with the rail at all. Taking off these flanges has been advocated by almost all the eminent engineers of the world. Mr. da Costa has dealt with the subject in his paper "Riding of pacific locos." He states that on sharper curves of less than 2000 ft. radius, at cruising speeds, the engine is subjected to a screwing action. The driving wheel at this instant is touching the inner rail. The leading coupled wheel under the influence of a very heavy control drifts towards the inner rail and the trailing coupled towards the outer rail. The driving wheel acts as a fulcrum. A condition is then reached when the bogie control becomes too less and the leading coupled wheel again moves back to the outer rail. This oscillation goes on repeating till the engine is able to attain stability again.

From the foregoing it can be safely concluded, that even with the thin flanges at the inter wheels, the question of their infringement with the inner rail on curves and turn-outs cannot be solved. At this infringement contributes to instability and produces heavy stresses on the vehicle and the track, a better practice may be to remove them. On locomotives which fit in the turn-outs and sharp curves without any infringement, the need of removing these flanges may not arise.

Recent analysis done by Mr. da Costa confirms that it is advisable to remove the flanges of the intermediate wheels. In the case of locomotives fitted with bar

frames, as they afford comparatively little flexibility on the curves and turn-outs, the possibility of the flange infringement is still greater. Therefore, to avoid heavy stresses in the track and the locomotive parts, it would be a better practice to remove these flanges.

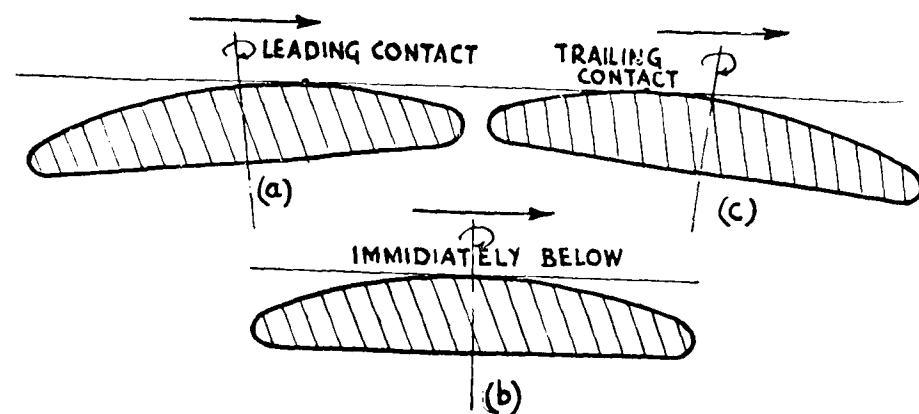
To avoid any infringements at the nose of the turn-outs, by the wheels fitted with thin and thick flanges, the amount of the thickness increased or decreased on the gauge face should be increased or decreased on the opposite side of the gauge face of the flange.

SLOPE OF FLANGE

Another very important factor in the profile of a flange is its slope at the gauge face, which determines the point of flange rail contact. It is this slope of flange on which depends the safety of millions of passengers travelling daily by the trains. This will be briefly discussed in this note, and those, sufficiently interested in the subject, are requested to refer, for a detailed analysis, to,

- (i) Notes on wheel flange profile by Mr. da Costa.
- (ii) Development of electric locos. in Switzerland by Dr. Boygeaurd.

It will be seen from the following analysis that there is a limit for the slope of the flange with respect to horizontal, for safety. Any increase in the wear on the flange gauge face, results in a corresponding increase in the angularity of the wheel base in the track, and brings the flange rail contact below the root of flange which is a source of danger. In the extreme angularity cases the flange may contact the rail just at its tip. As will be shown by the application of Nadal's formula for safe lateral loads, the tendency for the flange to mount the rail table even under the influence of relatively smaller lateral load, will be greater.



HORIZONTAL SECTION THRO POINT OF CONTACT

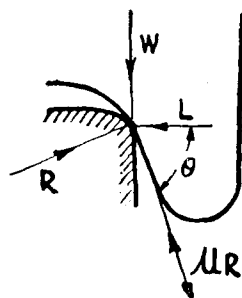


Fig-4

While running on a curved track there are three possible points of flange rail contact.

- (i) The flange may contact the rail, at the point, ahead of the vertical through the axle centre. This will be called a leading contact. Fig. 4(a)
- (ii) The flange may contact the rail, at a point, on the vertical through the axle centre. This will be called centre contact. Fig. 4(b)
- (iii) The flange may contact the Rail behind the vertical through the axle centre. This will be called trailing contact. Fig. 4(c)

Let us now consider the wheel moving along the rail, making a contact at the vertical through the axle centre. As the flange moves along the inner side of the rail, its tendency to mount the rail table is greater as the friction is also opposing. The forces acting at the flange are,

- (i) Lateral force
- (ii) Vertical wheel load
- (iii) Friction between the rail, and flange
- (iv) Reaction of the rail

By resolving these forces in the line of action of UR the components of the forces acting downwards should be greater in magnitude than the components acting upwards. Therefore if the wheel is not to derail,

$$W \cos (90 - \theta) > L \cos \theta + UR$$

$$\text{or } L \cos \theta + UR < W \sin \theta \quad \dots(4)$$

$$R = W \cos \theta + L \sin \theta \quad \dots(5)$$

Substituting (5) for R in (4) we get,

$$L (\cos \theta + U \sin \theta) < W (\sin \theta - U \cos \theta)$$

$$L < W \frac{\sin \theta - U \cos \theta}{\cos \theta + U \sin \theta} \quad \dots(6)$$

If the flange is making a trailing contact, the friction helps and the wheel requires a lateral load of sufficient magnitude to mount the rail table. In this case, if the wheel is not to derail, then,

$$L \cos \theta < W \sin \theta + UR \quad \dots(7)$$

$$R = W \cos \theta + L \sin \theta \quad \dots(8)$$

$$L (\cos \theta - U \sin \theta) < W (\sin \theta + U \cos \theta)$$

$$L < W \frac{\sin \theta + U \cos \theta}{\cos \theta - U \sin \theta} \quad \dots(9)$$

Taking the value of U as .25 and that of θ as 45° and 75° the safe lateral load will be .63 W and 1.6 W for the leading contact respectively and 1.7 W and very large respectively in the case of a trailing contact.

The foregoing analysis shows that an increase in wear on the flange gauge face helps the wheel to withstand heavier lateral load before it could derail. But in actual practice, we see that the wear on the flange helps derailment. Nadal's formula has some flaw as it does not take into account,

- (i) The frictional resistance between the rail and the other wheel of the same axle.
- (ii) The point of contact between the flange and the rail (see App. II)

Taking into account the frictional resistance of the opposite wheel, (fig. No. 5) we get,

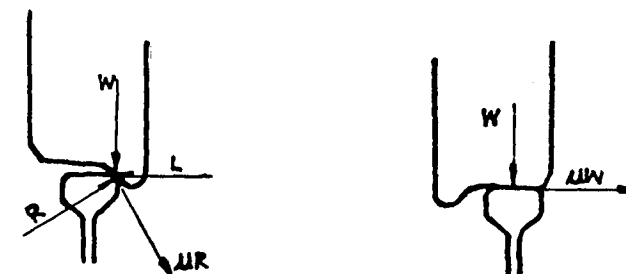


Fig. 5.

$$L (\cos \theta + U \sin \theta) < W \sin \theta (1 + U^2)$$

$$L < W \frac{\sin \theta (1 + U^2)}{\cos \theta + U \sin \theta} \quad \dots(10)$$

for the values of θ as 45° and 75° the safe lateral load will be .85W and 2W respectively. Similarly the values for a trailing contact can be calculated.

Mr. Yukta Sato of Japanese Railways has introduced creep theory developed by Dr. Carter and has changed the original formula. The application of Mr. Sato's formula is restricted upto a stage before the actual slip occurs and after which Mr. Da Costa's formula equation (10) applies.

It will be seen from the foregoing analysis, that Mr. Nadal's formula errs on the safe side in so far as the safe lateral load is concerned and ensures more safety. Even in the case of a leading contact, as the safe lateral load increases with an increase in the value of θ , the wheel can sustain heavier lateral load before it can mount the rail table. The investigators in India who have imposed a limit on the safe lateral force upto 55% of the axle load, possibly want to guard against any lateral bodily movement of the track.

The formula developed for leading contact has also a discrepancy which has been discussed by Mr. Da Costa in "Riding of pacific locos". After the flange actually slips, the friction is reversed and instead of helping a derailment opposes it and, if L is not of sufficient magnitude the wheel will slip down again. This is the reason that even under the influence of relatively higher values of L than those given by the leading contact formula derailment does not normally occur.

It may be safely deduced from the above analysis that apart from θ there is another factor L, the value of which depends upon θ , which controls derailment. As an increase in the value of θ raises the safe lateral force and also the value of L (a source of danger) a compromise in fixing its value is necessary.

OPTIMUM VALUE OF ANGLE θ

As stated before, that the investigators in India have recommended a lateral force of 55% of the axle load as 'SAFE', the limits for the value of θ may be so fixed as to enable the wheel to withstand a lateral force of at least equal to its instantaneous vertical load. In this respect the recommendations by Mr. Da Costa in his paper are reproduced below.

- (i) The flange gauge face should not make an angle exceeding 30° with the vertical ($\theta = 60^\circ$). This is based on Nadals analysis which indicates that the flange with this angle can sustain lateral force almost equal to the instantaneous vertical load.
- (ii) The flange gauge face should make an angle of at least 15° with the vertical.
- (iii) It may be from the above that the value of θ should lie between 60° and 75°.

For the geometrical lay out, drawing Nos. CSL 120 and 121 may be referred to.

APPENDIX - I

- 2a = Width of the track gauge at tread contacts.
 2b = Wheel base of the vehicle
 C = Total lateral clearance between frame and rail
 D = Wave length of the sinous motion of an axle truck
 D' = Wave length of the sinous motion of double axle truck
 f = Creepage coefficient
 i = Coning of the tyre
 K = Multiplying factor to determine the wave length of a four wheeled truck

L = Lateral force

l = Distance of an axle from the centre of friction

r = Radius of the wheel

R = Reaction at the rail

R_2 = Radius of the curve

U = Coefficient of friction

V = Critical speed (A speed when the energy input by the disturbing forces is equal to the energy dissipated by damping forces)

W = Vertical wheel load

w = Angular velocity of nozing oscillation

n = Angularity of the wheel at a time when the leading and trailing wheels are contacting outer rail

Y = Angle of swivel of wheel base, when the leading wheel maintains contact with the outer and trailing wheel shifts to inner rail.

X = Total angularity of the wheel base when the leading and trailing wheels are against the outer and inner rails respectively.

θ = Angle which slope of the flange makes with horizontal

APPENDIX-II

Location of the point of contact between the flange and rail

The point of the flange rail contact can be located by plotting the wheel base on the track and finding the total angularity which the wheel makes with rail. The Total angularity can be determined by first finding out the total lateral clearance which comprises of,

- (i) Clearance between the hub and horn including wear.
- (ii) Clearance between the flange and rail including wear.
- (iii) Gauge widening.

In fig. No. 6 below the wheel base of a locomotive is plotted on a curve, with the leading and trailing wheels against the outer rail.

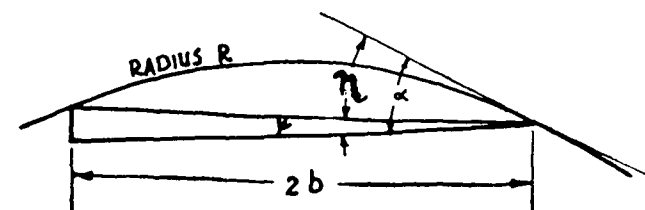


Fig-6

$$N = \frac{b}{R_2} \quad \dots (11)$$

If locomotive takes a position with the leading and trailing wheels against the outer and inner rails respectively, then the angle of swivel

$$Y = \frac{C}{2b} \quad \dots (12)$$

Then

$$X = N + Y = \frac{b}{R_2} + \frac{C}{2b} \quad \dots (13)$$

In the figure below, for a given slope of flange: lateral clearance and wheel base, the flange rail contact is located. It will be seen that as the wheel base increases the angle of swivel decreases from the wear on the flange gauge

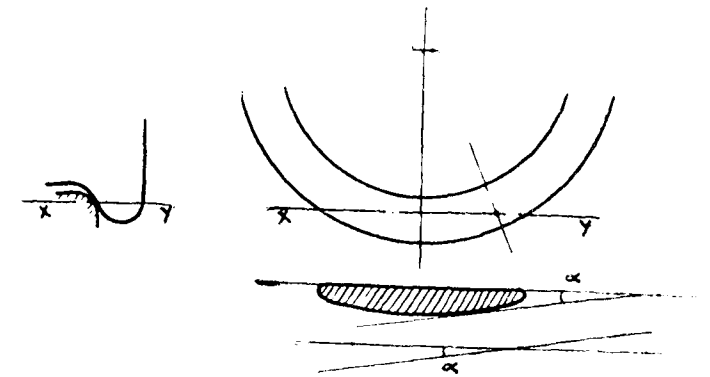


Fig-7

face, this contact will move ahead of the axle centre. This analysis helps in determining the maximum wear that can be tolerated on the flange gauge face.

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ELECTRIC TRAIN SERVICE

TWO NEW UNITS ADDED

WITH a view to tackling the rush during peak hours on the suburban service between Madras Beach and Tambaram, the Southern Railway authorities put on the line two Italian electric multi-unit trains on the Tamil New Year Day.

Mr. M. Bhaktavatsalam, Minister for Agriculture, who inaugurated these new trains, expressed the hope that the electrified train service in the State would be expanded and was confident that this expansion would become a *fait accompli* before long, seeing the interest taken by the Railway Ministry in this regard.

An order for six multi-unit trains had been placed with an Italian concern, the Breda Electro-mechanic Company of Milan, in 1953 and four have been received so far. Of these, two have been fitted up in the Car Workshop at Tambaram and work on the remaining two is proceeding fast apace and it is expected that these also will be put on the tracks in a month or two. Each of these new trains can carry 306 seated passengers (as against 196 carried by the trains at present). Each comprises four coaches (as against the three at present).

Mr. T. A. Joseph, General Manager, Southern Railway, disclosed that orders had been placed for another six multi-unit trains.

The Minister was received on arrival by Mr. T. A. Joseph, General Manager, and introduced to the officers and Heads of Departments of the Railway. Amongst those present were Dr. T. Lombardozi, Commercial Counsellor, Italian Embassy, New Delhi, Dr. Dagostini of Messrs. Finmeccanica, Rome and Dr. C. de Capitani of Messrs. Breda, Milan.

Mr. R. D. Walter, the Electrical Engineer of the then South Indian Railway who was in charge of the electrification of the suburban service in 1931 and who is now in private service, was also present.

Mr. T. A. Joseph welcoming the gathering recalled that three years ago, the centenary of the Indian Railways had been celebrated throughout the country. He said 1956 happened to be the centenary of the opening of the first stretch of line between Madras-Royapuram and Wallajah Road (1856). Also, this year happened to be of special interest, being the silver jubilee year of the opening of the suburban electric railway system.

On that occasion, 25 years ago they had made a beginning with 17 electric units and 90 train services a

day. At that time, they carried 3.3 million passengers per annum. In the 30's they added seven electrical units to the service but during the war years, they were not able to add any more. But there had been a rapid growth in the number of passengers travelling by the suburban service and to-day, 3.4 million passengers were carried per annum while the frequency of train services was around 200. Though they now carried ten times the number of passengers carried in the beginning, there was, during peak hours, a large amount of overcrowding. He hoped the new train units would go a long way towards reducing the overcrowding.

Of the six Italian multiple units for which orders had been placed in 1953, four had been received now and the remaining two were expected within the next few weeks. As replacement for some of the old units, they had placed orders for further six new units.

Mr. M. Bhaktavatsalam, inaugurating the train service extended cordial greetings to the officers, the staff and the thousands of workers of the railways on the occasion of the new Tamil Year. He hoped that even as they commenced the new year with the addition of these fine coaches, the new year would mean considerable expansion by way of services to the travelling public.

The Minister and the guests then boarded the gaily decorated train and had a 25-minute-run to Guindy where light refreshments were served. On the return journey, they travelled by a second train which had been waiting at Guindy. As soon as this train reached the Beach station, it joined the regular daily service with a run to Tambaram.

The coaches have comfortable seats with revolving overhead fans and adequate lighting arrangements, for both I and III classes. In addition, the first class coaches are well upholstered.

Dr. De Capitani of the Breda Electro Mechanic Company of Milan said that the electric motor was of 165 h. p. and each coach had eight electric fans. The maximum speed was 60 miles per hour.

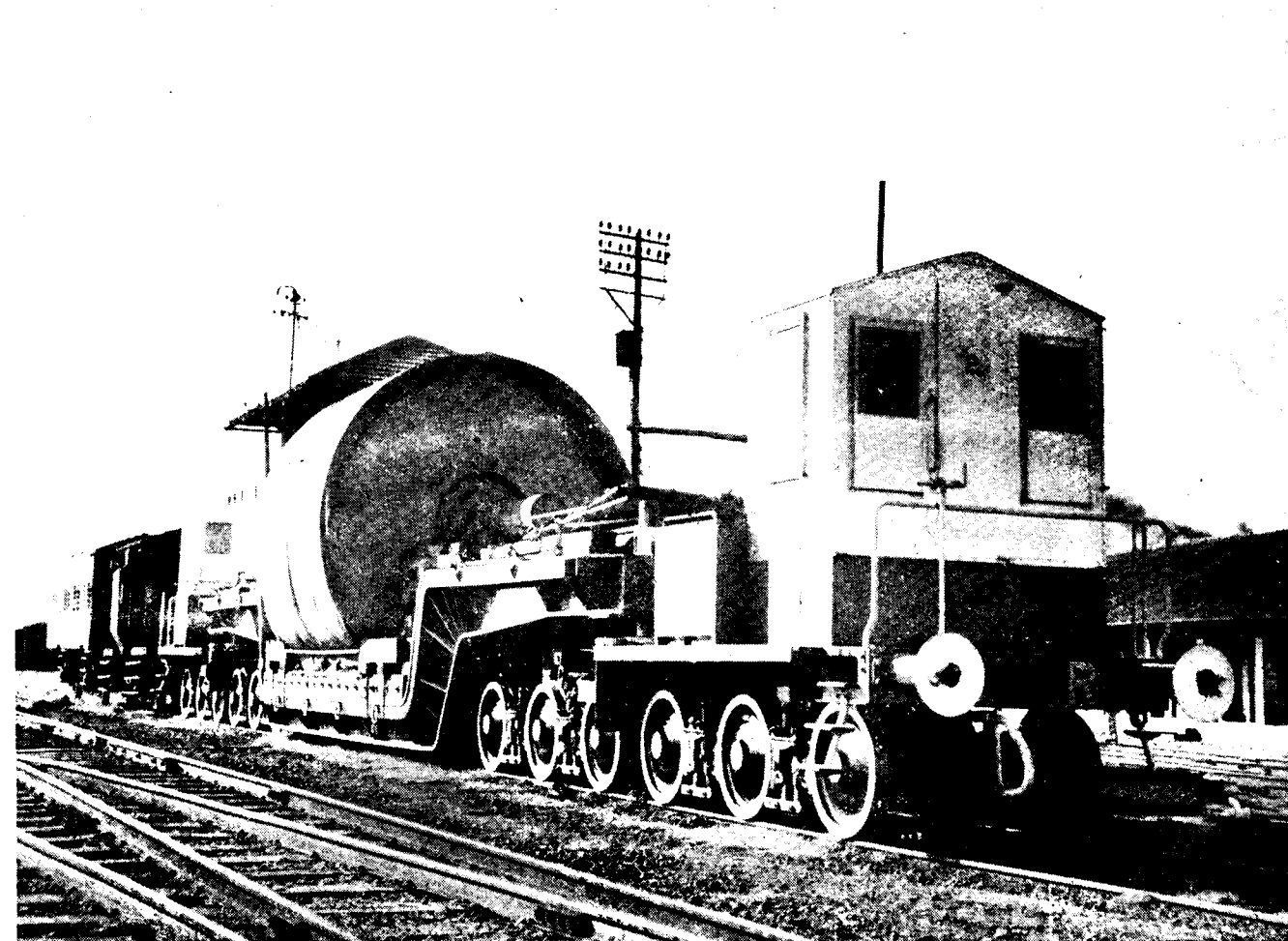
Each multi-unit train has a seating capacity for 252 third class passengers, 28 women, and 26 first class passengers. An equal number of standing passengers can be carried during rush hours, it was stated.

A notice found in the coaches amongst other things warns passengers against accepting drink, food or tobacco from strangers as these might be doped.

A MASSIVE YANKEE CYLINDER MOVES

YET another massive steel 'monster' has been carried by the Eastern Railway from the Calcutta Docks to Dehri-on-Sone for the expansion of the paper industry there. This is the

second movement of a heavy extra ordinary size consignment to the same destination within a month, the previous one being that of the 31-ton 'Kiln Shell' of similar dimensions carried on eleventh of last month.



A massive yankee cylinder moves.

The 'monster' is an Yankee Cylinder 21'-9" long with a 13'-9" dia. The machine weighs 50 tons.

Loaded on the Railway's 130-ton well-wagon the only one in India—the out-size consignment left the East Docks Junction by a special train on its nine-day 450-mile detour run to Dehri-on-Sone.

The load which allows at places minimum clearances of 1½" in height and 1¼" on either side is being trans-

ported under the supervision of a party of railway transportation and engineering staff.

Elaborate prior planning has been made for the load to move during daylight only and for the safety of all passenger and goods trains which may cross the special on the run.

The first Yankee Cylinder was moved by the Eastern Railway to Dehri-on-Sone in July, 1953.

PORTABLE ELECTRIC TOOLS

BY F. W. HUGHES, M.A.S.E.E. ★

THE practice of 'bringing the tool to the job' has rapidly increased the usage of portable electric tools in industry. Moreover as such tools have been developed for industrial applications, they have also been applied by garages as well as in small workshops by the home craftsman. This article, therefore, offers advice in the selection and use of such tools not only to the industrial but also to the domestic user.

There are a number of factors that should be considered in determining the best model of portable electric tool for a specific job. Before purchasing a tool, it should be examined in regard to its weight, spindle speed, suitability of shape, safety features and ease of maintenance. A tool may be favoured because of its light-weight, yet it may not have a motor powerful enough for the job in hand, since tool weight and motor horsepower are generally roughly proportional. At the same time, it is slow and uneconomical to use a heavy tool when a light tool can do the job equally well.

The spindle speed of a portable tool is usually established to suit its application. If the speed is too high in relation to horsepower, the tool may stall in operation. But a tool of the same horsepower with a lower speed has more torque and is less apt to stall. For proper application to the job, it is considered by the present writer that the relationship should be such that the speed under load can drop off to between two-thirds and one-half of the no-load speed.

A large tool with a low speed will, of course, have ample torque to drive a small cutter, but at a rate that is too slow to give a satisfactory output. Thus, there are the two extreme conditions, firstly, a speed too high for a motor that is not strong enough, so that the tool stalls and, secondly, a motor strong enough but too slow, so that time is wasted.

Proper cutting speeds must also be considered in determining spindle speed. If spindle speed is excessive and the motor of the tool strong enough to sustain the speed under load, the cutter will burn. A tool with a lower spindle speed and possibly a less powerful motor is indicated for this situation.

No-load spindle speeds recommended for various sizes of portable electric drills are indicated in Table I. The speeds given are for drilling mild steel. For soft materials, such as aluminium, these speeds can be practically doubled. For harder or tougher materials, such as stainless steel or Monel metal, these speeds should be about one-half of those given.

TYPE OF HANDLE

The smaller portable electric tools, such as drills and screwdriver generally have a pistol-grip-type handle. This permits the tool to be held securely and comfortably with one hand. For medium-sized tools, where there is more over-hung weight, a closed end handle is better. An auxiliary side handle on low-speed high-torque models lets the operator use both hands to resist any tendency of the tool body to turn. On the larger drills and screwdrivers, side handles (usually located opposite the switch handle) are essential to give the operator good control over the tool.

Closed handles afford the best control for portable saws. For grinders and right angle sanders, straight end handles are preferred. The sanders preferably have an auxiliary side handle at the spindle end.

ELECTRIC CABLE

Every tool should have a suitable motor switch, conveniently located. This switch is generally of the instant-release type. On tools like drills, screwdrivers and tappers, the switch can have a pin for locking it in the 'on' position. But on tools with cutting blades, like saws, there should be no arrangement for locking the switch 'on' so as to protect the operator. Still other tools, like grinders and sanders, are equipped with plunger or toggle switches. It is important that all switches be located and protected so as to avoid accidental operation.

Even if the tool is designed for light service, it should have a substantial cable of sufficient size to carry the full load current to the motor. Where an extension cable is

needed, this should be substantial enough to carry the current without too much loss in line voltage. Lighting flex should *never* be used for electric tools.

In Table II are shown wire sizes for various ampere capacities and wire lengths for 220 volt tools. These figures actually represent the wire section necessary and this cross sectional area may be made up of the requisite number of wires of any smaller diameter. Data are based on a current equivalent to 150 per cent of the full load with a loss in voltage of not over 5 volts. For 115 volt tools, the wire size indicated for twice the cable length required should be used. The words under the size represent the recommended insulation.

The Motors of portable electric tools are normally designed to operate satisfactorily with a variation in their nominal voltage of up to 6 per cent. Any greater variation has a pronounced effect on the motor performance. A 10 per cent drop in voltage reduces the power of the motor about 20 per cent and the speed of the operation at full load falls off considerably.

The necessity for using the proper rating of cable is obvious. On the other hand, with an increase in voltage, motor speed increases as well, with the possibility that the motor will overheat if operated over an extended period.

EARTHING

All British electric tools to-day are supplied with a three-core cable. The third wire, having green-coloured insulation, is for earthing. One end of the earth wire is connected to the tool housing and the other end should be connected to a good earth contact, such as a water pipe, conduit or copper rod driven into the earth. Earthing is particularly important when tools are being used in a damp area or inside of a tank, or on metal structures that are themselves earthed. The earthing connection should always be made *before* the current supply connection is made.

Some wiring systems are supplied with three-pole earthed socket, in which case the cable can be equipped with a three-pole plug. The prong to which the earth wire is connected is longer than the two other prongs, so that an earth is automatically made before the current can flow through the power wires.

CARING FOR THE TOOL

With few exceptions, the gears in portable electric tools are grease lubricated. The lubricant will remain in the gearbox for quite a long time. When it becomes necessary to replace it, all the old grease should be removed and the box thoroughly cleaned. A grade of grease recommended by the manufacturer of the tool should be used. Care should be taken not to fill the gearbox more than one-half to two-thirds of its capacity.

Ball bearings in tools so equipped are usually permanently sealed. They should never be put in cleaning fluid, as this removes the grease, which cannot then be replenished. If the tool has sleeve bearings, they are usually self-lubricating. Other sleeve bearings can be oiled through a ball valve on the tool.

TABLE I
No-load spindle speeds for
portable electric drills

Drill Capacity in inches	No-load spindle speed, r. p. m.
$\frac{1}{4}$	1,700 to 2,500
$\frac{3}{8}$	600 to 900
$\frac{1}{2}$	400 to 650
$\frac{5}{8}$	350 to 550
$\frac{3}{4}$	300 to 450
$\frac{7}{8}$	250 to 375
1	225 to 350

ANNOUNCEMENT

We have pleasure in announcing to all Advertisers and Subscribers that we are issuing a special Engineering Supplement along with our July 1956 issue.

★ Sales Research Engineer, Black & Decker Ltd., Harmondsworth, Middlesex, England.

TABLE II

Size of extension cable for portable electric tools					
(Based on current equivalent to 150% full load of tool and a voltage drop of approximately 5 volts)					
Name Plate Rating of Tool in Amps	0 to 2.0	2.1 to 3.4	3.5 to 5.0	5.1 to 7.0	7.1 to 10.0
Distance in Feet	Wire Sizes (S.W.G.)				
25	20 3 core thin	20 standard	18 standard	18 standard	16 standard
50	20 3 core thin	20 standard	18 standard	18 standard	16 standard
75	20 standard	18 standard	18 standard	18 standard	16 standard
100	20 standard	18 standard	18 standard	16 standard	16 standard
200	18 standard	18 standard	16 standard	16 standard	— standard
300	18 standard	16 standard	16 standard	—	—

Note : If voltage is already low at the source, have voltage increased to standard, or use a much larger cable than listed in order to prevent any further loss in voltage.

Brushes are readily removed for inspection. If worn to less than about ¼ in. length, they should be replaced; otherwise the motor will be badly and damage the commutator. If the commutator shows roughness, it can be smoothed with fine sandpaper. A smooth, dark brush track on the commutator is normal.

The switch should operate freely. There should be no likelihood of it sticking in the 'on' position with the possibility of causing an accident. The cable connections with the switch and plug should be tight. If the cable is worn it should be replaced with another of the same size.

SPECIAL FEATURES OF TOOLS

Portable electric screwdrivers usually contain a clutch that disengages the drive when the screw (or nut) has been tightened sufficiently. There are three general type of these tool. In one type, there is a positive clutch, enabling the operator to control the release of the driving torque by the pressure he applies. This screwdriver is ideal for driving for wood screws, where torque increases constantly and varies widely. It is not recommended for use in metal assemblies, unless by experienced operators, since the sudden increase in torque when the screw is tightened can cause damage and injury.

In the second type, the clutch of the screwdriver is adjustable. Here the release of the driving torque is not controlled by the pressure applied by the operator but by

a change in tension of a spring against which a jaw of the clutch operates. Once the value of torque is set, it remains fairly constant until the jaws of the clutch wear appreciably. This type of clutch is preferred to a positive clutch for driving machine screws and fasteners in metal assembly work.

The third type of screwdriver, the impact wrench, employs a driving torque releasing mechanism that is not controlled by the pressure applied to the tool or by spring tension. Its construction is such that there is practically no torque reaction transmitted to the operator. Tool size must be carefully chosen to suit the work, because the impact can create stress beyond the elastic limit of the fastening device.

Portable electric grinders have an elongated gear housing which can be grasped by the operator's hand. The grinding wheel is mounted directly on the end of the spindle. If the tool is inadvertently dropped or hit against an object so as to damage and possibly crack the wheel, there is the danger of having the wheel fly apart. Before using a wheel, it should be examined for cracks by being sounded with a solid piece of wood, such as a hammer handle.

A maximum surface speed of 6,000 ft. per minute should be observed for the general run of vitrified wheels. Special bonded wheels can run at a higher speed and require separate consideration. A quick way to check the

surface speed (in ft./min.) is to multiply one-fourth of the wheel diameter in inches by the speed of the spindle in revolutions per minute. For protection, the operator should always wear goggles and a suitable guard over the grinding wheel is mandatory.

Electric saws are usually equipped with a lower guard that recesses into the upper guard as the tool enters the cut and springs back over the exposed portion of the blade after the tool completes the cut. If the lower guard ever sticks and fails to spring back, the saw should be disconnected from the power source before any attempt is made to rectify the condition.

Unless portable electric tools are fitted with explosion-proof motors, they should never be used where there are inflammable dusts or vapours, because of the arcing between the brush and the commutator. Tools subjected to an excessive amount of moisture should be disassembled, cleaned and baked dry. Otherwise the motor is likely to be earthed, thus endangering the operator.

Table III shows some of the most common causes of portable tool failure together with suggested means of correction.

TABLE III

Possible causes of trouble in portable electric tools

Fault	Check for	Remedy
New tool, motor does not operate	Brush stuck in holder, not making contact with commutator	Remove burr from brush holder
	Poor contact at the socket	Replace plug
	Broken conductor in cable	Cut off broken end or install new cable
Tool has been in service, but motor does not operate. Takes no current	Worn out brushes	Replace brushes, preferably by those recommended by tool manufacture
	Switch not making contact	Replace complete switch mechanism
	Open circuit in field coil	Rewind or replace field coil
	Two or more open coils in armature	Rewind or replace armature
Motor hums and takes heavy current, but does not operate	Short circuit in field coil	Rewind or replace field coil
Motor operates abnormally. Slow, jerky excessive sparking at commutator, runs hot	Short circuit in armature. Charred insulation may give location of short circuit. Solder may be thrown from connections to commutator bars effected	Rewind or replace armature. Note : An accumulation of dirt with carbon and metallic particles between commutator bars can cause a short acircuit
Motor operates at excessive speed, gives poor operating performance	Partial short circuit in field coil	Rewind or replace field coil
Ring of fire visible around the commutator	Open circuit in armature	Rewind or replace armature
Motor overheats, solder thrown from connections to commutator bars	Overload voltage too low Dull cutter, requiring heavy pressure Motor ventilation poor	Use heavier extension cable Sharpen cutter Clean vent holes of motor housing
Operator gets shock	Earthing wire not connected Carbon and metallic dust on brush holder insulation	Connect earth wire Clean brush holder insulation

DEVELOPMENT AND DESIGN OF MACHINE TOOLS IN INDIA

By R. KOBAN, Chief Designer, Machine Tool Prototype Factory, Ambarnath.

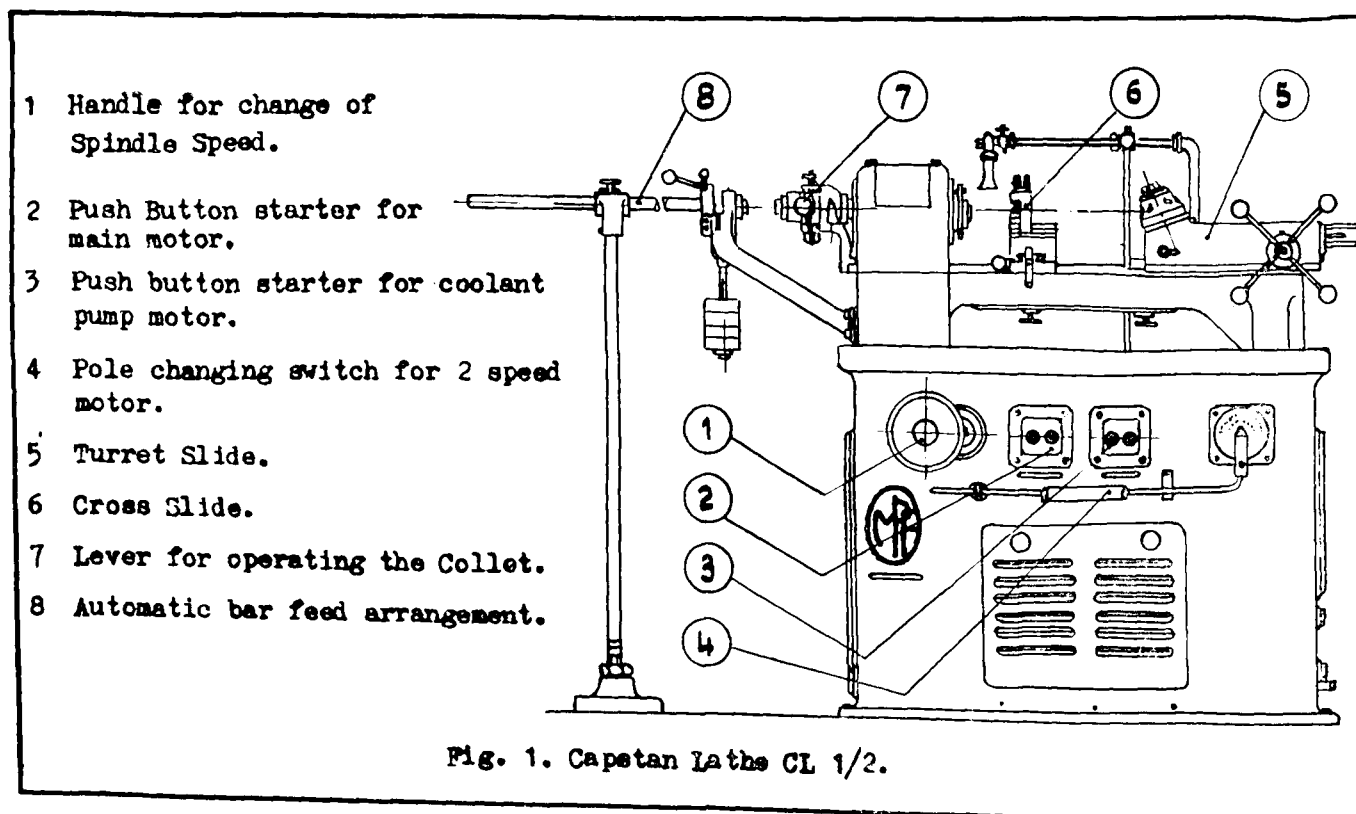
IN this country with its size and large population, it is undoubtedly obvious that Industrial expansion is a necessity and, to accomplish this industrial expansion, Machine Tools of many types are required. As the Industries improve, so must the accuracy, speed and the automation of various machine tools, in a similar proportion. For, the results are controlled by the Machine Tool or apparatus which does the work.

Far-seeing and wise Industrialists in India have already commenced the manufacture of many types of Machine Tools and the Government of the country have likewise seen its necessity and thus in different parts of the country have sprung up reliable and well-organised Factories for the production of immediate requirements and future necessities. The demand, however, at the present time is more than the supply and consequently imports are necessary; thus the economy of the country has, to a certain extent been restricted. Therefore, the Factories have a task before them of rapid but always excellent production, to ensure stabilization of the country's industrial future. The Machine Tool Prototype Factory in Ambarnath has been

set up by the Government with a view to design, develop and manufacture a variety of Machine Tools to cover the needs of Ordnance Factories, for the Defence Services and other Government departments in the first instance: and, likewise, as they are to cover the higher precision or automatic types of Machine Tools, the surplus capacity will be directed towards supplying civil trade.

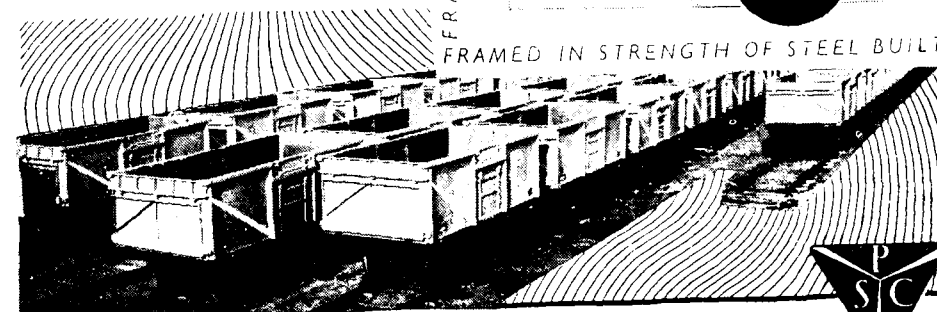
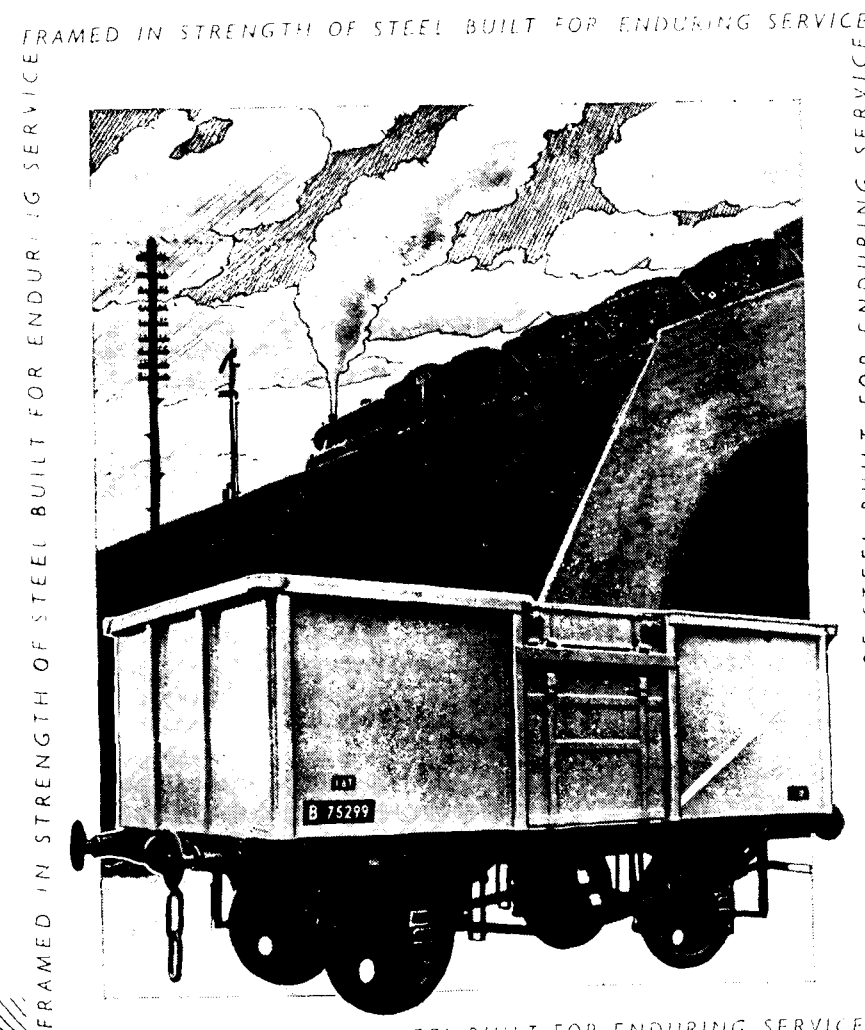
The establishment of a Machine Tool Design Office was a definite necessity and this Factory can be considered as having the first, and original, design team in India and it is proud of the fact that the Indian Designers and staff have reached a stage where they work independently on the design of any type of Machine Tool.

The establishment of the designs and Production of the Factory was by a gradual process to ensure efficiency and experience and, design and manufacture of various tool-grinders, polishing machines, monodrive (gear-box adaption for old types of lathes), Precision tool room lathes, Hydraulic Surface Grinders and 1 1/2"



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Capstan Lathes have been established. The Prototype of 1½" Capstan lathe and the design of 2" Capstan Lathe is at present in hand, and these machines are designed following the present trends of automation in Machine Tools by incorporating pre-selective spindle speeds, feeds and programme setting. By keeping to the modern trend in the manufacture of Machine Tools the Factory authorities are hoping to contribute to attaining self-sufficiency of the Indian Machine Tool Manufacturer.

With the old type of Capstan Lathe; which invariably has an unwieldy setting and manipulation,—it was rarely considered an economical Machine Tool unless the members required from it were in the region of hundreds; as the setting time required to ensure a semi-skilled worker to do the work could not be compensated unless the numbers were large. But the modern machine with its easy speed changes, its standardized tool boxes and tools and easy application, can be set so quickly that even pieces of 20 and upwards are easily and economically manufactured.

A Capstan Lathe 1½" is at present undergoing rigid test in the test branch of the Machine Tool Prototype Factory, Ambarnath. The following main characteristics of the Capstan Lathe, type CL 1½" (Fig. 1) are given.

The most striking feature of the CL 1½ is the absence of any gears for the main drive. The range of spindle speeds is from 300 to 3000 r.p.m. infinitely variable. By having the main drive of infinitely variable speed, it is always possible to obtain the optimum cutting speed for the job in hand and also achieve the most economical chip removal. Due to the wide range of spindle speeds, the machine is ideally suited for the machining of ferrous, light metal and plastic materials for Bar and Chucking work. The pedestal and chip tray are cast in one piece and 'house' the main drive, coolant pump tank, and the electrical equipment. The bed was designed in such a way that the maximum resistance against torsion is obtained. The sturdy head stock and the mounting of the heat treated and ground and dynamically balanced main spindle with American Spindle Nose No. 4, Type A2 in high precision taper roller bearings guarantee the sustained and continuous accuracy of working. The turret saddle can be clamped in the desired position by means of two eccentric clamps. The turret slide has a useful stroke of 2½" and carries the turret head with six tool stations with

standard ½" mounting holes. The turret head is automatically indexed and rigidly locked in position. The indexing of the turret head is automatically accomplished through the return stroke of the turret slide actuated by hand over star wheel, pinion and rack. The tool stops, which are adjustable in the longitudinal direction, are indexed at the same time as the turret and thus ensure perfect similarity of cutting lengths on every component. The cross slide movement is actuated by a conveniently adjusted lever and the slide carries two tool posts one in front and one at the back on which form tools can be set as well as a parting tool for accurate forming as the tool stroke can be set over an adjustable stop.

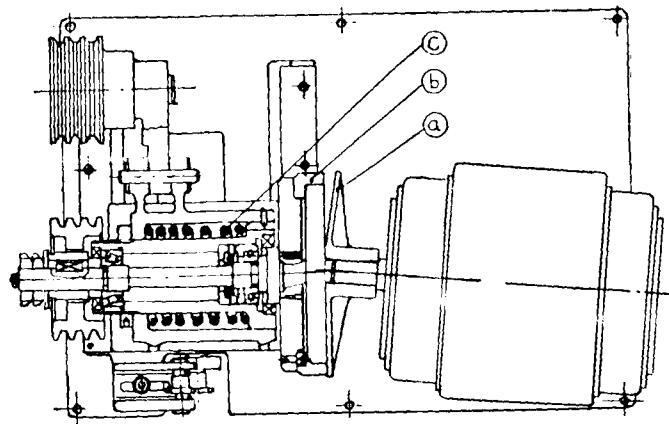


Fig. 2 : Variable Speed Main Drive.

The infinitely variable main drive unit (Fig. 2) consists of a two speed motor of indigenous manufacture with 1400/2800 r.p.m. and 1.1/1.5 H.P. On the motor shaft a cast iron cone disc (a) is mounted, which is in contact with a friction disc (b) of laminated bakelite. The necessary contact pressure is obtained through a compression spring (c). Through the variation of the radius of contact the speed variation in the ratio 1 to 5 is achieved. The necessary movement of the unit, housing and friction disc, is effected over screw and nut which are freely operated by a hand wheel and a chain. The hand wheel is connected over gears with a graduated dial indicating the speed. The main spindle is driven by means of 3 link type 'V' belts from the floating driving pulley of the friction wheel unit. By designing the driving pulley floating, this ensures that the spindle pulley, and the main spindle is not subject to additional thrust due to misalignment, which might have arisen as the friction disc goes forward to take up the wear as indicated in Fig. 3 below:

The jockey pulley mounted on the friction wheel unit takes up the slackness which may arise due to movement of friction wheel unit for speed adjustment and also

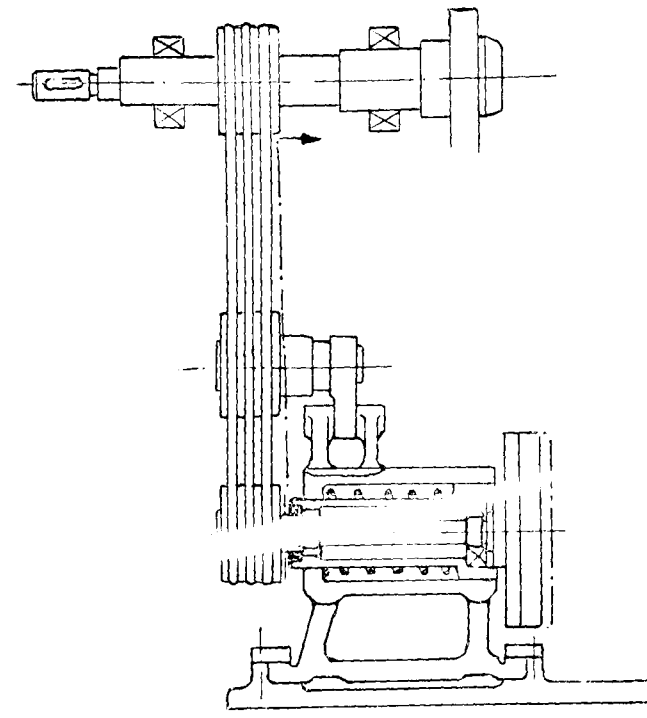


Fig. 3.

guarantees the alignment of the driving pulley with main spindle pulley. This type of variable drive is suitable for transmission of power upto 3 H.P. and covering upto a maximum speed ratio of 1 to 5.

The machine is supplied with the following standard equipment:—

Collet attachment of push type which is operated by a conveniently arranged lever on the end of the head stock (Fig. 4).

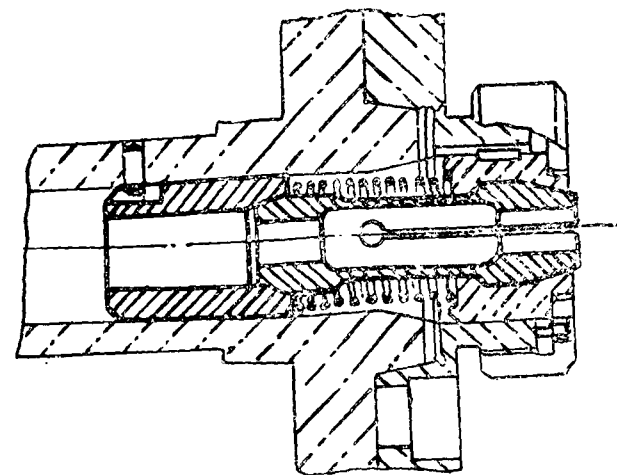


Fig. 5 : Double Gripping Type.

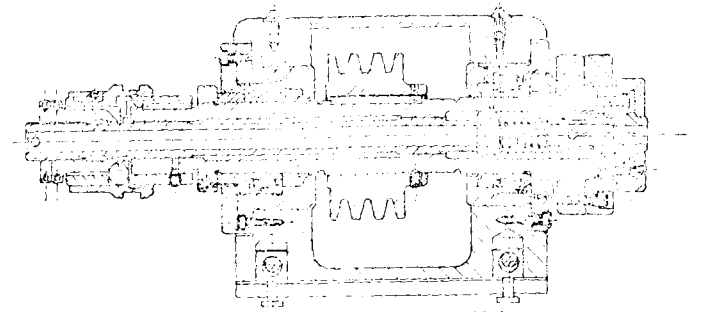


Fig. 4 : Head Stock with Push Type Collet.

Automatically fed bar feed arrangement and the following tool holders:

Adjustable stop Knee tool holder, Centre tool holder, Releasing die holder, Releasing tap holder, Adjustable tool holder, Box holder.

The following extra equipment can be supplied at extra cost.

Collet of double gripping type suitable for the push type collet attachment (Fig. 5).

Draw in type collet attachment (Fig. 6) with a full range of collets.

Thread chasing attachment (Fig. 7) for the cutting of threads upto a length of 2", likewise adaptable for taper screw cutting. A standard range of leaders and nuts for 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 24, 28, 30 and 42 T. P. I., R. H. are readily available. The supply of

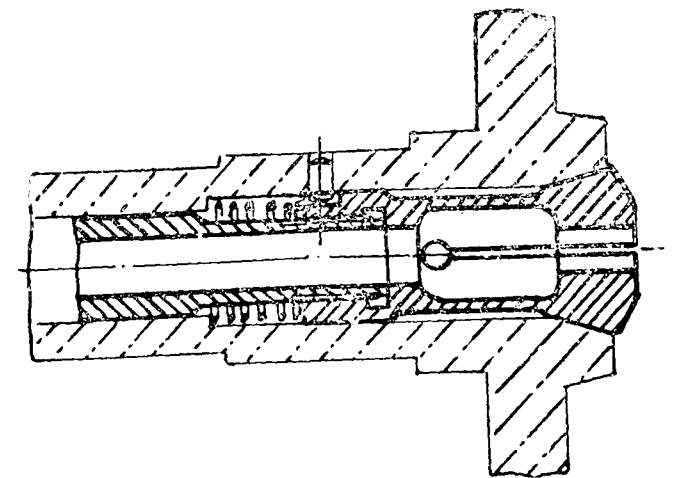


Fig. 6 : Draw in Type.

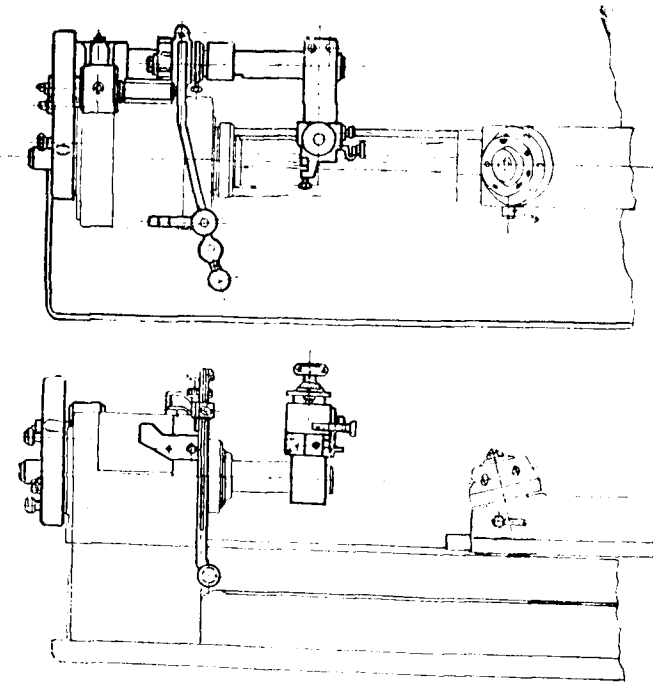


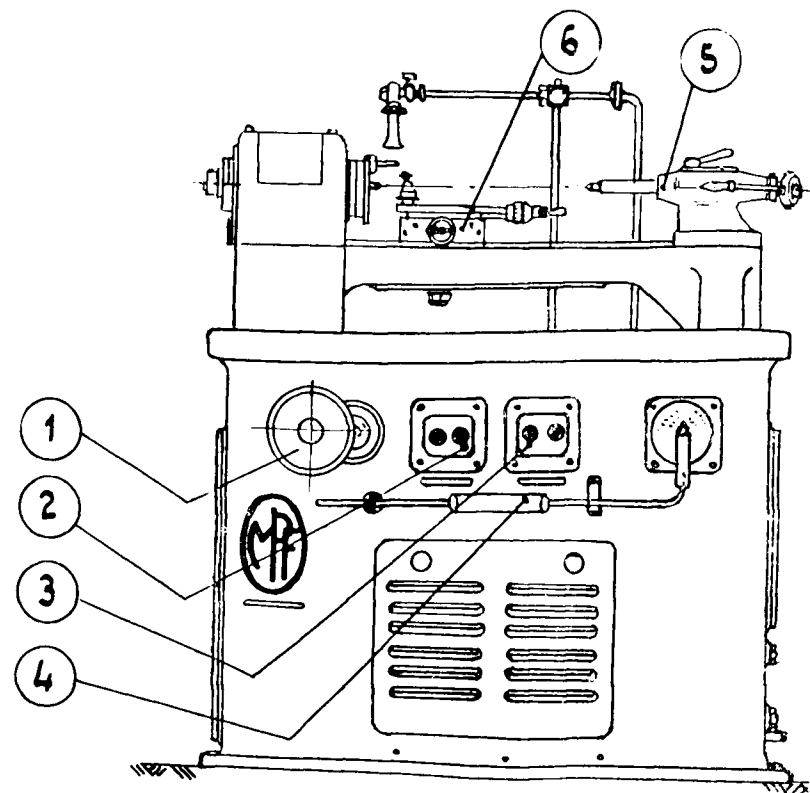
Fig. 7 : Thread Chasing Attachment.

leaders and nuts for L. H. and any special pitch sizes can be arranged if demanded.

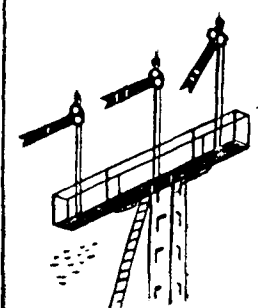
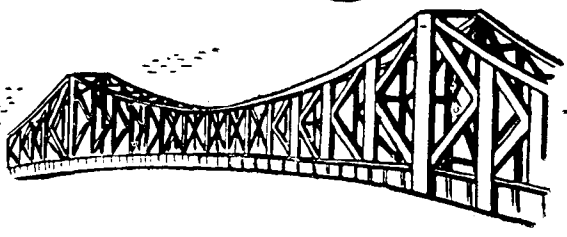
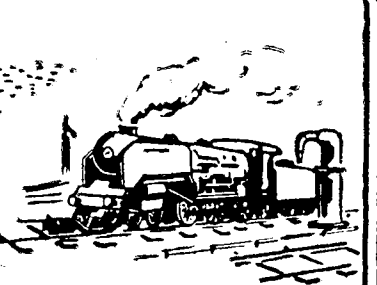
The $\frac{1}{2}$ " Capstan Lathe can be easily converted into a centre lathe by replacing the cross slide and turret by a compound slide and a tailstock respectively. This so converted lathe is called a Cabinet Lathe (Fig. 8) of $4\frac{1}{2}$ " height of centres and admits between centres $17"$. The cross slide and compound slide movement are $3\frac{1}{2}"$ and the movement of the tail stock sleeve is $4"$.

The above is a description of one of the notable machines designed and produced by the Machine Tool Prototype Factory, Ambarnath. Its sturdy, efficient, accurate and modern design recommends it to any production engineer.

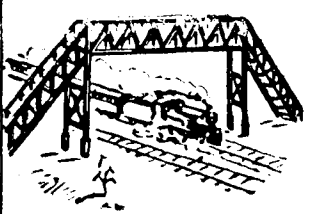
- 1 Handle for change of Spindle Speed.
- 2 Push Button starter for main motor.
- 3 Push button starter for coolant pump motor.
4. Pole changing switch for 2 speed motor.
- 5 Tail Stock.
- 6 Compound Slide.

Fig. 8 : Cabinet Lathe - CBL - $4\frac{1}{2}"$.

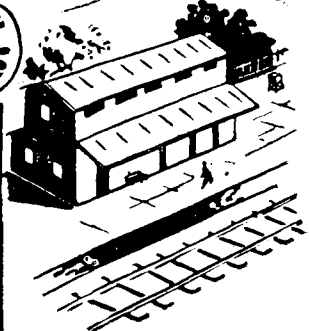
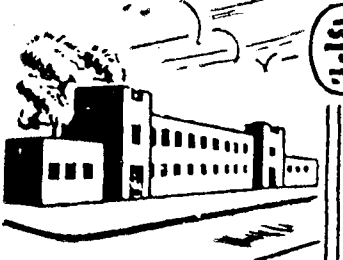


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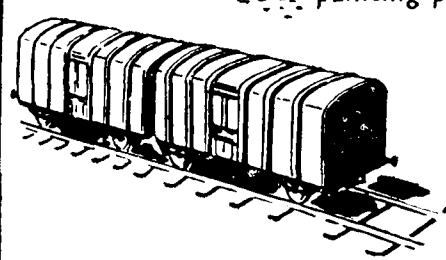


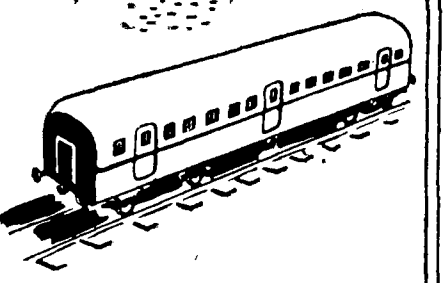

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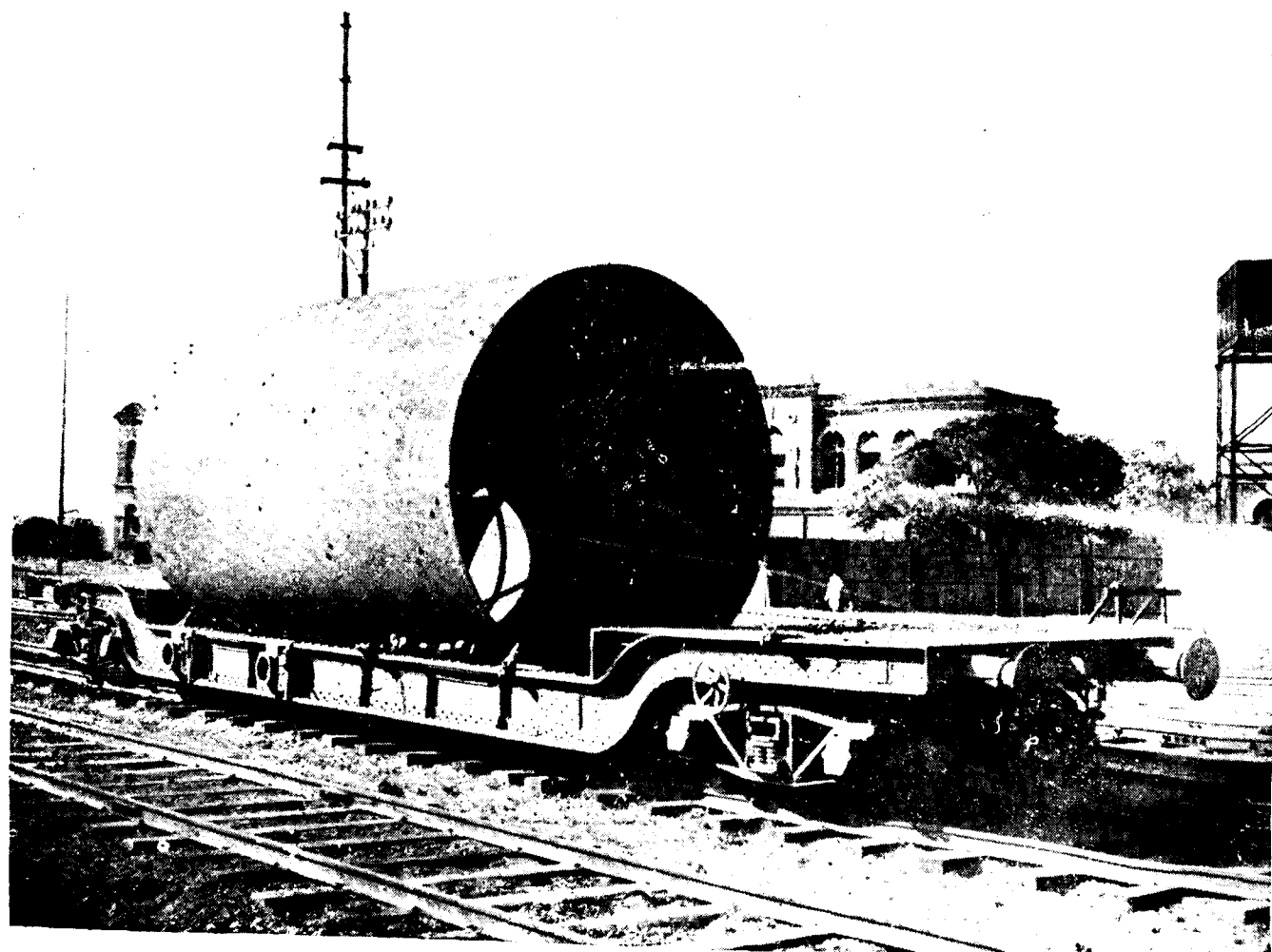
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A MONSTER MACHINE MOVES

LAST month a special train with a 50-ton wagon left the Calcutta Docks under the supervision of a party of railway transportation and engineering staff on its nine-day journey to a cement factory

at Dehri-on-Sone. The special carried an imported 'Kilu Shell'—that measured 15'-7" in its overall height from the rail-level after loading, and was about 22' long with 13'-9" dia. Its weight was 31 tons.



The bulk of the consignment posed difficult transportation problems for the Eastern Railway as the load allowed at places hairbreadth clearance from overhead and side structures.

Elaborate prior planning was done for the load to move during daylight only. Precautionary measures have been taken all along the route for the safety of the goods and passenger trains.

All goods trains have been ordered away from the tracks adjacent to that occupied by the special and suitable alterations made in the running schedule of a number of goods, passenger and suburban trains to avoid their crossing the load on its run. Warning has been issued to all stations on the way to keep the edges of the passenger platforms clear of waiting passengers and their luggage at the time when the special is expected to pass by them.

RAILWAY WEEK SUPPLEMENT

THE ROLE OF ENGINEERS ON RAILWAYS

By Shri M. Ganapati, General Manager, Western Railway

ON the occasion of the celebration of the Railway Week, I have chosen to address the listeners on the role of engineers on railways. Indeed, the part played by the engineer, both in the construction of railways and in their maintenance, is a very fascinating one.

On railways the term "engineer" applies to the civil engineer as apart from the mechanical engineer, the electrical engineer and the signals and telecommunication engineer. This may perhaps be due to the fact that the civil engineer who is responsible for the very construction of the railways from the time it is conceived till the time the railway line is established for the purpose of running trains, is first in the field in connection with any railway project. It is over a century now since railways were first constructed in our country, and the civil engineer has held the field throughout as an indispensable component of any railway organisation. On him devolves the responsibility of undertaking the survey, both preliminary and final, of any railway project, the eventual construction of the railway line in question and its ultimate maintenance for the running of trains, both passenger and goods. On him also devolves the responsibility of designing, constructing and maintaining other civil engineering works connected with the railway undertaking, namely, station buildings, goods sheds, staff quarters, bridges, both minor and major, roads, buildings and offices, water supply and sanitary arrangements, including social amenity centres, such as institutes, clubs, schools for children, dispensaries, hospitals and the like at stations and colonies, whether they be in the sub-district, district, divisional or regional or general headquarters. He is also responsible for the construction and maintenance of running sheds, workshops both small and big for the maintenance of rolling stock, such as locomotives, carriages and wagons and workshops for the ordinary maintenance of civil engineering works at various stations. The construction and maintenance of store depots at suitable sites as well as in the headquarters of railways is also his charge. Structures for power houses or substations and con-



Shri M. Ganapati.

nected civil engineering works are also his charge. In short, he provides and maintains the wherewithal for the Operating, commercial, Mechanical, Electrical Stores and Medical departments, etc., of railways. No one can, therefore, deny him the pride of place in the railway organisation. He is verily the creator of assets as far as the railways are concerned.

His task in these diverse fields is by no means an easy one. Beginning with the survey of a projected railway line he is faced with the problem of selecting the most

suitable alignment for the projected railway line between the two stations selected by the authorities and for this purpose he has first to study the contour plans of the Survey Department of the area in question, decide upon the approximate alignment depending upon the important places which have to be touched along the proposed route, make first a reconnaissance survey to determine the most suitable alignment and then proceed with the actual survey of the country to be traversed. What might appear on the contour plan to be an easy connection between two points touching important places may not actually prove to be quite so feasible on the ground on account of geographical conditions and only a careful survey of such geographical conditions such as the existence of rivers, canals, mountains, hillocks, valleys and other such barriers, will reveal the feasibility or otherwise of an easy connection consistent with practicable gradients which can be economically negotiated by the types of locomotives proposed to be used on the section. There are thus a large number of limiting factors which have all to be taken into consideration before the most suitable alignment can be selected and surveyed in detail at the time of the final location survey before the actual construction is sanctioned and commenced.

Coming next to the actual construction of the railway line, while the economics of such construction would have been studied by the appropriate authority and ultimately sanctioned as necessary, the detailed final location survey enables the engineer to assess precisely the alignment to be followed, the extent of sub-grade work consisting of earth work in embankment and in cutting and tunnelling and the bridging, both minor and major, to be done in connection with the project. The location of stations to serve the needs of the country being traversed, depending upon the importance of the major villages and towns touched by the proposed alignment, is also determined as a result of the final location survey which enables the engineer to prepare a reasonably accurate estimate of the cost of the project with all the data made available by such survey. The actual construction of the earth work in embankment and in cutting and tunnels, of the culverts and bridges designed most carefully to carry the full discharge of maximum flood waters known, and of station buildings and staff quarters, followed by the linking of the railway track and the various yards at stations, both small and big, and the construction of necessary running sheds, turn tables, etc., for use by rolling stock and the provision of station equipment at various stations all follow one after another until the projected line can be said to be completed in all respects and handed over for running of trains on the section.

With the collection of necessary rolling stock, namely, locomotives, carriages and wagons for running trains on the new section and the posting of necessary operating staff at stations and for manning the locomotives, etc., the line is now ready for being declared open for traffic. Before opening the line to traffic, the very necessary precaution of making a thorough check through the agency of the Government Inspector of Railways of the new construction comprising sub-grade work, bridges, track, stations and other appurtenances to ensure that they all comply with the standards laid down for such purposes, is doubtless taken. With this formality complied with, trains are now free to run on this section as necessitated by the dictates of traffic, both passenger and goods. This then is the story behind the opening of a new railway line in which, it will be obvious, the railway engineer plays a very important role.

Once the railway is opened to traffic, the engineer's responsibility is not finished. Actually, his responsibility increases after the opening of the line to traffic. He has to constantly attend to the maintenance of the railway line so as to keep it in good condition for the running of trains. Such maintenance becomes more intensive on sections where the traffic is heavy and where trains are required to run frequently and at fast speeds. In such cases the condition of the track which consists of rails laid on sleepers, either of wood, cast iron or steel, which in turn rest on a bed of stone or other ballasting material laid over earth work in embankment or cutting, suffers deterioration rapidly and need correction with regard to alignment, cross levels, longitudinal levels and wear and tear of permanent way materials. Such attention to track is given by gangs of men appointed over sections of 3 or 4 miles in length at the rate of between 2 to 4 men per mile depending upon the intensity of traffic on the section. It will thus be seen that every mile of track on a railway has 2 or 3 or 4 men attending to it every day in the year. The gangs of men thus appointed for sections of about 4 miles, work as one unit, overhauling the track in their charge little by little every day and thus ensure that the track in their charge is overhauled at least 3 to 4 times a year, besides giving emergent attention to any particular spot whenever required. Such intensive maintenance has to be closely watched by the engineer through his organisation so as to ensure that the railway line is at all times safe for the trains which run on it. Track maintenance is a very important charge of the engineer. During the monsoons, especially in places where rainfall is heavy, track maintenance becomes even more difficult and the utmost care and attention is required on the part of the engineer and his staff to maintain a good running track at all times of the year. Station yards with their numerous sidings and

points and crossings giving connections to the sidings also require considerable attention. As regards bridges, small and big, these also require constant watch and periodical repairs to keep them in good condition so that they do not fall into disrepairs and eventually fail or collapse, thus endangering the track which they support. Some of the major bridges across the rivers need meticulous attention to keep them in good condition. Rivers which carry large volumes of water during rainy season sometimes endanger the foundation of the piers or supports constructed in their bed and these require to be watched during the rains and immediately after the rains. Cases have been known where phenomenally abnormal conditions in this respect have endangered the safety of trains running over these bridges during the rains. On sections where the traffic is very heavy, as in the suburban areas attached to cities like Bombay, Calcutta, and Madras, the maintenance of track needs the utmost attention on the part of the engineer.

Quite apart from the construction and maintenance of the running line together with its sub-grade work, stations and yards, the engineers also have to construct and maintain various workshops and running sheds for the repairs and maintenance of rolling stock. Every railway has a large number of such major workshops and running sheds for repairs to locomotives, carriages and wagons. They have also large numbers of power houses, store sheds and other structures for use by the Electrical and Stores departments which require to be constructed and maintained in good condition. These workshops, power houses and store sheds have their yards attached to them to enable the free movement of rolling stock, machinery or stores to and from these sheds. All these require to be laid out properly and maintained so that these repair facilities and ancillary services are put to the maximum use. Fabricated steel work or concrete work, both reinforced and plain, are used in abundance in connection with these structures, and the engineer has to be an adept in the design, erection and maintenance of such structures.

In regard to staff quarters, roads and horticulture in railway colonies, not only has the engineer to design and construct these buildings to suit modern requirements, but he has to plan carefully the layout of these colonies with adequate number of social amenity centres such as institutes, clubs, children's parks, playfields, dispensaries and major hospitals whenever necessary. In deciding the construction of these social amenity centres, he has to keep abreast of times and plan them in such a manner that the staff colonies, small and big, at various

stations are most suited to the requirements of staff living in them. The engineer has to realise that staff have to be kept happy and contented in decent homes and in hygienic surroundings and proper environment with adequate facilities for recreation, etc., if such staff are to give of their best in running the railways. Here again, the engineer is faced with the problem of planning, designing and constructing structures not only from the point of view of maximum utility and minimum cost, but from the point of view of an æsthetic sense to satisfy discerning eyes.

Office accommodation at various centres, including district, regional and general headquarters, is also the engineer's charge, and in modern times this is assuming more and more importance on account of the large increase in staff and the need to provide them with well ventilated and adequate accommodation for doing their work. Offices built in the early days are now totally inadequate with large increase in the volume of work and the consequent increase in staff with the result that additional accommodation is required at many places, as at the general headquarters of the railways in Bombay. The Churchgate offices are totally inadequate now and additional office accommodation has to be built for housing a large part of the staff who are now scattered in various hired buildings in the town. It becomes imperative for the engineer to plan such additional office accommodation on modern lines even if he chooses to be austere.

Engineers have not only to initiate construction of new projects but have often times to remodel yards to meet ever increasing requirements of facilities and to renew existing structures, especially of major bridges on running lines under traffic conditions without dislocating existing services. Here the ingenuity of the engineer is taxed to the utmost. One example which I can quote here, is that of the regirdering of the single line Ganga Bridge at Kashi consisting of 7 spans of 350 feet and 9 spans of 110 feet into a new double line bridge including the provision of an overhead roadway and footpaths, all under traffic conditions without stopping even a single train of the total of 52 trains which were running on this single line section. This is at once one of the most intricate and complicated pieces of engineering work a railway engineer was called upon to execute. This work was actually done in a period of just 24 months. There are several instances like this where the Railway engineer is called upon to rehabilitate existing assets on the railways under traffic conditions and I can assure you that he rises to the occasion every time. The role of the railway engineer will, I am sure

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Western Railway's Rs. 100 Crore Plan Larger Traffic, More Amenities and Staff Welfare

By Shri M. Ganapati, General Manager, Western Railway

The Western Railway has a second Five Year Plan costing Rs. 100 crores. It will, in addition, receive fresh rolling stock costing about Rs. 69 crores. The Railway's Plan provides for relief in over-crowding in its suburban services, transport of larger passenger and goods traffic, increase in line capacity and survey of new lines, introduction of new Janatas and more amenities for rail-users. The Railway will spend Rs. 6,00,00,000 on quarters for staff including a new township at Kotah, and Rs. 2,53,00,000 on staff welfare works, including Rs. 2,28,00,000 on medical amenities.

OVER a century back, India saw the beginning of the railway system in 1853 with the construction of a small line from Bombay to Thana on what is now the Central Railway. The other rail system, the Western Railway, with its headquarters at Bombay, the commercial capital of India, saw its beginning at Surat, which was the first foot-hold of the British in this country.

The Western Railway feeds the fertile fields of Gujerat with an intensive service. The distance between Bombay and Ahmedabad is served by a double line track except for a small portion between Baroda and Anand, which is also soon to be provided with a double line.

From Ahmedabad, the metre gauge track leads one into the equally rich state of Saurashtra, and skirting along the desert of Rajasthan provides an alternative route to Delhi and East Punjab. The metre gauge system of this railway will shortly provide a link between the north and south with the construction of the metre gauge line from Khandwa to Hingoli.

be conceded as a very varied one demanding the utmost ingenuity, resourcefulness, care and devotion to duty.

In talking about new construction, both of new railway lines and projects connected with works calculated to bring self-sufficiency to railways in the matter of rolling stock, mention may be made of a few important projects like the Assam Rail Link project, Kandla-Deesa, Chunar-Robertsonganj, Pathankot-Mukerian railway constructions, conversion of Gandhi-dham-Bhuj narrow-gauge line into metre-gauge, restoration of Shoranur-Nilambur and Madura-Bodinaickanur lines, the Chittaranjan

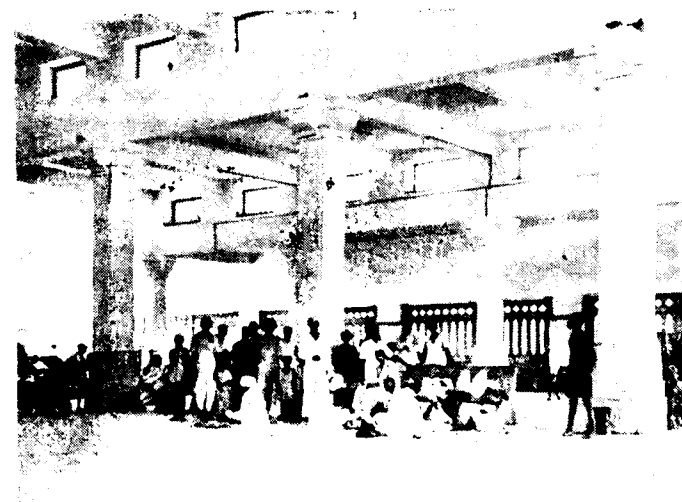


The new Mehsana Station, which was opened in July 1954.

Formed in 1951 by the amalgamation of the B. B. & C. I. Railway, Jaipur, Rajasthan and the Saurashtra Railways—the latter was itself the result of amalgamation of various small railways owned by the Princes of Kathiawar—the Western Railway consisting of a route

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Locomotive Works and the Integral Coach Factory project, which were all completed in recent times in record time, to meet the urgent requirements of the Indian Railways. The skill, energy, enthusiasm, devotion to duty and the team spirit displayed by the engineers engaged in these construction works have alone been responsible for the outstanding results achieved. There are many more projects on the anvil during the second five year plan and there is little doubt that the engineers will play their part in ensuring satisfactory completion of these projects, not only in time but within the estimated costs.



Third class waiting hall at the newly built Mehsana Station.

mileage of 5,614 miles was at once faced with the task of providing additional facilities necessary to cope with the large-scale development in the field of agriculture and industrialisation which followed independence.

The problem of bringing the amalgamated metre gauge lines to the standard of maintenance and operation of Government railways also meant a considerable amount of planning and execution of various works. With the coming of independence, this Railway was also faced with the task of finding transport capacity to replace the loss of Karachi port. It was, therefore, natural that during the first Five Year Plan stress should have been laid on the clearance of a heavy backlog of renewals and replacements which could not be carried out during the war and immediately thereafter.

"SPECTACULAR" PROGRESS

The progress of Western Railway's schemes for rehabilitation of rolling stock and for the removal of bottlenecks that hampered the progress of industrialisation and all-round development, has been almost spectacular.

Without much increase in its holdings of rolling stock and locomotives, the Western Railway carried last year 305 million passengers against 258 million passengers in the first year of its formation; similarly, the tonnage of goods carried increased from a little over 13 million tons to well over 16½ million tons.

Over 400 miles of metre gauge lines were completely renewed and nearly 900 miles were partially renewed.

Known as "the Line of bridges", this Railway had to face the task of strengthening bridges and

culverts to enable heavier engines and heavier loads to be carried at faster speeds. As many as 120 bridges between Bombay and Baroda alone, a distance of 240 miles, were strengthened during the first Plan. A new high-level bridge of about 1,500 feet in length was completed over the Mahi river at Sevalia on the Anand-Godhra section.

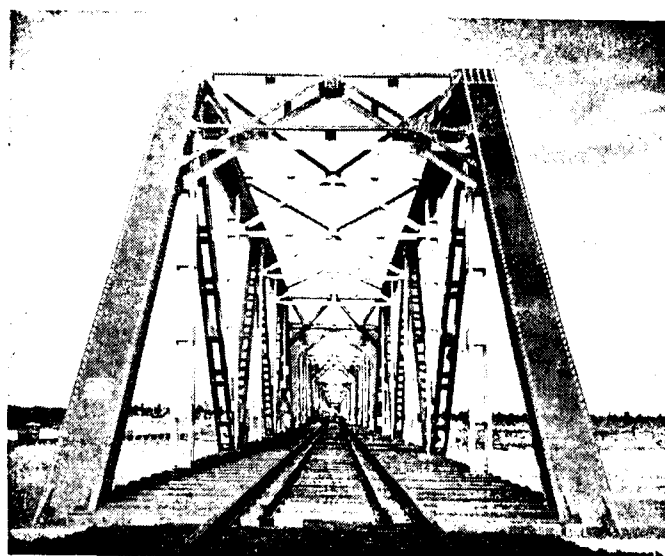
This period saw the construction of the Kandla-Deesa Railway, a length of about 170 miles, designed to provide an alternative cheaper and quicker route between the west and the north of India and to serve the developing port of Kandla as a relief to Bombay port. The construction of the Indore-Dewas-Ujjain line, the Raniwara-Bhildi line north of Kutch for establishing an alternative outlet from Kandla to its hinterland, and the Fatehpur-Shekhawati-Churu line has also been taken in hand and works are in progress.

The line from Ahmedabad to Kalol was doubled and the section from Kandla to Bhuj, a distance of 30 miles of narrow gauge line, was converted to metre gauge during the first Plan period. A large number of line capacity works for increasing the sectional capacity at various places have also been carried out. These include the construction and opening of 35 new crossing stations, the provision of new reception and despatch lines at various stations with a view to increasing terminal facilities, additional loop lines at various stations including extension of existing loops and signalling arrangements etc.

SECOND PLAN

The Western Railway has extensive plans for development in the future. The Western Railway drew up a Second Five Year Plan costing Rs. 149 crores excluding rolling stock. Due to shortage of funds this has been reduced to Rs. 100 crores, and within this amount it is proposed to cater for a 15 per cent increase in passenger traffic and 25 per cent increase in general goods traffic, in addition to meeting the additional requirements of industries and agricultural projects for which a definite demand for transport can be anticipated on the basis of information available at present.

To cater to this traffic, the Ratlam-Godhra-Nagda section and intermediate section between Baroda and Anand will be doubled, and double line working would be established from Bombay to Ahmedabad and from Bombay to Nagda. In regard to new construction, the survey for the Loharu-Pilani link, a distance of 13.75 miles, has been completed. The survey of the Kotah-Chitorgarh line (104 miles) is in hand, and it is also proposed to carry out surveys for the following line



End view of the new bridge at Sevalia which was opened for traffic from 28th September 1954. This bridge was built at a cost of half a crore of rupees.

projects: Dungarpur to Ratlam Via Banswara, Bhavnagar to Tarapore, and a broad gauge line into Saurashtra.

Additional line capacity works, bridge rehabilitation, track renewal, workshop expansion, signalling and safety arrangements, are all included in the Second Plan. Additional locomotives, coaches and wagons costing about 69 crores of rupees would be obtained to enable this railway to cater for the additional traffic.

RAIL-USERS' AMENITIES

During the first Five Year Plan, the Western Railway spent Rs. 200 lakhs in looking after the welfare of the passengers. Of particular significance is the rebuilding of stations like Baroda, Surat, Rajkot, Indore, Ujjain and Mehsana with modern facilities. The waiting halls, concourses, refreshment rooms, lavatories and booking windows at these and other stations have been designed to give the maximum comfort to the public. The remodelling of the Churchgate, Godhra and Jaipur and other large stations is contemplated.

Janata Express trains have been introduced between Bombay and Ahmedabad and it is proposed to introduce similar trains between Bombay and Delhi and between Ahmedabad and Delhi.

During the second Five Year Plan, an allocation of Rs. 230 lakhs has been made for the remodelling of stations to increase their usefulness for goods and passenger traffic.

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Owing to the paucity of coaches, over-crowding is endemic on the Indian Railways, and some sections of the Western Railway are particularly bad, such as between Ahmedabad and Mehsana. Passengers on the Bombay suburban section where there is heavy over-crowding, particularly during the peak hours, will be interested in the relief that is being planned for them.

SUBURBAN TRAFFIC

The three lines between Bandra and Borivli have already been electrified to cope with the additional traffic in the suburban section. It is further proposed to spend Rs. 32 lakhs on the provision of additional facilities and for bringing these three lines into use for suburban traffic also. Additional electrical multiple unit stock has been ordered and is expected to be delivered during 1956-57 and 1957-58. One of the big schemes in the second Plan is the remodelling of the Churchgate station.

With the provision of these facilities it should be possible to run additional trains which can be introduced on receipt of the 25 multiple electrical coaches which are on order. The new Churchgate station, which will also provide additional accommodation for the overflow of the Western Railway headquarters office, will be a modern, multi-storeyed structure.

The suburban traveller whose number has increased from 1.45 million to 1.73 million during the last two or three years may take consolation in the fact that he is no worse off than his "comuter" on the English or American railways.

On the claims side, apart from expediting the settlement of claims, a claims prevention organisation has recently been set up with a view to improving the security afforded to packages in Railway custody during transit or otherwise. It is the common experience of the public that settlement of claims either for compensation or refund is normally very expeditious on the Western Railway.

STAFF TRAINING AND WELFARE

While great stress is being laid on efficiency and improvement in working, equal attention is also being devoted to the betterment of staff and their welfare. Training of staff has been given a very important place in the second Plan of the Western Railway. At present, two training schools are functioning, one at Ajmer and the other at Udaipur. In the second Five Year Plan, provision has been made for the development of the school at Udaipur at an estimated cost of Rs. 62 lakhs and for the establishment of a school at Dohad for

Survey of 868 Central Railway Stations More Passenger Amenities, Faster Trains

By M. N. Chakravarti, General Manager, Central Railway

The Central Railway has carried out an exhaustive survey covering all its 868 stations to find out what basic rail-users' amenities are lacking, and as a result, plans are being made to provide more amenities in stages. This article relates how as a result of a vigorous drive the Railway is now able to carry more traffic. Plans are also under way to run faster trains on certain sections.....

THE first Five-Year Plan commenced with the Central Railway's assets badly in need of rehabilitation. Traffic increased during the war period and has continued to increase thereafter, and this has had to be carried out on depleted and overage assets, necessitating more intensive use of them.

Considerable arrears had to be made up in track renewals, replacement of locomotives and rolling stock and other assets and this claimed the major portion of the funds available. Although rehabilitation was the keynote, the needs of increasing traffic were not overlooked. During the first three and a half years of the Plan period, additional traffic facilities were provided on a somewhat limited scale to cater for the increasing needs of traffic, then estimated to be of the order of 2 per cent per annum.

It was towards the end of 1956 that the Railway Board directed the individual Railways to prepare themselves to carry 20 per cent more traffic during the busy season of 1955-56 than what they did during the busy period of 1954-55. This entailed considerable expansion in the Railways handling capacity.

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imparting training to technical apprentices at a cost of about Rs. 20 lakhs.

An interesting feature of the plan of this Railway is the provision of Rs. 20 lakhs to be spent on various training centres where class IV staff would be given instruction in accordance with the recommendations of the Accident Enquiry Committee. Similarly, staff in the Mechanical Department will be provided with training facilities at an estimated cost of Rs. 25 lakhs.

For efficiency, it is essential that the staff should be in good health, both physical and mental. Towards this objective, over 253 lakhs of rupees would be spent, of which Rs. 228 lakhs would provide medical assistance to the staff and their families. During this period,

INCREASING TRAFFIC CAPACITY

Additional crossing and block stations had to be provided to increase line capacity. Loop lines had to be lengthened and additional loops provided at a number of stations. It was estimated that on the Central Railway 19 new crossing stations would be required and additional lines would be necessary at 20 other stations. The handling capacity of 16 yards through which the stream of traffic passes had to be improved, including some major yards. Improvement of terminal facilities in large goods-sheds, facilities for transshipment at break-of-gauge, junctions, facilities at repacking points were required to be undertaken. It was also considered necessary that efforts should be made to improve locomotive usage and wagon usage by cutting down drastically all avoidable delays. Detailed plans had to be chalked out to achieve all these objectives.

By the end of November 1955, most of the works planned were completed. For example, work went on unceasingly during the monsoon in Bombay last year to improve goods-shed facilities at Wadi Bandar, to enable it to handle an additional 100 wagons. Extensive work

Rs. 600 lakhs would be spent on the provision of staff quarters, and on the creation of a township at Kotah where a wagon repair shop is to be established.

All this expenditure on behalf of the staff is being incurred on the well-established economic theory that man does not live by bread alone, and that for a worker to give his best, he should be guaranteed entire satisfaction of certain minimum needs.

The Western Railway embarks on the second Five Year Plan with courage and confidence. If past achievements are any indication the future of this Railway is bright in its sustained efforts in the service of the public and the nation.



Shri M. N. Chakravarti.

was undertaken at the Ghorpuri tranship shed which was generally considered a traffic bottleneck. Traffic moving across this junction was previously subjected to quota restrictions, but from the middle of December, it was possible to do away completely with the quota regulation and to allow booking freely.

A number of improvements of a minor nature were effected in loco workshops and running sheds to improve the out-turn of locomotives. Special efforts were also made to improve the availability of wagons. As many as 8 to 10 per cent of the total number of wagons on the Railway used to be out of commission due to damages. Through a vigorous drive, it was possible to bring down the number of damaged wagons to 3.5 per cent. Besides, a number of wagons which had outlived their existence were "rehabilitated" temporarily. To reduce the incidence of hot axles on goods trains, a number of "first aid" posts were set up near marshalling yards.

Thanks to the co-operation of the mercantile community, it was possible to improve further the availa-

bility of wagons for loading by keeping goods sheds open for longer hours than before and by sometimes loading in open wagons commodities which used to be moved only in covered wagons.

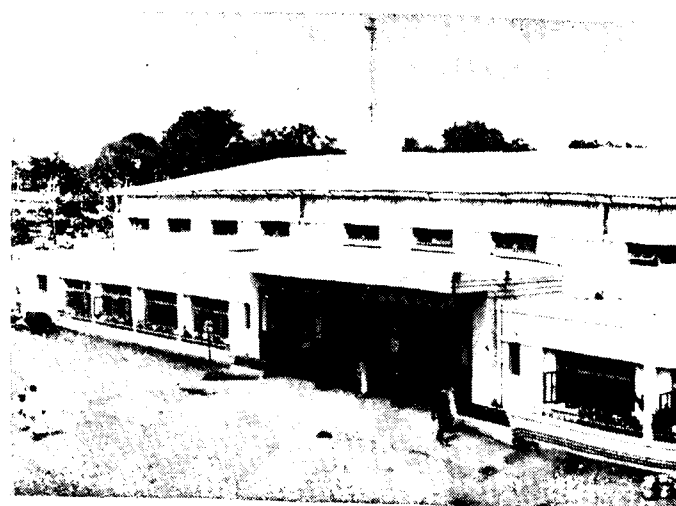
BETTER OPERATIONAL EFFICIENCY

As a result of these steps it is heartening to note that the number of wagons loaded on the Central Railway (B.G.) during the six months from September 1955 to February 1956 was ten per cent more than what it was during the corresponding period last year.

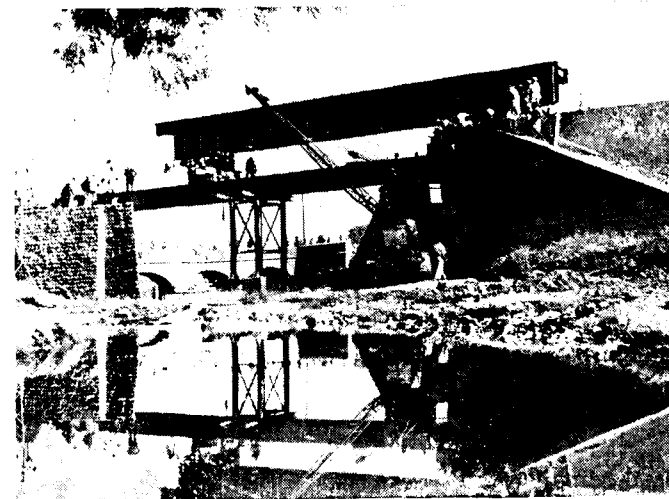
The efficiency of operation on the Railway improved enormously during the six months. For example, the figure of "wagon miles per wagon day", which is a measure of the number of miles a wagon moves in one day on an average (inclusive of delays at terminals, transshipment and other points), improved steadily from 53.5 in February 1955 to 59.6 in February 1956. Likewise, the "net ten miles per wagon day", which is a measure of the quantum of traffic moved by a wagon each day, improved from 714 in February 1955 to 808 in February 1956.

During the second Five-Year Plan we will be called upon to carry more and more traffic. We are gearing our administrative machinery in order that we may fulfil our future obligations.

While we have been able to achieve substantial results in the field of goods movement, we have not been able to achieve much in regard to passenger train services.



The exterior view of the new III Class Waiting Hall and Booking Office at Nagpur station. Almost 3 crores of rupees have been expended on providing passenger amenities over the Central Railway since 1949 when the scheme was introduced.



The work of construction of the 187 mile long Khandwa-Hingoli Metre Gauge rail link was commenced in March 1954. This project will link the 10,100 mile long Northern and 4,900 mile long Southern Metre Gauge systems of the country. This work is by far the largest Engineering work undertaken by the Central Railway during the first Five Year Plan. Considerable headway has already been made in the construction. 53 miles of earth work in formation has been completed and work is in progress on earth work in formation over 70 miles whilst masonry in bridges is in varying stages of progress for over 100 miles. More than 20,000 workmen are busy on this project which is expected to be completed in 1959 at an estimated cost of some 9 crores of Rupees. The project is a symbol of the progress made on the Central Railway, the Pioneer Line of India.

Photo shows the launching of a 60 foot skew girder across the Rameshwar Nalla at the north entry into Khandwa.

The punctuality of passenger carrying trains has unfortunately been low and we are making considerable efforts to improve it. Owing to limitations of rolling stock and locomotives, it has not been possible to effect substantial improvements in the quality of the existing train services or to improve their frequency, except on a few branch lines.

Efforts to procure additional stock to augment the Bombay electric suburban services have, however, just borne fruit and the first consignment of coaches from Italy has just arrived. In the coming months, we hope to receive many more coaches. While every effort will be made to run additional trains, the need for replacing old and worn out stock will have to be constantly borne in mind.

FASTER TRAINS

As a result of signalling improvements, it would be possible in the near future to run faster trains on certain

sections. The Itarsi-Nagpur line which lies along the Grand Trunk Express route is being provided with a new type of signalling called "Multiple Aspect, Upper Quadrant Signalling". When this is completed and the section between Wardha and Balharshah is relayed with 90 lb. rails, it will be possible to speed up the Grand Trunk Express train further.

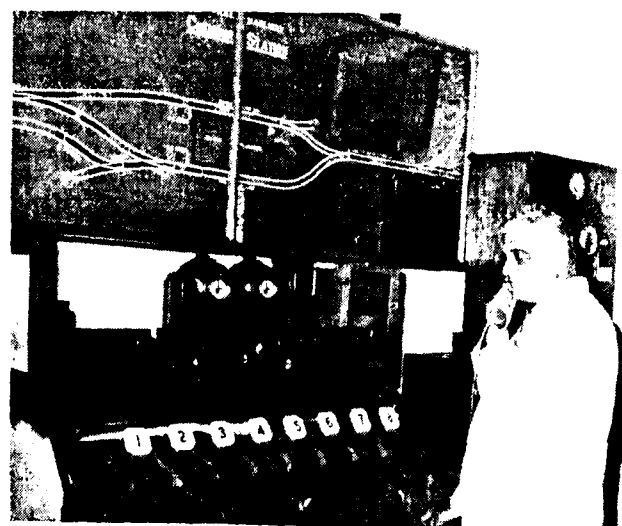
It is interesting to know that the twelve-coach corridor Janata train between Delhi and Calcutta, which was inaugurated on October 2 last year, was built in the Matunga Workshops on the Central Railway. The experimental First class chair car, now running on the Northern Railway, was also built in the same Workshop recently.

PASSENGER AMENITIES

Last year an exhaustive survey was undertaken by the Central Railway on the nature and extent of deficiencies in basic amenities provided at all its 868 stations and also of the additional amenities needed at the bigger stations. The deficiencies at some of the stations are being made up in the current year's amenities programme but there will still remain a number of amenities to be provided at different stations.



Interior of the Dining Car of the fully corridorred Janata Express which now runs between Howrah and Delhi exclusively for the 3rd class passengers. The Dining Car is well lighted and is provided with many fans to keep it cool. Dust-proofing minimises this nuisance to diners. The panel have been decorated with photos and paintings. In the background may be seen a painting of a famous scene on the outside of cave No. 17 at Ajanta. The furnishing of Dining Car, like the rest of the train, was executed at the Central Railway's Carriage & Wagon Workshops at Matunga last year. The train performed its inaugural run on Gandhi Jayanti, 1956.



For the first time in India, the Automatic Block System on a single line section was introduced between Kurla and Chembur in the latter half of 1954—One of the more important signalling projects undertaken by the Central Railway in the first Five Year Plan. With this modern signalling system more than 90 trains a day are now being run between Kurla and Chembur, a symbol of the progress made by Central Railway, the Pioneer Line of India, under the first Five Year Plan.

Photo shows the miniature lever frame installed in the Station Master's Office, Chembur, for operation of colour light signals and power operated points.

Amenity works costing over a lakh of rupees have been carried out at Ahmednagar, Chalisgaon, Kings Circle, Burhanpur, Banda, Belapur, Gadarwada, Itarsi, Manikpur, Jalgaon, Masjid, and Satna — to name a few stations. At a number of other medium and small

stations, a number of works have been carried out including improved water supply, waiting arrangements, food stalls, surfacing and cover over platforms. Some of the major works are now in progress at Jabalpur, Sholapur, Raja-ki-Mandi, Agra Cantt., Nasik Road, Katni and Kurnool Town stations.

In connection with the 2,500th anniversary of Lord Buddha, extensive amenities have been provided at Sanchi station, including extension, raising and paving of platforms, construction of two retiring rooms, etc. at a cost of about Rs. 2,00,000.

DIVISIONAL SYSTEM

A chronicle of achievements in other spheres of activity of the Central Railway would be too long to mention within the compass of a short article. We would, however, draw attention to a very significant change in the system of administration. It is now widely realised that decentralisation and devolution of authority are essential for the successful administration of a big unit like the Railway. The introduction of the full divisional system of working where it does not exist, with a wide measure of decentralisation of authority, has been decided upon by the Railway Board as a matter of policy. The Central Railways which has an organisation very close to the full divisional system has introduced it on two of its existing divisions, viz., Secunderabad and Bombay. Very active steps are being taken to extend it to the remaining divisions, and before the next year we hope that it would have been introduced in practically all the divisions.

WORLD STEEL OUTPUT WILL BE DOUBLED

Mr. Alfred Krupp, proprietor of the well-known German steel firm of Krupps, in an informal talk with the Pressmen in New Delhi said he estimated that in the next 30 to 40 years, steel production in the world would have to be doubled to meet demands. India would require large quantities of steel for her second Five Year Plan.

Referring to the steel plant at Rourkela in Orissa for which Krupps along with another West German firm, Messrs. Demag, are technical consultations, Mr. Krupp said that by October 1, 1958, the first blast furnace of the plant would be ready.

The Rourkela plant, he said, would be one of the most modern steel plants in the world.

Asked whether the German firm would provide credit for the steel project, Mr. Krupp said that his firm was not in a position to do it and it was for the West German Government to consider the matter.

Apart from the State-sponsored steel project, he said, his firm was building three cement factories for private firms in India.

Mr. Krupp disclosed that his firm had also offered to provide machinery for the lignite project in South India. The firm had also supplied locomotive boilers and other locomotive parts to the Indian Railways, he said.

IN YOUR OWN INTERESTS HOW TO PURCHASE TICKETS

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

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

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

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)

192225

CLEANLINESS LEADS TO HEALTH AND HAPPINESS

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

Cleanliness prevents disease; medicine only attempts to cure.

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

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

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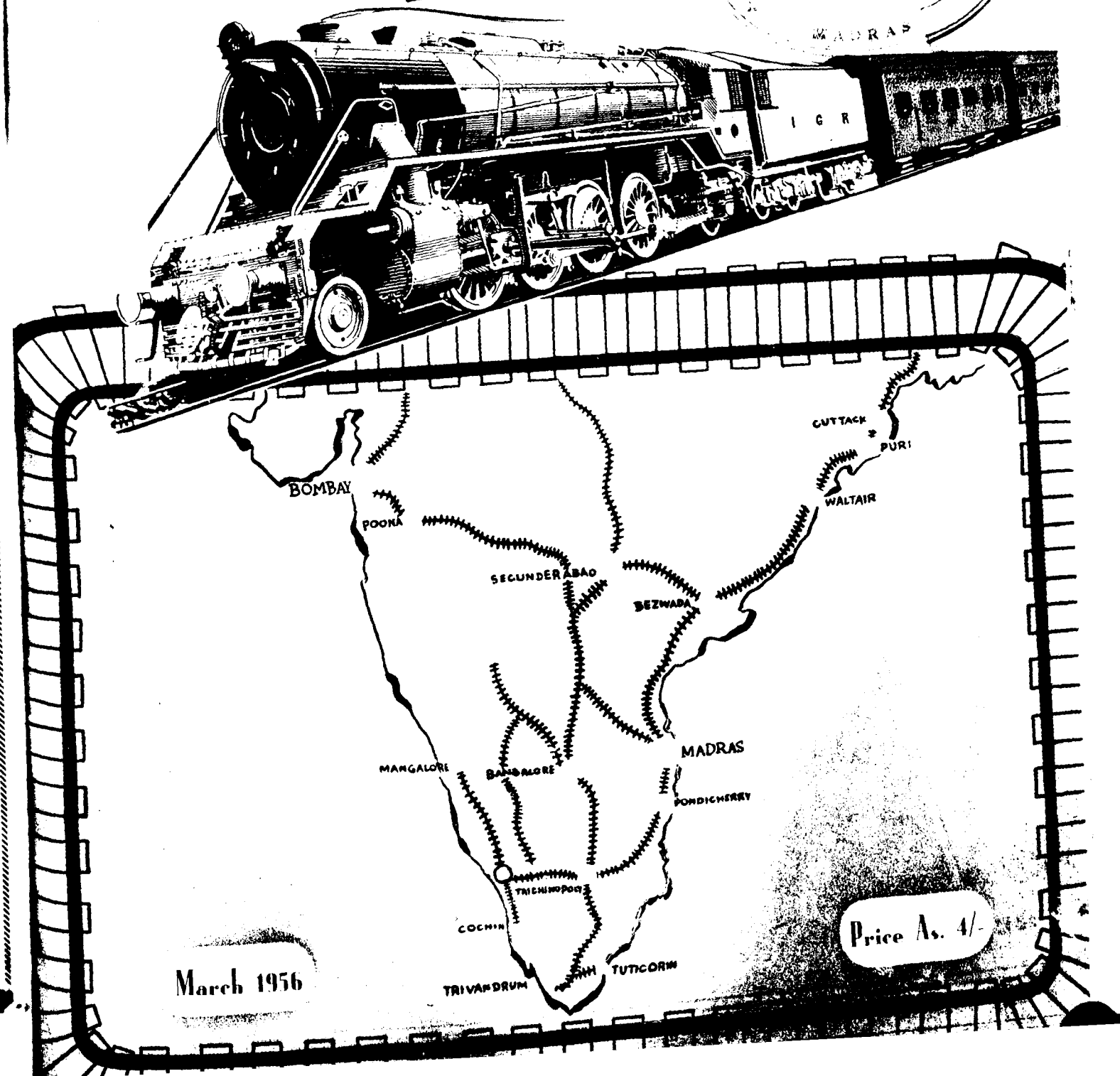
SOUTHERN RAILWAYS

Magazine

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MADRAS



March 1956

HOW TO RESERVE ACCOMMODATION

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

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

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

Tickets will be issued only if accommodation is available.

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

Reservation fee is not refundable.

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

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

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

(Inserted in the interests of Travelling Public by the Public Relations Officer, Southern Railways Magazine)

March 1956

SOUTHERN RAILWAYS MAGAZINE

INDIAN RAILWAYS BUDGET

THE Railway Minister, Mr. Lal Bahadur Shastri, announced a proposal to levy a surcharge of one anna in the rupee on all freight traffic, with the exception of grain and pulses, fodder, manure, khadi, newspapers, newsprint and books. The surcharge would add Rs. 11.6 crores to the Revenues during 1956-57. This step was being taken, he said, to fill the gap between railway revenue and the contribution which they were expected to make towards financing the Second Five-Year Plan for the Railways.

The Railway Minister, who presented the Railway budget for 1956-57 in the Lok Sabha made no new proposals in regard to passenger fares.

It was the intention of the Government, he said, to abolish the existing third class and to rename it as second class with sleeping accommodation in one or two separate coaches.

The financial year 1954-55 ended in a surplus of Rs. 9.1 crores, the Minister said. Mr. Shastri declared that the railways themselves were expected to provide Rs. 375 crores or one-third out of the total allocation of Rs. 1,125 crores made in the Second Plan.

The Minister announced that during the coming year it was proposed to survey 15 new projects. Among them were: a line from Nellore to Maidukur; Manamadurai to Virudhunagar via Arupukottai; and Chinna-

salem to Chingleput via Kallakurichi, Tiruvannamalai and Wandiwash.

Gross traffic receipts for 1954-55 actually amounted to Rs. 286.78 crores, recording an improvement of Rs. 3.98 crores. Ordinary working expenses came to Rs. 205.87 crores, the increase of Rs. 3.1 crores on the revised estimate being due mainly to heavier expenditure on repairs and maintenance.

Mr. Shastri said that passenger traffic had improved by seven-and-a-half per cent in terms of passenger miles, with heavy traffic on account of marriage parties, the Indian Industries Fair, etc., and the revised estimate of passenger earnings had been placed at Rs. 108.5 crores against Rs. 104.5 crores in the budget.

INCREASE IN GOODS TRAFFIC

Goods traffic showed a substantial increase and the revised estimate was placed at Rs. 180 crores which was Rs. 16.1 crores more than the budget.

The gross traffic receipts for 1955-56 were now estimated at Rs. 314.1 crores.

For the year 1956-57 the Railway Minister estimated the gross traffic receipts at Rs. 345 crores.

BUDGET AT A GLANCE

	Actuals 1954-55	(Rupees in crores)		Budget 1956-57
		Budget 1955-56	Revised Estimate 1955-56	
Gross Traffic Receipts	286.78	292.50	314.10	345.00
Working Expenses	206.09	206.80	214.41	224.30
Net Miscellaneous Expenditure	6.63	7.49	8.95	13.04
Appropriation to Depreciation Reserve Fund	30.00	35.00	45.00	45.00
Total	242.72	249.29	268.36	282.34
Net Railway Revenues	44.06	43.21	45.74	62.66
Dividend to General Revenues	34.96	36.07	36.16	39.67
Net Surplus	9.10	7.14	9.58	22.99

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INCIDENCE OF SURCHARGE

The surcharge of one anna in the rupee on all freight traffic except grains and pulses, fodder, manure, khadi, newspapers, newsprint and books, proposed in the Railway Budget will increase the incidence of freight by an average of about eight pies per maund, or less than one-fourth of a pie per seer.

Mr. Lal Bahadur Shastri, explaining the surcharge, and that the increase in freight in the case of individual movements would be small and should cause little or no hardship. In the case of parcels moving at full parcel rates, for example, the surcharge upto a distance of 300 miles will be about one and a half pies per seer.

On vegetables, which move at half the parcel rates generally for distance upto 200 miles, the increase will be about half a pie per seer. Similarly on fruits, which move at one-fourth the parcel rates for distances upto 600 miles, the increase will amount to about half a pie per seer.

The Railway Minister said that in pursuance of the Railways' policy to reduce the number of classes to only two in addition to air-conditioned travel, "our present intentions are to abolish the existing third class and to rename it as second class with sleeping accommodation in one or two separate coaches".

He said: "This change would be in consonance with our objective of reducing class distinctions and I trust that the people travelling in the present second class would welcome closer contact with those travelling in the present third class".

Mr. Shastri said that "as a token of the standard of service which the Railways would like to provide if they had adequate resources, and as a model to be kept in view for the future," it was proposed to introduce from October 2 next a vestibuled fully air-conditioned fast train service, which would have only two classes between Delhi on the one hand and Bombay, Madras and Howrah on the other. To start with, this service would be weekly or bi-weekly.

PASSENGER AMENITIES

The Railways will in future issue concession return tickets for the general public at one and a half times the single ticket fare between July 15 and September 30 each year.

The return tickets will be issued for distances over 300 miles, and with a graded period of availability varying with the distance.

The Minister further proposed that the concession now available to students travelling in groups of four between their homes and their educational institutions, should in future be available to students even when travelling singly, on the production of the usual certificate.

The quarterly season tickets at present available at 2½ monthly season ticket fares on certain Railways, would be extended to the Calcutta suburban areas on the Eastern and South-Eastern Railways, and also to the Northern Railway and the old O.T. section of the North-Eastern Railway, where it is not now in vogue.

The Minister said that the concession tickets issued last year during the Dasara, Diwali and Christmas holidays had proved very popular. It had now been decided that, in future, journeys can be broken on these tickets on the outward trip.

The Minister remarked: "We should very much like to have introduced all the old travel concessions so that the public at large could be benefited, but I cannot overlook the fact that overcrowding is still substantial."

GUARANTEED QUICK TRANSIT OF GOODS

The Railways propose to introduce shortly, as an experimental measure, a special scheme for guaranteed quick transit of goods in wagon-loads and in smalls on important trunk routes, Mr. Shastri said.

He said that the basic features of the scheme were that goods would be carried by express goods trains within a guaranteed period, and their movements would be specially watched.

He added that a small percentage of the normal freight would be levied extra for this service, and if the guarantee was not fulfilled, the extra charge would be refunded.

The Railway Ministry is considering a proposal to send a team, including representatives of railway workers, on a study tour to foreign countries where workers' participation in management has been tried, the Railway Minister said.

MANAGEMENT OF RAILWAY WORKSHOPS

He told the House that the question of participation of labour in management had been "exercising our mind for some time now". He felt that more positive opportunities for participation in the management of the Railways should be provided to workmen in the lower

cadres, and said that it had been decided to take a few important steps in this direction.

The Railway Minister said that a scheme would be drawn up to associate workers in the management and in the running of the railway workshops. The Railway Board would be asked to select two or three workshops on the Indian Railways to give the scheme a trial. The National Federation of Indian Railwaymen would be consulted in these matters.

It had also been decided that workers should be given greater powers and responsibility in matters directly concerning their own welfare.

Mr. Shastri said: "It is my earnest wish that all grades of staff interest themselves in thinking of improvements in all phases of our activity. Many may have constructive ideas, and useful suggestions from them will be welcome. I need hardly assure them that these suggestions will receive consideration and suitable rewards will be given for those which are accepted."

Deploring vandalism, the Railway Minister said that in recent disturbances as many as 40 coaches were destroyed.

On the misuse of alarm chains, he said that during 1955, there were over 40,000 cases of trains being stopped by the pulling of alarm chains, the largest number of cases being on the North-Eastern and Eastern Railways.

IMPROVEMENT IN EARNINGS

Presenting the Railway Budget in Lok Sabha Mr. Lal Bahadur Shastri, Minister for Railways, said:

I shall first outline the financial picture of the Indian Railways as it has emerged from the completed accounts of the previous year. Gross traffic receipts for 1954-55 actually amounted to 286.78 crores, recording an improvement of 3.98 crores on the revised estimate, mainly under goods earnings. Ordinary working expenses came to 205.87 crores, the increase of 3.1 crores on the revised estimate being due mainly to heavier expenditure on repairs and maintenance, and an increase under suspense. With a saving of about 1.7 crores under miscellaneous expenditure and other minor variations, the surplus rose to 9.1 crores against the revised estimate of 6.57 crores, and the entire amount was credited to the Development Fund.

REVISED ESTIMATES FOR 1955-56

Turning now to the current year, the traffic trends, which showed signs of improvement towards the end of

last year, have continued to be encouraging. Passenger traffic has improved by about 7½ per cent. in terms of passenger miles with heavy traffic on account of marriage parties, the Indian Industries Fair, etc., and the revised estimate of passenger earnings has now been placed at 108.5 crores against 104.5 crores in the budget. An increase of 2½ crores is also anticipated under other coaching earnings, mainly on parcels traffic. There has been a substantial increase in goods traffic, in spite of interruptions during the year due to the severe floods in the north and cyclones in the east and the south. The revised estimate of goods earnings has, therefore, been placed at 180 crores, which is 16.1 crores more than the budget. With an improvement of 50 lakhs in sundry earnings and variations in suspense, the total gross traffic receipts for the current year are now estimated at 314.1 crores.

There is a corresponding increase of about 7½ crores under Ordinary Working Expenses. About three-fifths of this increase is on repairs and maintenance, which partly reflects the heavy damage done by floods and cyclones, and partly the increase in repairs to rolling-stock and machinery, arising out of the higher level of traffic and increased out-turn from the shops. The rest of the increase is mostly under operational demands and generally reflects the increase in the tempo of activity on the Railways, in the process of gearing up for the big effort that they will be called upon to make during the Second Five-Year Plan, which, even in the reduced scale, is nearly three times as heavy as the First Five-Year Plan.

CONTRIBUTION TO RESERVE FUND

It is proposed to increase the contribution to the Depreciation Reserve Fund from the budgeted figure of 35 crores to 45 crores for special reasons which I shall explain presently. There is an increase of 1½ crores in miscellaneous expenditure, mainly due to a larger allotment for Open Line Works chargeable to Revenue, and sundry increases under surveys and miscellaneous establishments.

The net result of all these variations is that the surplus is now expected to be 9.58 crores against the budget estimate of 7.14 crores. It is proposed to appropriate this increase of 2.44 crores to the Development Fund.

In recent years, naturally the Railway Budget has increasingly been influenced by the progress of the Five-Year Plan. Not only does it register the progress in the railway segment of the Plan, it also reflects to a degree the effects of the rest of the Plan on railway extensions and improvements. It will, therefore, be appropriate, before proceeding to the Budget Estimates for 1956-57,

to refer briefly to the implementation of the First Five-Year Plan on Railways that is now coming to an end, and the magnitude and implications of the Second Five-Year Plan that is due to commence in the next financial year.

FIRST FIVE YEAR PLAN

The central objective of the First Five Year Plan was rehabilitation of railway assets had fallen heavily into arrears during almost two complete decades before the commencement of the Plan and the cumulative effect of this was very considerable. There were also pressing demands from the public for the restoration of dismantled lines and the provision of more passenger amenities, and from the staff for more housing and welfare measures. The allotment made to the Railways originally was only 350 crores, which was later raised to 400 crores. I am glad to inform the House that not only has this allotment been fully utilised, but the actual expenditure is likely to be of the order of 432 crores which figure has received the approval of the Planning Commission. Rolling Stock has accounted for over 240 crores spread over the purchase of 1,589 locomotives, 4,837 coaching vehicles and 61,773 wagons on additional as well as on replacement account. All the lines recommended for restoration by the Central Board of Transport, except one, have already been re-opened to traffic. Five new lines which were in progress at the beginning of the Plan as well as seven more sanctioned during the Plan have been completed, and considerable progress has been made on a number of other new lines commenced during the Plan. The Chittaranjan Locomotive Works, which was expected to produce 268 locomotives during the Plan period, has actually produced 337 locomotives, i. e., an improvement of 25 per cent over the target. The Integral Coach Factory at Perambur is making good progress and, as the House is aware, production therein was inaugurated by the Prime Minister in October last. The Ganga Bridge construction is well under way and good progress has also been made in the provision of facilities at the Vishakapatnam Port. The Railways can surely look back on their achievements during the First Five Year Plan with some satisfaction and embark upon the Second Five Year Plan with confidence.

ALLOCATION IN SECOND PLAN

I now come to the Railways' Second Five Year Plan. Originally, the Railway Board had prepared a plan costing 1,480 crores, on the basis of an increase of 30 per cent in passenger transport 15 per cent for increased traffic and 15 per cent to alleviate overcrowding—and 60.8 million tons in goods transport, assuming that the demand at the end of the First Five

Year Plan will be 120 million tons. The Planning Commission, whose task was none too easy, have, in the context of the overall requirements to be met by the limited financial resources of Government, indicated that the allocation for the Railway Plan will be only 1,125 crores, of which 375 crores will have to be found by the Railways from their own revenues during the Plan period. It has been agreed also that, if the resources of the Railways exceed this figure, they will be allowed to expand the Plan outlay accordingly.

The Railway Plan has, therefore, been reviewed, and it has been found that, within the revised allocation, it will be possible to provide only an additional transport capacity of 15 per cent for passenger traffic and 47 million tons of goods. The total goods movement during the current year is likely to be 115 million tons, against an estimated demand of 120 million tons, leaving a gap of 5 million tons, which is also to be covered by the expected increase, and, therefore, the net increase during the Second Five Year Plan would be of the order of 42 million tons, against the original estimate of 60.8 million tons. While this increase is expected to meet fully the additional traffic load of 25 million tons on account of coal and other raw materials required for the expanding steel industry and its finished products, 6 million tons more coal and 4 million tons more cement, I am afraid it will leave a meagre margin for increases in trade and output in other sectors of our economy. It is also feared that the small increase of 3 per cent per year in passenger train miles now planned will not help much to relieve over-crowding as long as passenger traffic continues to grow as anticipated.

The Planning Commission, no less than the Railways, are concerned at the prospect of a shortfall in passenger and goods transport capacity from the targets originally envisaged in the Plan. We are, however, most anxious to step up the capacity.

An assessment of the earnings and expenditure of Railways during the Plan period shows that, against the 375 crores which they are required to provide, their resources would amount only to 325 crores, made up of 225 crores to be contributed through the Depreciation Reserve Fund during the Plan period, and 100 crores from Revenue including expenditure on open line works, interest on Railway fund balances, and Revenue surpluses, which will be very small since a large proportion of the additional traffic will be low-rated and the dividend liability to General Revenues on account of increases in the Capital overhead will rise very steeply during this period. The gap of about 50 crores has to be filled to

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avoid a further restriction in the scope for the development of the transport capacity and the Railways must, therefore, endeavour to increase their earnings so as to meet the contribution required of them, and, if possible, something more, in order to reduce the margin between the present lower targets and the original targets of transport capacity.

INCREASE IN FREIGHT

It is in these circumstances that I have to approach you to agree to a surcharge of one anna in the rupee on all freight traffic, with the exception of grains and pulses, fodder, manure, Khadi, newspapers, newsprint and books. This will add 11.6 crores to our earnings during the ensuing year and will, I hope, ultimately help in building up capacity to the original targets. I have proposed a flat increase instead of a selective variation in the basis of charge, which, I feel would not be desirable while the Freight Structure Enquiry Committee is already examining this question. The increase in freight in the case of individual movements will, however, be small and should cause little or no hardship. The incidence of increase in goods freight will, on the average, be in the neighbourhood of 8 pies per maund or less than a quarter pie per seer.

In the case of parcels moving at full parcels rates, the surcharge for a lead of 300 miles, for example, will be about one and half pies per seer. The increase will be only about half a pie per seer on vegetables which move at half parcels rate generally for distances up to 200 miles, and on fruit which moves at quarter parcels rate for distances up to 600 miles.

PROVISION OF ROLLING STOCK

A substantial portion of the allotment under the Plan is intended to be utilised on the provision of rolling stock for carrying the extra traffic, including new stock required for sections to be electrified. Another large portion of the allotment is for line capacity works designed to relieve pressure on trunk routes on which traffic has already reached saturation point, and for electrification or dieselisation of certain routes which cannot take more traffic under steam traction. The Plan provides also for enhancing workshop and stores capacity for the increased holding of rolling stock, and expansion of goods sheds, improvements in signalling and interlocking, safety measures and increase in stores holdings incidental to the large works programmes and the higher level of traffic as well as for the projected increase in the capacity of the Chittaranjan Locomotive Works.

The reduction in the Plan allotment will, however, fall heavily, initially at any rate, on new line construc-

tions other than those integrally connected with the increase in coal and steel traffic. In the context of our developing economy, however, we should look ahead boldly and not take a pessimistic view. The Planning Commission have assured us that the position will be kept under constant review and necessary adjustments will be made in the allotment to Railways as the Plan progresses. In no way less important is the co-operation forthcoming from the people, either in the form of voluntary labour or contribution in the form of land and money. I, therefore, propose to proceed with the survey of new lines on the original programme of 3,000 miles so that the construction work may be commenced immediately funds become available.

MEASURES TO MEET EXTRA LOAD

The extra load that would fall on the Railways, due to anticipated increase in traffic and the general upsurge of activity anticipated during the Plan period, will indeed be very substantial. I am glad to tell the House that the Railway Board and the Railway Administrations have already applied themselves vigorously to the tackling of manifold problems that will arise out of the actual implementation of the Plan. An all-out effort is being made to build up capacity on the Railways for handling this load, on the works side as well as on the administration and operating sides. The programme of recruitment and training of staff required on the Railways, under scores of categories has already been intensified.

Advance procurement of materials which are in short supply, like steel, etc., is also being planned in consultation with the Ministries and other interests concerned, and it has been decided to send a high-level delegation of officials abroad to procure the requisite quantity of steel, the shortage of which has been causing us some concern.

FINANCIAL ASPECTS OF PLAN

Now I would like to say a few words on some of the financial aspects of the Plan. On a rough break-up of this expenditure of 1,125 crores, it has been worked out that there will be an increase of 680 crores under Capital, a withdrawal of 293 crores from the Depreciation Reserve Fund, and expenditure of 92 crores chargeable to the Development Fund, and of 60 crores chargeable to Revenue for open line works. Against the anticipated withdrawal from the Fund, during the period, of 293 crores, the balance in the Depreciation Reserve Fund at the commencement of the Second Plan is expected to be 101 crores. Appropriations to the Fund during the period have, therefore, to be so adjusted that there will be enough left in the Fund at the end of the period to

finance at least one year's expenditure on renewals and replacements. In other words, the balance in the Fund should not be allowed to fall much below 50 crores. In order to ensure this, the contribution to the Fund is proposed to be raised to 45 crores from 35 crores per year recommended by the Convention Committee of 1954 on the basis of an anticipated withdrawal of 250 crores only in five years and agreed to by Parliament. Since this will be a modification of the Resolution of Parliament fixing the contribution at 35 crores per year, I would request the specific approval of the House to this. It is in this context that it has been proposed that the contribution to the Fund for the year 1955-56 should be raised by 10 crores.

BUDGET ESTIMATES

I now come to the budget estimates for the next year. On the basis of the present trend of passenger traffic, the estimate under this head has been fixed for the next year at 111.4 crores—an increase of 2.9 crores over this year's revised estimate of 108.5 crores.

The budget estimate of other coaching earnings is being placed at 21.8 crores, an improvement on the current year of 1.3 crores, of which about one crore will be due to the supplementary charge of one anna in the rupee proposed on parcels.

The estimate of goods earnings in the budget year is placed at 205.5 crores on the basis of the anticipated increase in traffic and the supplementary charge of one anna in the rupee on goods freight, which I have mentioned earlier. Other sundry earnings are expected to amount to 6.40 crores, which is about the same level as the revised estimate for the current year. Allowing for an increase of 10 lakhs in traffic suspense, the gross-traffic receipts have been placed at 345 crores during the next year.

The estimate of ordinary working expenses for the budget year has been fixed at 224.1 crores, which represents an increase of nearly 10 crores over the revised estimate for the current year. Of this increase, about 6½ crores is on the wage bill, mainly for the extra staff required for handling the large increase in traffic and intensification of other activities. There is an increase of 1.4 crores in repair expenses in consonance with the increase in traffic and increased in out-turn of rolling stock after periodical repairs from the workshops. The rise in the cost of steel also has contributed to the increase in working expenses. The fuel bill will go up by about a crore, and miscellaneous other increases total another crore.

It is proposed to spend about 3½ crores more on a larger programme of open line works chargeable to Revenue. With the heavier Capital expenditure on works, there is an increase of about 3.5 crores on the dividend payable to General Revenues. Taking all these factors into account, the net revenue surplus is expected to be of the order of 23 crores. It is proposed to credit the entire amount to the Development Fund.

EXPENDITURE ON ROLLING STOCK

The revised estimate for the current year of expenditure on works, machinery and rolling stock, including open line works chargeable to Revenue, comes to 140.55 crores, involving an increase of about 14 crores over the budget estimate. This increase is mainly due to earlier deliveries of rolling stock and machinery than anticipated at the time of the Budget, the acceleration of certain works to increase line capacity and more expenditure on track renewals.

The estimates for the works, Machinery and Rolling Stock Programme for the budget year have been placed at 199.8 crores. Of this, rolling stock accounts for about 79.6 crores, plant and machinery for 5 crores, construction of new lines and restoration of dismantled lines for 16.6 crores, track renewals for 19.7 crores, other open line works for 50.8 crores, investment in road services for 1.3 crore and expenditure on Vishakhapatnam Port for 1.1 crore. There is a larger provision of 29.5 crores for building up reserves of difficult items of stores, so as not to hamper the progress of works. There is a credit, however, of 6.81 crores for the transfer of the cost of Railway collieries to the Ministry of Production, and of about 3.8 crores for released materials, so that the net expenditure will be of the order of 193 crores.

NEW CONSTRUCTIONS

The progress made on new constructions has been satisfactory and the projects have been executed with commendable despatch notwithstanding shortages of essential materials, particularly steel, required for permanent-way and bridge girders. The Pathankot-Madhapur line was opened to traffic in September 1955 and the Gop-Katkola Metre Gauge link in December 1955. The construction of the Champa-Korba, Quilon-Ernakulam, Khandwa-Hingoli, Noamundi-Banspani, Fatehpur-Churu, Indore-Dewas-Ujjain, Raniwara-Bhiladi and Gandhidham-New Kandla railway lines, totaling 454 miles, is in progress. Construction will be started very shortly on three new lines, aggregating 221 miles, required for the Steel work projects at Rourkela and Bhilai—namely, the Rourkela-Dumaro, the Bhilai-Dhalli Rajhara and the Bharkakana-Rourkela connections.

SURVEYS

In all, about 2,000 miles of surveys for new lines were sanctioned during 1955-56. Of the surveys mentioned in the last year's Budget papers or which were already in progress then, those for Diva-Dasgaon, Tildanga-Khajuria-Malda, Kotah-Ajmer and Ramshai-Binnaguri have been completed and traffic estimates of the Garo Hills lines worked out. Surveys for the Mangalore-Hassan and Madhopur-Kattua lines are nearing completion and those for the Gwalior-Ujjain, Nizamabad-Ramagundam, Sambalpur-Titilagarh, Baraset-Hasanabad, Sitamarhi-Sonbarsa, Bangalore-Salem, Trivandrum-Tinneveli-Cape Comorin, Vellore-Conjeevaram, Kottah-Chittoor-garh and Udaipur-Himmatnagar lines are still in progress. In addition, 11 new surveys were also sanctioned. These are the Satna-Rewa-Govindgarh, Rampur-Lalkua, Loharu-Pilani, Nipani-Raibag and Nipani-Sakleshwar-Ghataprabha, Kadur-Chikmagalur-Sakleshpur, Muzaffarpur-Darbhanga, Robertsganj-Garhwa Road, Bukhtiarpur-Rajgir, Bhaili-Bhadran and Sojitra-Dhalka, avoiding lines in Delhi area, and branch lines in the Karanpura and Ramgarh Coalfields. The Loharu-Pilani survey has also been completed. The remaining surveys are in progress.

BRIDGE OVER JAMUNA AT DELHI

A proposal is also under examination for a second road-cum-rail bridge over the Jamuna at Delhi with an avoiding line connecting Tughlakabad and Ghaziabad. An aerial survey has been completed of the difficult country in the West Coast area from Dasgaon (to which a ground survey from Diva has already been done) up to Mangalore. The aerial photo mosaics are being studied with the object of exploring the possibilities of development of rail communication in the region.

NEW RAIL LINKS IN S. INDIA

During the coming year it is proposed to survey the following 15 new projects:

- (i) A line from Bijuri to Khairadih with a branch line to Jhilmilli in the Central India Coalfields.
- (ii) Nellore to Maidukur.
- (iii) Kottur to Harihar.
- (iv) Manamadurai to Virudhunagar via Arpukottai.
- (v) Chinnasalem to Chingleput via Kallakurichi, Tiruvannamalai, Wandiwash.
- (vi) Kosi Kalan to Alwar or Bharatpur.
- (vii) Dungarpur to Ratlam via Banswara.
- (viii) Bhavanagar to Tarapore.

- (ix) A Broad Gauge line into Saurashtra.
- (x) Hindumalkot to Ganganagar.
- (xi) Kurukshetra to Pohwa.
- (xii) Pandu-Amjanga-Darangiri.
- (xiii) Rudrapur to Nautanwa via Kushinagar and Deoria.
- (xiv) Jagadhri-Chandigarh-Rupar-Ludhiana.
- (xv) Orai-Jalaun.

Of the 12 dismantled lines the restoration of which was approved by the Central Board of Transport, 11 were restored with the opening of the Utratia-Sultanpur Section in June 1955. Of the remaining line, namely, the Rohtak-Panipat link, it is intended to take in hand the restoration of the Rohtak-Gohana portion in the coming year. Owing to the limited funds, it is proposed to undertake the restoration of only one more, namely, the Akbarpur-Tanda line. This is 11 miles long and will cost 12.4 lakhs approximately and will help in the rehabilitation of the handloom industry in that area.

NARROW GAUGE LINES

The working of Government-owned Narrow Gauge lines situated in the plains is under review and it is hoped that the critical studies being conducted now will enable the Railways to formulate a long-term policy, spread over possibly 10 to 15 years, for their rehabilitation or conversion to the gauge of the contiguous railway systems in a manner closely integrated to the transport needs of the areas served and the economics of railway operation.

TRANSPORTATION POSITION

While dealing with the revised estimates of goods earnings for the current year, I had mentioned that there has been a substantial increase in goods traffic. The position at the commencement of this year was that, in spite of an increase in the later half of 1954-55 compared to the previous year of 8.2 per cent in the total wagon loadings on the broad and metre gauges taken together, outstanding registrations commenced mounting up from February 1955, and heavy arrears of loading had accumulated. A drive was instituted to liquidate these accumulations by still greater improvement in operating performance, on the one hand by optimum utilisation of existing line capacity and rolling stock and on the other by the acceleration of certain works designed to ease bottle-necks and increase the throughput. The 1st of November 1955 was set as the target for a 15 per cent increase in movement capacity

on all Railways taken together, made up of a 10 per cent increase on the Eastern and South-Eastern Railways which already accounted for roughly 45 per cent of the wagon loadings and a 20 per cent increase on the other Railways. Since wagons were short of requirements, steps were taken to improve their availability for traffic by a reduction in the number of wagons under repair, and by intensive utilisation. These efforts have borne fruit. The percentage of sick wagons in November and December 1955 came down to 4 per cent on the broad gauge and 5.8 per cent on the metre gauge, from 7 per cent and 7.2 per cent in the previous year. Capacity for movement over the Madras-Bezawada section has increased from 350 to 450 wagons a day, and the daily movements over the Ratlam-Godhra section have improved from 490 to 630 wagons a day. The daily transshipment position during the last three months at Virangam has improved by 90 per cent, and at Sabarmati by 22 per cent, as compared to the corresponding period of last winter. Movements *via* Ghorpuri to South India are now free. Movement across the Ganga has been stepped up, notwithstanding difficult river conditions resulting in frequent disorganisation of ferry crossings. The transshipment *via* Manduadih, particularly, has been stepped up and is 45 per cent better than last year. As a further relief for movements of traffic to North Bengal and Assam, an agreement was negotiated with the Pakistan Railways for through bookings *via* their eastern route, and on an average about 50 wagons daily have been moving that way. The daily average number of wagons passing through Moghalsarai has stood during the last three months at 1,778 as compared to 1,662 last year, and the allotment of coal above Moghalsarai has been 1,320 wagons per day during that period, which is an improvement of 15 per cent over the corresponding period of the last year. The cumulative result of all these improvements may be gauged from the tonnage lifted in the first 9 months of the current year, which was 8 1/4 per cent higher on broad gauge and 18 per cent higher on the metre gauge than during the corresponding period for last year.

The Railway Board have set target of further improvement ranging from 10 to 20 per cent, during the coming year, and many works for development of sectional and transshipment capacity have been sanctioned and will be progressed rapidly so that these higher targets may be achieved during the next busy season. Before I leave this subject, I should like to mention two outstanding figures of operating performance in 1954-55. Net ton miles per wagon day during the year over the broad gauge reached the record figure of 483, which constitutes an improvement of 8 per cent over the wartime peak figure of 451, the highest ever reached before. Net ton miles per day per engine in use on the broad

gauge rose to 29,345 — an improvement of nearly 9 per cent over the best previous performance in 1941-42, the corresponding figure over the metre gauge being 12,851, which is nearly 4 per cent over the best previous performance.

It is proposed to introduce shortly, as an experimental measure, a special scheme for quick transit for consignments both in wagon loads and in small on important trunk routes. The basic features of the scheme are that the goods will be conveyed by express goods trains within a guaranteed period and that their movement will be specially watched. A small percentage of the normal freight will be levied extra for the service which will be refunded if the guarantee is not fulfilled.

RAILWAY PROTECTION FORCE

I mentioned last year that a Railway security organisation was being built up on each Railway, into which the Watch and Ward organisation would be absorbed, and that arrangements are being made for the training of staff to make the force a really efficient organisation. Officers of the rank of Deputy Inspector-General of Police have been appointed on each Railway as Chief Security Officers and an Inspector-General of the Railway Protection Force is attached to the Railway Board. Adequate arrangements have been made for the training of the personnel of the force in special training schools, and an armed wing of this force is also now being built up which is expected to be of substantial assistance in the protection of railway property and of goods entrusted to the Railways for transit. A Bill to give this force a statutory standing is also proposed to be introduced during the current session. As a result of these measures and the efforts of the Claims Prevention Organisations on Railways, there has been an improvement in the position in respect of compensation claims. I may incidentally mention that the amount paid as compensation in 1954-55 was about half a crore less than in the previous year.

TRAVEL CONCESSIONS

I would now refer to certain concessions we propose for the travelling public. We should very much like to have reintroduced all the old travel concessions so that the public at large could be benefited, but I cannot overlook the fact that over-crowding is still substantial. The return tickets at 1/3 fares for distances over 150 miles which were issued in the current year during the Dasara, Diwali and Christmas holidays have proved very popular. Representations have, however, been made to me against the restriction on break of journey on these tickets, and accordingly it has been decided that,

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in future, journeys can be broken on these tickets on the outward trip. From a study of the monthly passenger traffic statistics it is seen that during certain periods in each year passenger traffic is low. We have, therefore, decided that general return tickets for distances over 300 miles may be issued between 15th July and 30th September 1956 at 1½ single journey fares, and with a graded period of availability varying with the distance. This should go some way to meet the demand that has been voiced in this House from time to time for really cheap return tickets, without at the same time aggravating over-crowding. Another change we have proposed in the coming year, is to permit the concession now available to students travelling in groups of four between their homes and their educational institutions to be granted even to students when travelling singly, on production of the usual certificate. In regard to season tickets, certain Railways issue quarterly season tickets at 2½ monthly season ticket fares and it is proposed to extend this also to the Calcutta suburban areas on the Eastern and South-eastern Railways, and to the Northern Railway and the O. P. section of the North-eastern Railway where it is not now in vogue.

FREIGHT STRUCTURE COMMITTEE

As I indicated in my Budget Speech last year, a Committee has been set up to examine the Railway Freight Structure in all its aspects. The terms of reference of this Committee also include the examination of the existing statutory provisions governing the liability of Railways as carriers and the constitution, procedure and jurisdiction of the Railway Rates Tribunal. The Committee has addressed itself vigorously to the task entrusted to it and has issued comprehensive questionnaires to elicit the views of State Governments and commercial interests, and I expect their report will fully reflect the views of the public in regard to this important matter and take note of the changing pattern of the country's economy.

AMENITIES TO PASSENGERS

I feel the House will agree with me that a sustained effort has been made during the last few years to make railway travel less irksome and inconvenient, specially for the third class passenger, and that, although conditions are still far from satisfactory on certain sections, it is not because the Railways have spared any efforts in this direction but because the chronic shortage of materials and some shortage of capacity for the execution of works have handicapped them in their endeavour to overtake the progressive increase in the number of Railway passengers. The introduction of the Janata trains

and of sleeping accommodation for the third class passenger has, I believe, given some relief to the long-distance traveller. I am deeply concerned with the continued overcrowding in the third class on some sections, especially on the North-Eastern Railway and the Metre Gauge Section of Northern Railway. Data have already been collected regarding overcrowding and, on sections on which it is at its worst, new trains will be introduced, the run of the existing trains extended or the composition of rakes strengthened, to the extent engines and carriages become available. 24 Broad Gauge and 12 Metre Gauge rail cars expected to be received during the next year will also be introduced on some sections.

From the 2nd October last a new type of Janata corridor train, with a well-equipped dining car and a conductor to look after the convenience of passengers, has been introduced between Calcutta and Delhi, and I am informed that the reaction of the public to this has been favourable. Three more such rakes are now under construction which will play between other important cities so that country-wide reactions to this type of coaches become available. A coach with only seating accommodation has recently been introduced for the benefit of first class passengers undertaking short journeys who are unable to find accommodation in the normal first class coaches, particularly for short night journeys during which they would find it difficult to obtain admittance to compartments bolted from inside by sleeping passengers.

AIR-CONDITIONED FAST TRAIN SERVICE

As a token of the standard of service which the Railways would like to provide if they had adequate resources, and as a model to be kept in view for the future, it is proposed to introduce from 2nd October next a vestibuled fully air-conditioned fast train service, which would have only two classes, between Delhi on the one hand and Bombay, Madras and Howrah on the other. To start with, the service will be weekly or bi-weekly.

The House is aware that our objective has been to reduce the number of classes on the Railways to only two in addition to air conditioned travel. In pursuance of that policy our present intentions are to abolish the existing third class and to re-name it as second class with sleeping accommodation in one or two separate coaches. This change would be in consonance with our objective of reducing class distinctions and I trust that the people travelling in the present second class would welcome closer contact with those travelling in the present third class. I would personally like to

provide cushioned benches in these coaches but it seems it will have to remain a long-term objective.

CATERING

As regards catering, most of the recommendations of the Committee on Catering presided over by the Deputy Minister for Railways, have, in consultation with the National Railway Users' Consultative Council, been accepted and implemented and the House is aware the departmental catering has been started on a limited scale on Railways on which it did not so far exist, for example, at Delhi and Pathankot on the Northern Railway and Gorakhpur on the North-Eastern Railway. It is proposed to extend it to a number of other stations in the next year. Our experience is that this change has given genuine satisfaction to the travelling public, as the quality of food as well as of service has improved, and, with more experience in the line, further improvement is expected in a matter which so far has been a constant cause of irritation and complaint. While every effort will be made to see that departmental catering covers costs, the House, I hope, will agree that the improvement will be worthwhile even if there is a slight loss. I would welcome suggestions from all quarters towards an improvement of this service in all its aspects. Special efforts are being made to improve the quality of food which is taken by the large majority of the passengers and to see that it is wholesome.

RAILWAY USERS' COMMITTEE

The Railway Users' Consultative Committees constituted at three different levels—namely the National Council, the Zonal Committees and the Regional/Divisional Committees—have been rendering valuable assistance to the Railway Administrations. The scope of the activities of these advisory bodies is being steadily expanded. Local consultative committees of users at important industrial centres are now being constituted. Besides, a separate Time Table Committee for each zonal railway and separate Suburban Passenger Amenities Committees are also being set up. The Zonal Passenger Amenities Committees are also being expanded specially to include ladies.

SOCIAL EDUCATION

I propose to intensify the campaign initiated early in 1955 for a scheme of social education in regard to general problems as well as problems peculiar to Railways. Publicity media, such as posters, press notes and announcements through loudspeakers at stations have been used to invite the co-operation of the public to keep

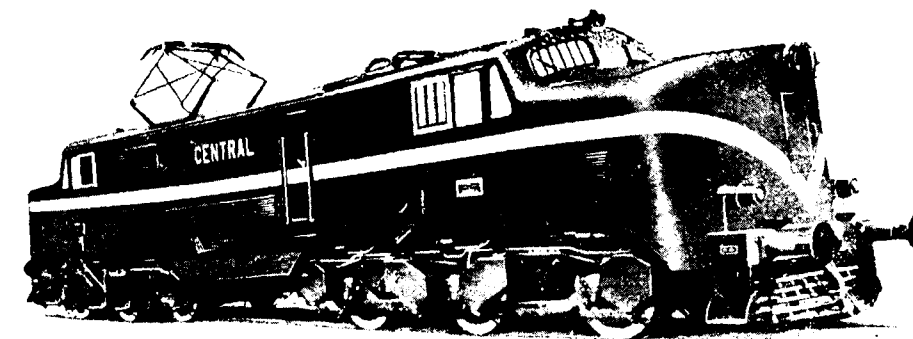
railway premises clean by depositing refuse in the receptacles provided, by developing the queue habit, by waiting for passengers to detrain before attempting to entrain and similar other matters. It is now proposed to provide loudspeakers at some more stations and even in some running trains. Such an experiment is being made in one coach on the corridor Janata Express train, the idea being to extend this to the other coaches with programmes carefully selected so as not to disturb the passengers. At stations, chiefly in third class waiting halls, the exhibition of documentary films is also proposed. A dual-purpose coach has been built in which films can be shown while the train is on the run and will soon be attached to one of our trains on which it will serve as a buffer-car-cum-Cinema coach. A small section is being set up in the Railway Board's office to organise the activities directed towards social education. With imagination and proper assessment of public taste, the scheme should be capable of being made both interesting and instructive, and thus help to ensure the co-operation of the passengers on the proper use and maintenance of the amenities provided.

ANTI-CORRUPTION MEASURES

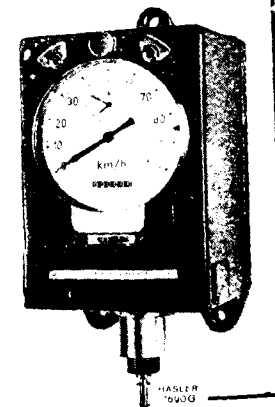
The Anti-Corruption Enquiry Committee submitted its report in July last and I would like to sincerely thank the Chairman, Acharya J. B. Kripalani, and the Members for the pains they have taken in the compilation of this report. It is a valuable document with plenty of information and concrete and helpful suggestions.

The problem of weeding out corruption is an enormous one, and, although one might feel discouraged in tackling it because of its magnitude, the question must of course be seen in its correct perspective. The Railway Ministry will leave no stone unturned to fight and resist this evil, but it must get the help and co-operation of the staff and the people at large, chiefly the users of the Railways. The need for this cannot be better summed up than in the words of the Committee itself.

"It is not enough for the public to say that, if bribes are not given, their work will not be done and they will be harassed. Citizens of a free country have the right—nay the duty—to insist that public servants render due service for which they are paid from public coffers. It is rightly said that eternal vigilance is the price of liberty. Our democracy will not work unless there is honesty and efficiency in administration. Under present circumstances, this is not possible merely through governmental action. Citizens themselves will have to be vigilant and they must insist upon their rights. They



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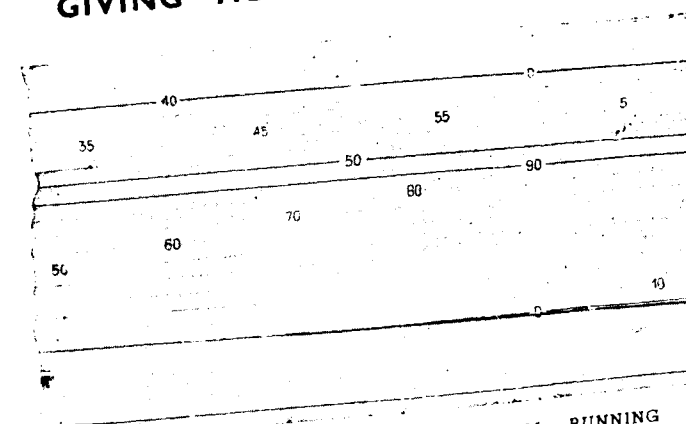
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should also be prepared to pay, if necessary, the price of such insistence with some temporary loss or inconvenience to themselves. A strong public opinion must therefore be created and a determined effort made to withhold to payment of illegal gratification."

Out of 146 recommendations which required consideration by Government, decisions have already been taken on all except 14, which also are in the final stage of consideration, and 128 of these have been accepted by Government. One of the important recommendations was for an anti-corruption organisation to be set up on each Railway with a senior officer at its head. On examining this, I felt that there should be provision for a co-ordinating link; and I have, therefore, decided to set up one in the Board's office under the direction of an experienced administrative officer for overall supervision and the investigation of important cases. My intention is that the organisation on the Railways as well as in the Railway Board should work in close co-ordination with the Special Police Establishment, so that any case which can be better investigated by the Police could be handed over to them right from the start.

DIVISIONALISATION

The Eastern Railway was divided into two units from the 1st of August, 1955, the old Bengal-Nagpur Railway section having been constituted into a separate unit called the South-Eastern Railway. This decision was taken in view of the fact that the old Eastern Railway, which already had the heaviest work-load and served an area rich in mineral resources, would have to bear the main brunt of the vast developments imminent in the Second Five-Year Plan.

Experience of the working of the regional set up and the prospects of substantial development in traffic and work-load in the coming years have indicated the need for unified control of each area which is a feature of the Divisional Pattern as obtaining on the Northern and Eastern Railways. Under this pattern, each Railway system is divided into territorial units of suitable size, the general administration of which is entrusted to a Divisional Superintendent, who function in his sphere more or less as the General Manager does for the entire Railway. It is proposed to introduce this organisational change shortly on the Central Railway, to be extended thereafter to the Southern, Western, North-Eastern and South-Eastern Railways. It is hoped that this change will ensure fuller co-ordination and greater efficiency.

EFFICIENCY BUREAU

The scope of the activities of the Efficiency Bureau

has been extended to cover some more important aspects of railway working, such as civil engineering repairs and maintenance and office organisation. The present procedure on Railway administrations for handling establishment work is now being studied by the Bureau, with a view to quicker settlement of staff dues and earlier disposal of representations made by the staff, thus removing a potent cause of staff grievances. The Bureau has also suggested ways and means of reducing the number of wagons awaiting repairs in sick lines and workshops, so as to increase the availability of rolling stock for traffic, and is also tackling the problem of more effective utilisation of wagon-time. Another problem which it is proposed to remit to the Bureau is that of devising suitable tests on the basis of which merit certificates could be awarded for exceptionally good work, which could be taken into account for the grant of accelerated promotion.

RESEARCH ORGANISATION

I would like to say a word at this stage on the useful work which the Research Organisation of the Railway Board with its headquarters at Lucknow and sub-centres at Chittaranjan, Delhi and Lonavla has been doing. Their activities this year mainly cover trials on new locomotives and coaches to assess their performance and riding qualities, and experiments with substitute materials for steel in order to reduce the Railways' requirements of this vital commodity which is in short supply.

TOWARDS SELF-SUFFICIENCY

We have attached the greatest importance to making the Railways self-sufficient in the matter of rolling-stock and other equipment and I am glad that it has been possible for us to secure appreciable results. The production at Chittaranjan has already been increased and will soon be reaching the equivalent of 200 average sized locomotives per year, and, according to the scheme now approved, it will ultimately manufacture 300 locomotives per year. A scheme has also been approved already to accelerate the production of the Integral Coach Factory at Perambur, which will enable the target for the Factory to be achieved earlier than originally programmed. We have also invited the private sector to come forward and help the country in reducing its imported material for the Railways from abroad and the Railway Equipment Committee has informed us that they are in earnest to play their part. The progress we have already made towards self-sufficiency which is so vital, not only to the sound economy of the Railways,

but also of the whole country, will be clear from the fact that last year this country produced 145 locomotives, 970 coaches and 10,689 wagons, against 63 locomotives, 791 coaches and 6,388 wagons only two years earlier. Deliveries in the current year are expected to be even better. The proportion of stores of Indian manufacture purchased by the Indian Railways to the total value of stores purchases made also rose within the same period of two years from about 70 per cent to about 78 per cent, while the percentage of stores imported direct has fallen from 16.8 per cent to 10.5 per cent.

KHADI

The House will be interested to know that the use of khadi on the Railways is on the increase. Khadi was not being used so far for uniforms, but this summer about 186,000 railway staff will receive uniforms made of khadi. It is expected that the Railways will purchase this year over 1.3 million yards of khadi valued at about Rs. 27 lakhs. The quantity might have been more if it were available.

HINDI

We are adopting a constructive policy in the matter of teaching Hindi. There will hardly be anyone on the Railways who would not want to learn Hindi. In some places the staff have taken the initiative in conducting evening classes. Steps are under consideration for departments generally to hold half hour classes during working hours, which, I have no doubt, will be welcomed by the workers. In every training school and the Baroda Staff college, Hindi teachers have been, or are being appointed.

Words in common usage for stations, offices, etc., have been translated into very simple Hindi, retaining English words if they have become popular, and circulated to Railways as standard expressions for adoption.

Steps have been initiated to translate the various railway codes, manuals, forms, etc., into Hindi. As a first step, selected composite forms and English and Hindi are proposed to be put into use.

EX-STATE RAILWAY OFFICERS

It was stated in my budget speech in February, 1955 that the issues connected with the fitting in of officers of the ex-State Railways into service under the Government of India had been examined, and that orders, which we hoped would be acceptable to all the interests concerned, were being issued. It is regretted that, due to a variety of reasons, the issue of the orders was delayed. I am glad to announce that it is now possible to issue these orders. The main decisions are that

(1) on a review of the position, some more officers will now be fitted into the Class I service with effect, from the date of integration;

(2) the declared date for the purpose of calculating seniority, already fixed for each permanent officer of the ex-State Railways initially absorbed in the Class I or Class II service, will remain unchanged;

(3) each permanent gazetted officer of the ex-State Railways, who was absorbed in the Class III service as a result of the equation of posts, will now be given the option to continue to serve under the conditions previously laid down for such officer, or to be permanently promoted to the Class II service with effect from the date of the Federal Financial Integration. Temporary gazetted officers, who were recruited with the expectation of permanent absorption in the gazetted ranks, will be absorbed permanently in the Class II service against vacancies as they occur, provided they are considered suitable. Probationers recruited for appointment as gazetted officers will similarly be absorbed in the Class II service, subject to the satisfactory conclusion of their training;

(4) a special quota of 16 2/3 per cent, of the annual recruitment to the Class I service will be reserved for the promotion of the ex-State Railway officers previously on a common cadre but absorbed now in the Class II service from 1st April, 1950 or earlier date. Each officer will be given a chance to have his suitability assessed by the U.P.S.C. and thereafter the quota will lapse.

STAFF REQUIREMENTS FOR SECOND FIVE YEAR PLAN

An appreciable number of gazetted posts on Indian Railways have remained temporary for a number of years in the expectation that the number could later, be reduced. Work has, however, been increasing continuously in complexity as well as in intensity. There has also been an inadequacy of leave reserve posts. The situation has recently been reviewed on the eve of the Second Five-Year Plan, and an adequate gazetted cadre for the present requirements, including provision for leave and deputation reserve posts, is being sanctioned. This will enable permanent recruitment to be stepped up. It is planned to make good the shortfall against the current sanctioned strength within two years.

RECRUITMENT OF OFFICERS

At the same time recruitment of temporary officers is being made for all departments which will have to bear the brunt of the Second Five-Year Plan. The appointment of 120 temporary engineers is at present in hand.

and the recruitment of another 150 engineers is being planned. Full opportunities for promotion are also being provided to staff in service, and some of the shortage of officers is being met by the re-employment of retired officers, who, by virtue of their experience and their maturity, will provide a desirable backbone to the temporarily expanded cadres.

As envisaged last year, a planning organisation has already been set up in the office of the Railway Board as also at the railway levels, and posts for planning and execution are being sanctioned as required for each railway administration.

TRAINING OF STAFF

The necessity for imparting adequate training to recruits to the various railway services and arranging refresher courses for employees in service is constantly in our mind. The existing training institutions are inadequate and their expansion is necessary. It is therefore, proposed to make a provision in the Second Five-Year Plan of 3 crores for the initial expenditure on these. In the meantime, a special officer in the office of the Railway Board has been appointed to review the existing facilities, to plan for the permanent expansion of the training facilities to cater for the normal and special requirements of Railways during the Second Five-Year Plan and to arrange for setting up temporary centres for training and refresher courses on each Railway, pending the completion of the permanent arrangements. Refresher courses for staff on an extended scale have just been started on all Railways. The number of employees requiring such refresher courses is considerable. It is proposed that everyone of these employees should go through a refresher course within the next two years.

The problem of the recruitment of technically trained personnel and the technical training of candidates for appointment as artisans, as technical supervisors and on other technical jobs, particularly in view of the requirements of the Second Five-Year Plan, is of considerable importance. Steps have already been taken to increase the annual training capacity at Chittaranjan from 270 to 360, and at Perambur from 201 to 260 and further expansion is being planned. It is proposed very soon to recruit candidates for training as artisans and as technical supervisors for the workshops that will be set up during the Second Five-Year Plan. An officer on special duty has also recently been appointed to set up training establishments for the training of junior technical personnel required for the execution of projects during the Second Five-Year Plan.

MEDICAL FACILITIES FOR RAILWAY STAFF

As visualised by me last year a medical officer has been appointed in the Railway Board's office to review the existing medical arrangements on Railways and to plan for future expansion.

Under the scheme which I mentioned two years ago, for providing accommodation for railwaymen suffering from tuberculosis, 220 beds have by now been reserved for railway servants in certain selected sanatoria all over the country, and negotiations are at present proceeding for the reservation of 75 beds more. A scheme has also been sanctioned for setting up chest clinics at the more important railway hospitals for early diagnosis and treatment of tuberculosis.

It is also proposed to attach to the new hospitals at New Delhi and at Bombay specialists in diseases of the eye, ear, nose and throat, the chest and teeth, as well as fully equipped laboratories for pathological examination. A proposal is also under consideration for the association of surgeons and physicians of repute with Railway headquarters hospitals.

Maternity and child welfare centres, which were being run at the cost of the Staff Benefit Fund on the Railways, have now been taken over by the Railway Medical Department at an estimated cost to the Railway Revenues of about a lakh per year, in order to relieve the Staff Benefit Fund of this item of expenditure, and also to ensure the provision of adequate facilities at these centres.

A similar measure is the extension of free medical treatment facilities in Railway hospitals and dispensaries to certain dependent relatives of employees.

STAFF BENEFIT FUND

In pursuance of the proposal which I mentioned last year, the annual per capita contribution of one rupee to the Staff Benefit Fund has been doubled during the current financial year, so that the contribution from Railway Revenues to this Fund now amounts to about 20 lakhs. Simultaneously, the Fund has been relieved of expenditure on the maintenance of maternity and child welfare centres and some expenditure on relief of distress due to sickness in the family. With the increased resources, Railways should be able to increase the tempo of the assistance from this Fund. A proposal is under consideration for awarding about 1,000 scholarships varying from 15 to 50 rupees per month in deserving cases to children of railway employees drawing pay up to a specified limit to assist them in the prosecution of technical education.

The relations between the National Federation of Indian Railwaymen and the Railway Board throughout the year have been cordial. The House is possibly aware of the fact that, at a meeting that was held between the Federation and the Railway Board in July 1955, it was possible within the short space of four days to come to an agreement in respect of three of the five terms of reference to the ad hoc tribunal. Of the two remaining items, the one relating to the distribution of posts in various grades covers a wide field and is of great interest to railway men, the other being a comparatively minor one. It is my firm conviction that differences of opinion can best be resolved by discussions across the table, and I trust that a meeting for this purpose will soon be arranged between the Federation and the Railway Board.

The work and the responsibility of railwaymen are increasing simultaneously with the complexity of the problems which they have to deal with. There will be a further increase in these directions during the coming years. The fact that a larger number of employees at the lower levels of the Class III services now shoulder heavier responsibility can be recognised by a redistribution of posts in the lower grades so as to effect an appreciable reduction in the posts in the lowest grade with a corresponding increase in the numbers in the higher grades for categories like office clerks, train clerks and others, and by appropriate adjustment in the case of station masters. It is proposed to take concrete steps early in these directions. The exact pattern that such redistribution should follow needs detailed examination and discussion between the representatives of the Federation and the Railway Board.

PARTICIPATION OF WORKERS IN THE MANAGEMENT

The question of participation of labour in management has been exercising our mind for some time now. All Railway employees are servants of the State and all are partners in this vast undertaking. It is my earnest wish that all grades of staff interest themselves in thinking of improvements in all phases of our activity. Many may have constructive ideas, and useful suggestions from them will be welcome. I need hardly assure them that these suggestions will receive consideration and suitable rewards will be given for those which are accepted. I consider, however, that more positive opportunities for participation in the management of this undertaking should be provided for workmen in the lower cadres. We have decided to take a few important steps in this direction. A scheme will be drawn up to associate workers in the management and the running of

the Railway workshops, and the Railway Board will be asked to select two or three workshops on Indian Railways to give it a trial. A proposal is being considered for sending a team, including representatives of workers, to other countries where such participation of workers in management has been tried. The Federation will also be consulted in these matters.

It has also been decided that workers should be given greater power and responsibility in matters directly concerning their welfare. There are already the Staff Benefit Fund and Labour Advisory Committees and canteens managed by the staff on a co-operative basis. The Railway Board have now been directed to increase the elected element in each of these Committees and to give them the fullest possible freedom to take decisions. Further, a proposal of the National Federation of Indian Railwaymen for the association of labour in the implementing of programmes for the construction of houses is scheduled for discussion by them with the Railway Board in the near future.

VANDALISM ON RAILWAY PROPERTY

I think I shall be failing in my duty if I do not briefly refer to the recent disturbances in some parts of the country which have led to the infliction of serious damage on the Railways. It is a tragic thing for people want only to destroy the nation's property, in other words their own property. It has been our experience that, whenever any commotion or disturbance of the peace takes place, the Railways are chosen as the easiest target of attack. In the recent disturbances as many as 40 coaches were destroyed due to mob violence. I want that the conscience of the people should wake up in regard to this very vital matter. There will always be some mischief-mongers about to take advantage of particular situations to indulge in all kinds of anti-social activities, but the people in general and our youth in particular should see that they are not allowed to have their way.

MISUSE OF ALARM CHAINS

I would also like to refer to the problem of misuse of the alarm chain apparatus in regard to which I would solicit the fullest public co-operation. During the calendar year 1955 there were over 40,000 cases of trains being stopped by the pulling of alarm chains, the largest number of cases being on the North-eastern and Eastern Railways. While there might have been justification in some cases there was none in most of them, and I trust that those who indulge in this pastime would realise the injustice they do to the hundreds of their fellow travellers

and the dislocation they cause not only to their own trains but also other connected train services.

I owe it to the Railway Board to thank the Chairman and the other Members sincerely for the way they have discharged the heavy and most difficult responsibilities shouldered by them. They have shown great tact and ability in administering the Railways, which has led to the solution of many thorny and difficult problems. They have now to direct and guide the Railways in the successful execution of the biggest Railway programmes ever undertaken. This is a heavy charge indeed, but I think they will consider it as a great privilege and opportunity to serve the country and the Railways in the changed conditions of to-day. At the same time I feel that the present set-up of the Board requires strengthening and proposals towards this end are under my consideration. The former status of the post of Secretary, Railway Board, has already been restored.

I must also acknowledge the conspicuous role of railwaymen as a whole in helping to increase the efficiency of the Railways in spite of many handicaps. Drawbacks and shortcomings could no doubt be pointed out against railwaymen and the Railways. The fact, however, cannot be denied that Railway staff have tried to

HIGHER TRANSPORT TARGETS FOR RAILWAYS

New targets of transport capacity for goods ranging from an increase of 10 to 20 per cent during the next busy season over what is expected to be carried during the current season have been laid down. A large number of works have been sanctioned to expand sectional and transshipment capacity in different parts of the country where transport bottlenecks, have during recent years hindered the free flow of traffic.

As a result of the drive launched in the early part of last year, many bottlenecks were either eliminated or eased. The line capacity over the Madras-Bezwada section was increased from 350 to 450 wagons a day, and the daily movement over the Ratlam-Godhra section improved from 490 to 630 wagons a day. The daily transshipment position during the last three months at Viramgam has improved by 90 per cent and at Sabarmati by 22 per cent, as compared to the corresponding period of last winter. As a result of the Central Railway's drive involving a certain amount of remodelling and construction work at Ghorpuri, movements via Poona to South India have now been made free.

Movement across the Ganga has been stepped up despite difficult river conditions resulting in frequent

discharge their duties in tune with the spirit of the times and that they have done very well indeed. They cannot afford, however, to be complacent because in the multifarious and complicated nature of their work they might err at any moment, and hence an attitude of vigilance, and watchfulness on their part is always essential.

In unity lies the real strength of railwaymen. It has pained me to see that the trends in the field of Railway labour have not been quite happy for some time past. I am glad, however, that persistent efforts have been made to maintain the old unity although they may not have been fully successful. Still I believe that where there is a will there is a way, and I would earnestly appeal to them to put their house in order so that they will be able to function in the best interests of the Railways and the workers.

The Second Five-Year Plan is a big and bold venture and the Railways have to play a significant role in the destiny of the nation in this respect with the co-operation of all, whether officials or non-officials. Railwaymen should feel proud of being partners in this venture and thus make it a great success. Needless to add, they will have all the good wishes of this House and of the whole country.

disorganisation of ferry crossings. The transshipment via Manduadih, particularly, has been stepped up by about 45 per cent over last year. As a further relief for movements of traffic to North Bengal and Assam, an agreement was negotiated with the Pakistan Railways for through bookings via their eastern route, and on an average about 50 wagons daily have been moving that way.

The cumulative result of all these improvements may be gauged from the tonnage lifted in the first nine months of the current year, which was 8½ per cent higher on the broad gauge and 18 per cent higher on the metre gauge than during the corresponding period for last year.

Since wagons are short of requirements, steps have been taken to improve their availability for traffic by a reduction in the number of wagons under repair, and by intensive utilisation. The percentage of sick wagons in November and December 1955, consequently, came down to 4 per cent on the broad gauge and 5.8 per cent on the metre gauge, from 7 per cent and 7.2 per cent in the previous year.

THE GANGA BRIDGE

IMPORTANCE TO THE STATE'S ECONOMY

PRESIDENT Rajendra Prasad laid the foundation-stone of the Rs. 15-crore railway-cum-road bridge on the Ganga at Hathidah, 54 miles from Patna this month.

Speaking to a large gathering of people who attended to witness the function, Dr. Prasad declared that the Ganga Bridge would be a vital link in the communications in Eastern India.

TEXT OF ADDRESS

Dr. Prasad said: The Ganga Bridge will be the first bridge over the Ganga in Bihar State and, as such, I know full well what a boon it is going to be to the people of this State and what a long-felt need the bridge is going to fulfil. As one who belongs to this State and whose activities have mostly kept him mobile, necessitating frequent touring of every part of this State, I can very well imagine the great benefits that this bridge will confer on the people of Bihar particularly and on others generally.

The Ganga has been flowing through the heart of Bihar from times immemorial, cutting this State into two parts, known as Mithila and Mahadha in ancient times. In those days when inter communications were not so well developed, when people were reconciled to long distances and when self-sufficiency was the key-note of the economic set-up of every region in India, it is possible that the absence of a bridge over the Ganga in these parts was not so keenly felt. In the present day world when scientific inventions have conquered space and distance and when great importance is attached to speedy communications, absence of a direct rail and road link between North and South Bihar was bound to be felt as a grave handicap. The economies of these two parts of Bihar are complementary to each other, one part being dependant on the other. North Bihar is primarily agricultural and produces large quantities of sugar and foodgrains. South Bihar, on the other hand, is very rich in minerals like coal, iron, copper, mica, cement, etc., which provide the basic requirements of present-day industries. Inadequate facilities of transport between these two parts of Bihar have had a deleterious effect on the development of North Bihar. Is it not surprising that it should be easier to transport coal from Dhanbad to Delhi than to northern districts of Bihar on the other side of the Ganga?

These delays and consequent inconveniences began to be felt by the people in the early years of this century when the question of replacement of the wagon-ferry at Mokamehghat by a bridge began to be mooted. On two sides of the Ganga different Railway Companies were operating. They operated on commercial lines and, therefore, profits and dividends for the shareholders weighed more with them than people's convenience or the question of developing inter-communications in Bihar. That is why, right from the first decade of this century up to the Second World War no decision could be taken about bridging the Ganga with a view to providing rail-cum-road link between North and South Bihar. Whenever the question came up for consideration, the two Railway Companies viewed it in the light of the possible effect the proposed bridge would have on their earnings. Although the Railways had been nationalised, the Railway Board in new Delhi could not take a bold line of action because of the fear of any adverse effect of such a step on the British shareholders of the former B. N. W. Railway, which was purchased by the Government long after the Government had acquired the East Indian Railway.

All such considerations look outmoded, if not parochial, to-day to the Government of free India. Although in the interest of the nation the Railways must continue to work on commercial lines, yet proper development of the means of communications in the country is without doubt of paramount importance. I am glad that the Ministry of Railways has given this project the priority which it deserved. While in the neighbouring State of Uttar Pradesh there are as many as 6 bridges over the Ganga within a stretch of about 600 miles, in Bihar where the Ganga flows over a length of 250 miles, this will be the first bridge over it. I do not mean to draw any comparisons, but the fact remains that the absence of a bridge and the division of the Bihar into two parts by the river has been a great hardship. It would perhaps be no exaggeration to say that this factor has to a large extent been responsible, comparatively speaking for the backwardness of North Bihar in industrial development in spite of its industrious people and an exceedingly fertile soil.

The new bridge will also link West Bengal with its northern districts and Assam. Since the partition of India and the subsequent closing of the old Bengal-Assam Railway route, it was most urgent to provide adequate traffic facilities between South Bihar and

North Bihar and from Calcutta side to North Bengal and Assam. The construction of the Assam Rail Link seven years ago was only the first step taken towards joining North Bihar with Assam and the southern districts of West Bengal with its northern districts and Assam. The construction of this bridge will complete that process by providing a direct rail link between the above-mentioned areas. This bridge will, therefore, be a vital link in the system of communications in eastern India.

The facts and figures about the proposed project, the huge quantities of material required and the number of men engaged in the work—all these show the magnitude of the undertaking. I must congratulate the Railway

Minister, Shri Lal Bahadurji and also the Ministry of Railways and Transport on their earnestness and speed in respect of this important project. The arrangements they have made for the residence, medical care and other amenities for the workers are indeed commendable. I have no doubt that everyone who lends a helping hand to this work, whatever his status and whatever the function assigned to him in this project, will be able to look back with pride to this joint national venture. Let me hope, the Ganga Bridge which will link North and South Bihar, will be symbolic of the unity and strength of the Indian Nation, which was once so well reflected in the glory and grandeur of Mithila on the one hand and of Magadha on the other—the two regions which this bridge will join together.

MEASURES TO IMPROVE BOMBAY SUBURBAN TRAIN SERVICES

174 New Electric Multiple Unit Coaches for the Bombay Suburban Service of the Central and Western Railways are now on order, the first of which are expected to be in service by the middle of this year.

Shipment of the first four new Electrical Multiple Unit coaches out of an order for 50 such coaches placed on Messrs. Breda, an Italian firm, has already commenced. These coaches will be serviced and put into commission by the middle of this year. Deliveries of the remaining coaches on this order will continue into the second quarter of this year and as and when the coaches arrive, they will be got ready for service.

Out of the balance of 124 coaches, an order for 50 electrical Multiple Unit coaches has been placed with

the same Italian firm and deliveries of these coaches will start in the latter part of year. Orders have also been placed with two Japanese firms, one for 50 coaches and the other for 24 coaches for the Bombay Suburban Railways. Delivery of these coaches will be effected in the latter half of this year.

Of the 174 coaches ordered, 149 have been allotted to the Central Railway and the balance to the Western Railway. 64 of the new coaches will be utilised exclusively for running additional trains in the Railway's endeavour to ease the overcrowding, in the peak periods, in particular. The remaining coaches are intended to serve as replacements for some of the units now running and which have been in service for 30 years.

SPECIAL TRAINS FOR TOURISTS AND KISANS

The Central and Western Railways provided three Special trains for the convenience of 261 American Tourists who arrived in Bombay on March 2 aboard the luxury liner RMS. "CARONIA". The Specials started and terminated at Ballard Pier and ran over the Central, Western and Northern Railways. Included among the places the tourists visited were Delhi, Agra, Banaras, Fatehpur, Sikri, Sanchi and Jaipur. Two of the special trains left on the 2nd and one on March 3, all returning to Bombay on the 8th March. Two of the Specials were made up of Air-conditioned coaches and the third comprised first class tourist cars. Each tourist car was fully self-contained with a comfortable lounge-cum-dining

room completely equipped with crockery, cutlery and linen together with a Kitchenette. The air-conditioned trains had dining cars attached.

A Kisan Special carrying 418 persons left Bombay V.T. on the night of March 1, 1956 on a three week tour of the country. The itinerary of the train included visits to Poona, Hyderabad, Vizagapatam, Puri, Tananagar, Sambalpur, Sealdah, Bolpur, Chittaranjan, Dhanbad, Banaras, Lucknow, Delhi, Nangal Dam, Anandpur Sahib, Hardwar, Fatehpur, Sikri, Agra and Anand which cover places of historic interest, Community Project and industrial centres.

IN YOUR OWN INTERESTS HOW TO PURCHASE TICKETS

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

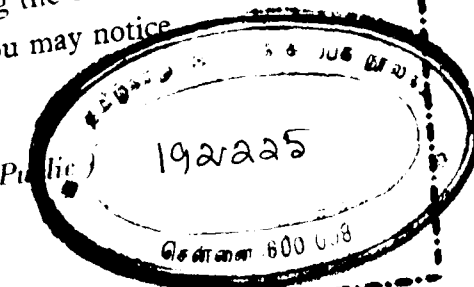
Buy your tickets in the proper time. You can avoid unnecessary excitement and trouble if you come to the station in good time, that is at least half an hour before the scheduled departure of your train. The Time Tables of the Railway are on sale at Booking Offices and Bookstalls.

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

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)



CLEANLINESS LEADS TO HEALTH AND HAPPINESS

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

Cleanliness prevents disease: medicine only attempts to cure.

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

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