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Office of the Assistant Executive Engineer,
Bommidi Concrete Sleeper Factory,
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From

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To

Director,

IRICEN

Pune

Sir,

Sub: National Technical Seminar of IPWE (India) 2016.

Ref: IPWE letter No.2015/IPWE/Seminar/2016 dt.15.09.2015

Kindly find enclosed Technical paper on the topic 'Design Construction and Maintenance of station yard' 'Redesigning of Chennai Central and Basin Bridge station yards in '7 pages for your consideration please.

Soft copy of the technical paper enclosed in a CD.

This technical paper is also mailed in 'director@iricen.gov.in

Thanking you Sir,

Yours truthfully,

T.V.Mahaganapathy

AXEN/CS/BQI/SR

Design Construction and Maintenance of station yard
Design of Terminal Station Yard
Redesigning of Chennai Central Terminal Station yard

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1.0 Synopsis:

Railway Terminal station Yard plays an important role in reception and dispatch of trains and providing maintenance facilities for the coaches. Existing terminal station yards were designed long back. Now due to increase in number of trains existing terminals station yards choked causing bottle neck in traffic flow during peak hours. Finding a way to ease out congestion by redesigning the yard will be added advantage for smooth flow of traffic and reduction in train handling time. In this technical paper an attempt is made to study the existing yard design of Chennai Central and Basin Bridge yards and list out problems and suggest solutions to ease out congestion at Chennai Central station yards.

Chennai Central is a major terminal station of Southern Railway. It caters to main line traffic and suburban traffic. Chennai Central station yard is choked preventing reception and dispatch of trains as scheduled during peak hours. Chocking of Chennai Central station yard also affect reception and dispatch of suburban traffic and adjacent Basin Bridge station yard as a chain reaction. Easing out the yard congestion at Chennai Central and Basin Bridge will improve train services of through traffic and suburban traffic. It will also contribute to speeding up of trains.

2.0 Study of existing layout

2.1 Study of Chennai Central station Yard (MAS)

1. Chennai central is a terminal station yard catering to traffic from MAS-GDR, MAS-AJJ sections through traffic and suburban traffic of MAS-AJJ and MAS-GPD sections.
2. MAS-AJJ section is for the trains bound to Mumbai and Bangalore. It is with four lines two for through traffic and two for suburban traffic. All these four lines originate from Chennai Central Station.
3. MAS-GDR section is double line section for trains bound to New Delhi and Calcutta and suburban traffic between MAS-GPD. There is no dedicated track at Chennai central station yard for suburban traffic of MAS-GPD.
4. Trains for two different directions MAS-GDR and MAS-AJJ originate at MAS yard but actual Route change take place at BBQ yard. There is no dedicated track for MAS-GDR trains between MAS-BBQ.
5. To cater to the terminal traffic 11 platform lines are available for through trains and three platform lines are available for suburban trains at Chennai central.
6. The lead track available is one for reception and one for dispatch for through trains for two directional traffic of MAS-AJJ and MAS-GDR. This restricts the traffic flow in to the yard and from the yard.

At a given time only one train can be received and one train can be dispatched.

Only one direction movement is possible at a time. It results in detention to train.

2.2 Study of Basin Bridge yard (BBQ)

1. MAS-GDR section is a double line section.
2. Two lines are taken through BBQ yard.
3. One common loop is provided at BBQ yard.
4. This yard also deals traffic towards BBQ-WST by providing scissor crossover.
5. Between MAS-BBQ no dedicated track for MAS-GDR trains.
6. MAS-GDR and MAS-AJJ tracks actual direction change takes place at BBQ
7. Between MAS-BBQ, same track is used by MAS-AJJ trains as well as MAS-GDR trains.
8. Four lines are available for the traffic of MAS-AJJ route.
 - (i). Out of this two lines are for suburban traffic and two lines are for through traffic.
9. There is no dedicated track for suburban traffic for MAS-GPD route.
10. Lead track for MAS-GDR is not available between MAS-BBQ.

3.0 Principles of Railway yard design

3.1 Ideal railway terminal yard design shall include the following

1. Provision of Dedicated approach track for each direction of traffic.
2. Minimum number of platform lines for each direction is equal to
 - (i). Twice the approach track for reception of trains in each direction.
 - (ii). Twice the approach track for dispatch of trains in each direction.
 - (iii). Two tracks for platform turn back trains when reception and dispatch are different directions.
 - (iv). Two tracks for each direction for platform turn round trains.
3. Provision of track for Dedicated Suburban traffic.
4. Feasibility for independent reception and dispatch on each direction
5. Separate entry and exit facilities.
6. Stabling and coaching yards in rear so that removal and placement of empties at platform lines do not affect reception and dispatch of trains.
7. In the revised design one train from each direction can be received and one train can be dispatched in each direction simultaneously.

4.0 Re-Design Requirements of Yards

4.1 Chennai Central Terminal yard

1. Minimum number of platform lines is equal to number of approach track in each direction multiplied by two.

Type of movement	MAS-AJJ	MAS-GDR
Reception	2	2
Dispatch	2	2
PF Turn back trains(same route)	2	2
PF Turn back trains(one route to another)	2	2
Total	8	8
Grand total	16	

Existing	11
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Existing platforms are not adequate for the present day traffic.

2. Requirement of track for suburban terminal at MMC

Reception and dispatch 2 direction (4x2)= 8 tracks

Available 3 tracks

3. Other requirements

- Independent shunting operations for placement of empties rake on platform line.
- Independent shunting operations for removal of empties rake from platform line.
- Facilities for stabling empty rake.
- Shunting operation and empty rake movement should not affect reception and dispatch of trains.
- Independent entry and escape facilities
- Coaching and stabling yards to be in the rear of platform lines.

4.0 Problems areas

5.1 Chennai Central Terminal YARD

- There is no dedicated track for reception and dispatch of trains bound to MAS-GDR section.
- Existing MAS-AJJ tracks are used for reception and dispatch of MAS-GDR trains also.
- It is not possible to dispatch MAS-GDR and MAS-AJJ trains simultaneously from MAS yard.
- It is also not possible to receive MAS-GDR and MAS-AJJ trains simultaneously at MAS Yard.
- There is no dedicated track for two directional EMU traffic.
- Existing track is used by MAS-AJJ and MAS-GPD EMU trains.
- Placement of empty rake in platform lines and removal of empty rake from platform affect reception and dispatch of trains.

5.2 Basin Bridge through yard

- Double line section provided with single loop is a bottle neck by itself.
- If down direction Suburban train received on common loop it takes extra time due to cross over movements and it affects up line BBQ yard dispatch also.
- Stopping of MAS-GDR suburban train after dispatch from MAS terminal before reaching BBQ yard causes blocking of suburban train towards MAS-AJJ line also.
- Dispatch of MAS-GPD Suburban train from MAS terminal yard to BBQ yard will stop MAS-AJJ up and down trains to stop at signal for clearance.

Only one common loop line is available hence when DN line train is received in to common loop UP line trains cannot be dispatched.

- Movements at BBQ Yard is through following points and crossings.

S.No	MAS-GDR	MAS-AJJ
1	DN Main 51A-54A-58B-59A-61-D1-65B-72A-71B	Dn 51A-53B-54A-58B-59A-61-D2-57A
2	Dn EMU 14B-50B-52A-55B-55A-59B-59A-61-D1-65B	
3	Up main 73-72B-71A-70B-69A-65A-64B-62-58A-56A-53A	Up 60A-D1-62-58A-56A-53A
4	Up EMU 73-72B-71A-70B-69A-65A-64B-62-58A-58B-54A-54B	

Based on the grouping of points and crossing it can be seen that at BBQ yard MAS end only one up train can be dispatched.

At MAS yard DN trains bound to GDR has to wait for the clearance of DN train bound to AJJ and up train bound to MAS.

6.0 Design solution to MAS and BBQ yards

Space constrain is a major concern in providing ideal solutions. Hence for immediate requirement it is planned to utilise available infrastructure by modifying as required. Ideal solutions can be provided as world class facilities either elevated or underground.

6.1 First stage with existing facilities

1. At BBQ yard MAS-GDR Down line to be connected to existing engine line and taken through to Chennai Central.
2. At BBQ yard MAS-GDR Up line to be connected to existing coaching line and taken through to Chennai Central.
3. At BBQ yard Rear of 56B 1 in 12 points and crossing to be laid connecting straight track to down line and turn out to common loop.
3. Coaching line and engine line to be upgraded to running line.
4. This arrangement will provide direct connection to MAS yard. For trains coming from GDR end.
5. Existing parcel line to be connected and put to use as coaching and engine lines.
6. MAS Yard platform lines to be grouped and nominate for reception and dispatch for each direction to minimise cross move and to facilitate direct reception and dispatch.

i. Platform lines 1 to 3 MAS-GDR trains

ii. Platform lines 4 to 7 Plat form turns back trains.

iii. Platform lines 8 to 11 MAS-AJJ Trains

On completion of this arrangement simultaneous reception and dispatch on MAS-GDR and MAS-AJJ trains will be possible.

7. The existing arrangement of connection through MAS-AJJ line will also continue for reception of train from one direction and dispatch to other direction and for platform turn back trains.

7.0 Ongoing improvement works at MAS and BBQ

1. Provision of 5th and 6th lines work in progress between MAS and BBQ. On completion of this work MAS-AJJ suburban traffic will have dedicated track between MAS-BBQ.

2. Work of providing additional platforms at Chennai Central Suburban terminal is in progress. on completion MAS-AJJ suburban track will have dedicated facilities and MAS-GPD section will have improved facilities.

8. Other requirements for terminal yard

1. Paved area between tracks with paver block.
2. Prevention of weed in working area.
3. Prevention of slurry in working area during rain.
4. Placement and removal of coaches in washing line and stabling line including releasing of rake by TXR to be independent of train reception and dispatch.
5. Shunting operation including loco movements to be independent of train reception and dispatch.
6. Yard layout to be measured twice in a year to find out its correctness.
7. All curves sharper than 4 D to be provided with check rail to prevent wear on outer rail and to prevent flange claiming derailments.
8. Facilities for dealing special traffic like pilgrim and tourist traffic.
9. Flexible shunting operation

10. Reception of train to any line to be possible on signalled move.

11. Dispatch of trains from any line on signalled move.

9.0 Scope for further study

9.1 Presently independent exit facilities are not available. Hence shunt move for placement of empty formation for dispatch of train and removal of empty formation after arrival of train take more time and affect reception and dispatch of trains due to cross move.

Elevated exit cum stabling line to be planned as a world class facility.

10.0 Conclusion: Basin Bridge and Chennai central railway yards were designed long back. Presently traffic at these yard increased many fold needing re-evaluation of available infrastructure.

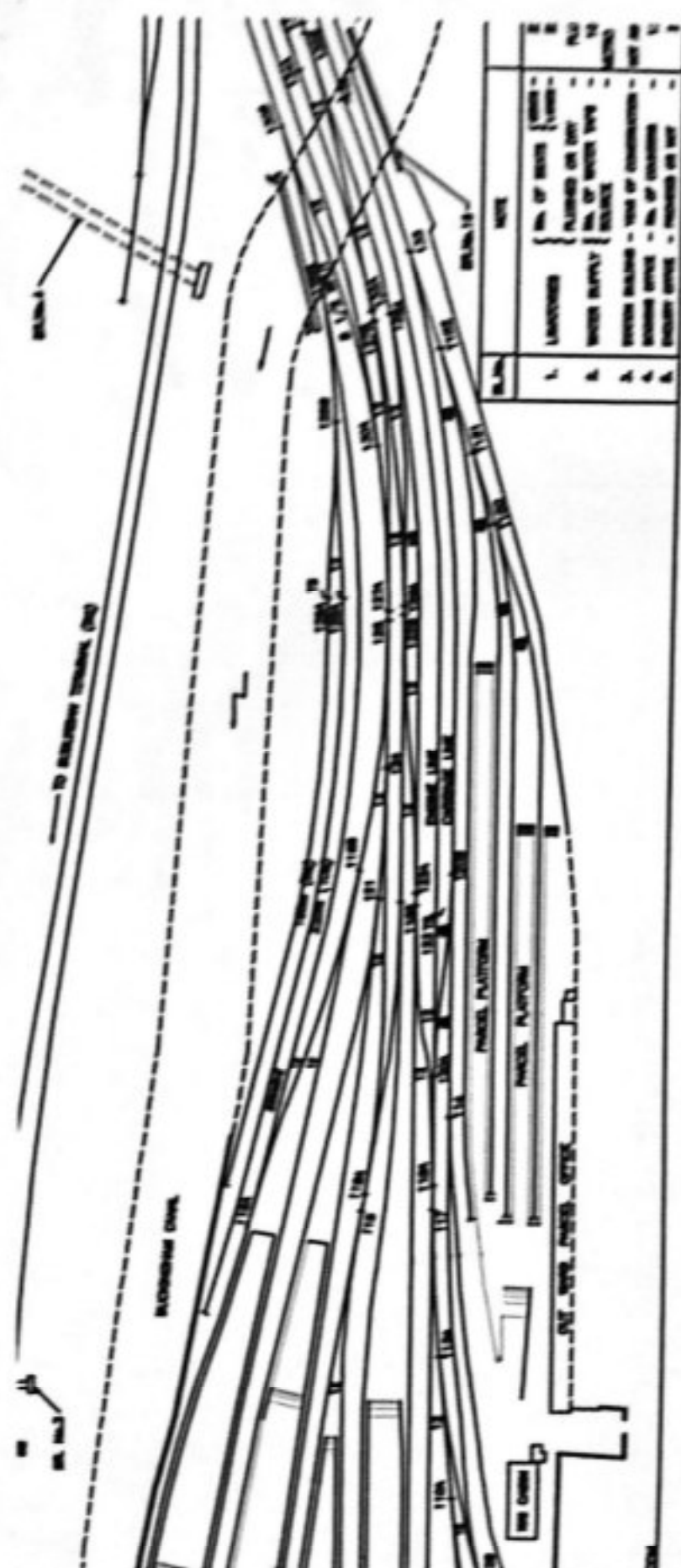
It is evident that the available facilities are not adequate for the present day traffic requirements.

The design requirements are to cater to the present day traffic and future requirements.

Southern Railway already initiated action for provision of two additional tracks between MAS-BBQ so that it functions as dedicated suburban track for MAS-AJJ direction.

On completion of this line Congestion to MAS-AJJ suburban traffic at MAS can be eased out.

To ease out congestion to MAS-GDR traffic up grading of engine and coaching line and connecting to MAS-GDR track is to be taken up. Yard working facilities are also to be provided as brought out in other requirements for terminal yard.



No.	NAME	NOTE	
		1. LAUNCHES	2. NO. OF WAGONS (WAGONS - PLU)
1.	LAUNCHES	NO. OF WAGONS (WAGONS - PLU)	NO. OF WAGONS (WAGONS - PLU)
2.	WAGON SUPPLY	NO. OF WAGONS (WAGONS - PLU)	NO. OF WAGONS (WAGONS - PLU)
3.	WAGON BALANCE	NO. OF WAGONS (WAGONS - PLU)	NO. OF WAGONS (WAGONS - PLU)
4.	WAGON OFFICE	NO. OF WAGONS (WAGONS - PLU)	NO. OF WAGONS (WAGONS - PLU)
5.	WAGON OFFICE	NO. OF WAGONS (WAGONS - PLU)	NO. OF WAGONS (WAGONS - PLU)

