

BANGLADESH RAILWAY is Government-owned and Government managed transportation agency of the country. It covers a length of 2835 route kilometers managed by 27971 regular employee.

Some Historical moments about BR:-

15 Nov. 1862 : Construction of 53.11 Km of Broad Gauge line between Darsana and Jagati of Kushtia District by Eastern Bengal Railway.

1985 : Construction of Dhaka-Mymensingh Railway section by Dhaka State Railway.

23 June-1998 : East-West Railway connectivity over the mighty river Jumana was established from the

day one, the day of formal opening of Jamuna Multipurpose Bridge, after completion of construction of Broad Gauge track from Jamtoil to Ibrahimabad.

14 Aug-2003 : Direct Communication between Dhaka (Joydebpur) and Rajshahi over Jamuna Multipurpose Bridges was established by introducing first intercity passenger Train after Completion of construction of new Dual Gauge track from Ibrahimabad to Joydebpur.

14 April-2008 : Direct Communication between Dhaka & Kolkata was established by introducing ``Maitree Express'' Train.

The network :

Bangladesh Railway has a total of 2,835 route kilometers. East Zone has 1,266 route kilometrese of MG track and 34 route kilometer of DG track . West Zone has 535 route kilometres of MG, 659 route kilomertres of BG and 375 route kilometres of DG track. The total length of running track including track on double line. in the yards sidings is 3,974 kilometres . BG and MG indicate Broad Gauge (5'-6'' or 1676 mm) and Meter gauge (3'3-3/8'' or 1000 mm) respectively. The abbreviation DG indicates Dual Gauge (Broad Gauge and Meter Gauge combined).

Route length by Civil Districts :

Bangladesh Railway is not connected with all the Civil Districts of the country. At the end of 2007-2008 only 44 Civil District of the country could be connected by Railway.

Track Maintenance :

Sophisticated track maintenance methods are under active consideration of the railway administration to replace conventional methods. Mechanical track lifting, slewing tamping and laying machines have been introduced on Dhaka-Chittagong main line for track maintenance. A track recording trolley car is in use.

MAINTENANCE OF PERMANENT WAY

- a) Complete overhauling
- b) Maintenance of Earth Packed track
- c) Through Packing
- d) Picking up slacks
- e) Track laid with steel through sleeper with mills jaws and two way keys
- f) Maintenance of points and crossings
- g) Gang strengths

Important points and connection with maintenance:-

- a) The clearance of check rails at crossing and the gauge at points and crossing should be constantly checked .
- b) It is important to check rail gauge spirit levels & level boards on receipt from stores and before issue to works.
- c) The straightening and correct gauging of bent rails are important points and maintenance work.
- d) To ensure proper packing, all ballast between the sleeper should be removed up to depth of 2inches below the bottom of the sleeper.
- e) When lifting and packing a low joint, the three sleepers on either side of the joint should also be opened packed.

Modern methods of maintenance of track

- i) Mechanized Maintenance of track with the help of track machines
 - a) Of Track Tempers
 - b) Temping
- ii) Measured shovel packing (MSP) using sophisticated equipment & gadgets
- iii) Directed track maintenance (DTM) which is basically need based maintenance may also be included in this category particularly if DTM is done by MSP.
 - a) Systematic maintenance
 - b) Packing up of slacks
 - c) Periodic maintenance works
 - d) Occasional Maintenance work

Stations :

Bangladesh Railway had a total of 440 stations. These include one block hut, thirteen train halts and four goods booking points.

Bridges :

There are a total 3,452 bridges of which 2,928 are minor and 524 are major ones. Foot over bridges are provided in important cities and district towns.

Important Features of Hardinge Bridge:-

- | | | |
|---|---|---|
| -Bridge No | : | 205 (located in between Bhairamara-Paksey & at km-194/15-196/14 from Khulna) |
| - Total length of the Bridge | : | 1.125 miles=5940ft.=1.81 km. |
| - Number of main span | : | 15 nos (Each span 360 ft. in length & 1250 tons in weight.) |
| - Number of land span | : | 6 nos (Each span 75 ft in length 7 3 spans at both ends) |
| - Year of commencement of construction | : | 1910 |
| - Year of completion of construction | : | 1915 |
| work | | |
| - Estimated cost of construction | : | Rs. 4.75 Core |
| - Formal inauguration code Harding viceroy of india | | on 04-03-1915 |
| - Datum level | : | 200ft. below M.S.L |
| - Reduced Level at top of rail over the Bridge | : | 296 ft. |

Bridge Type:-

- a) Types -1
- I) Minor- Single span <40'-0" or total span length <60'-0"
 - II) Major -Single span >40'-0" or total span length >60'-0"
 - III) Important-Span length >100'-0" or declared by Chief Engineer.

- b) Types-2
- I) Deck Girder
 - II) Semi-through
 - III) Through
 - IV) Under-slung

c) Painting of bridge girder

- I) First coat: One gallon boiled linseed oil weight of 9 lbs. of dry red lead mixed with one gallon boiled oil makes 1.33 gallons of paint which covers 900 sft.
- II) Second coat: 7 lbs red oxide paste mixed with one gallon boiled linseed oil makes 1.28 gallons of paint which covers 1368 sft.

d) Guard Rails:- On BG & MG Lines.

- I) Guard Rails should be provided on all bridges of 40 Ft. and above whether through or semi-through, deck or R.C.C. Slabs. Thus 4x 10 Ft, 2x 20 Ft and 1x40 ft. Bridges should be provided with guard rails. If the deck is of through plates guard rails need not be provided.
- II) Inside Guard Rails of approved design shall be provided.
- III) Guard Rails already provided on smaller bridges shall be removed and utilized elsewhere as and when necessary.

Level crossing gates :

Level crossings are provided on the railway line to pass the road traffic across the track. As the road traffic passes at the same level as that of the railway track, the crossing is termed as level crossing.

Classification of level crossings :

Level crossings can be classified in different categories

- (i) Special class : These are most busy type of level crossings for the road users. Most of the busy level crossing on National High way are spl. class level crossings.
- (ii) 'A' Class : These are also busy level crossing for the road users.
- (iii) 'B' class : These level crossings are relatively less busy ones.
- (iv) 'C' class : These level crossings are mostly provided on un-metalled roads.
- (v) 'D' class : These level crossings are provided ofr cattle crossings and normally used by cattle or pedestrians.

Bangladesh Railway has presently about 2541 (1413 Approved & 1128 Un-approved) level crossing gates.

Dimensions etc. for various class of crossing.

Details	'Special'	"A"	"B"	"C"	"D"	Remarks
1. Minimum length of guard rail (for a square crossing)	30 ft or 36 ft	24 ft	18 ft	15ft	-	
2. Minimum width of gates at right angles to the center line of the road	24 ft or 30 ft	18 ft	12 ft	9ft	6ft	
3. Minimum distance of gate posts from centre line for meter gauge	9ft 6 in.(BG) 8ft	9ft 6 in.(BG) 8ft	9ft 6 in 8ft	9ft 6 in. 8ft	9ft 6 in. 8ft	
4. Provision of wicket of gate for foot passenger	To be provided, except where foot over bridge are provided	same as for "special"	same as for "special"	Not to be provided	Not to be provided	
5.(i) Light as observed by driver of approaching trains	No light.	No Light	No Light	No Light		
6. (a) (ii) Light as observed by drivers of approaching trains	Red when gates closed across the track	-	-	-	Not to be provided	
7. Interlocking of gates with signals, or other protection against train running through a crossing when open to road traffic .	All gates if within station limit shall be interlocked with station signals or if outside station limit with special signal provided at an adequate distance on both sides of the crossing except in special cases under rules approved by the government inspector of the Bangladesh Railways	same as for "special" if within station limit if outside station limit gate should be coupled and a warning bell, controlled from the adjacent station may be provided	No special provision to be made unless the line is on a curve and the view is obstructed	Same for class	'B'	
9. Formation width of road surface outside gate	Same as the rest of the road outside the railway boundary	12 ft wider than the metalling.	9 ft wider than the metalling.	15 ft	10 ft	

Track Structure :

Main ingredients of rail track are Rail, Sleeper, Ballast, P-way fittings & Embankment (Sugrade & Formation)

Rails : Rails are similar to steel girder. Functions of Rails :

- 1) Continuous and level surface
- 2) Less friction.
- 3) Lateral guide.
- 4) It bears the stresses developed.
- 5) Transmitting the load to a large area of formation through sleepers and ballast.

Different types of rails used in BR: 50 lbs, 60-R, 75-R, 75-A & 90-A.

Defects in rail:

- 1) Wear & tear
- 2) Rail end batter.
- 3) Hogging of rails.
- 4) Scabbing of rails.
- 5) Wheel burns.
- 6) Rail fracture.

Tests of rail

- 1) Chemical Composition
- 2) Mechanical Properties.
 - a) Falling weight test- No fracture or crack.
 - b) Tensile properties i) Minimum tensile strength-880 MPa ii) Minimum Elongation -8%.
 - c) Hardness properties- Brinell hardness limits of 285 mm.
- 3) Physical Properties:
 - a) Rail section profile
 - b) Rail Length.
 - c) End Squareness.
 - d) Straightness.
 - e) Weight.

2. Sleeper

sleeper are transverse ties on which the rails are laid. The main functions of sleeper are as follows:

- (i) Holding rail to correct gauge and alignment.
- (ii) Giving a firm and even Support to rails.
- (iii) Transferring to load evenly from rails to wider area of the ballast
- (iv) Acting as an elastic medium between the rails and the ballast to absorb the blows and vibration of moving loads.
- (v) Providing longitudinal and lateral stability to permanent way.
- (vi) Providing means to rectify the track geometry during its service life.

Different types of Sleepers

The sleeper use on Bangladesh railway are:-

- (i) wooden Sleeper(Ordinary & Special)
- (ii) PC Sleeper,
- (iii)Steel sleeper.

Size of Sleeper.

B.G. Sleeper = 9' x 10" x 5", M.G. Sleeper = 6' x 8" x 4.5"

Test for wooden sleepers

- i) Specific Gravity.
- ii) Modulus of elasticity
- iii) Maximum crushing strength
- iv) Compressive strength at proportional limit
- v) Hardness
- vi) Shearing stress
- vii) Tension Perpendicular grain
- viii) Cleavage average

Sleeper test (Steel)

- a) Laboratory test
 - (i) Sleeper Assembly
 - (ii) Toe load
 - (iii) Pulsating Test
 - (iv) Dynamic Load Test
 - (v) Welding Test
 - (vi) Chemical Composition Test
 - (vii) Physical Test

Test from PC Sleeper

- i) Rail seat bending moment test
- ii) Center moment test
- iii) Rail seat repeated load test
- iv) Ultimate load test
- v) Fastening uplift test
- vi) Fastening Repeated load test
- vii) Lateral restraint test
- viii) Longitudinal restraint test
- ix) Sleeper pad test
- x) Electrical resistance and impedance test

3. P-Way Fittings

- a) Fish Plates
- b) Combination of Fish Plate
- c) Dog spike
- d) Round Spike
- e) Screw Spikes
- h) Bearing Plates
- i) Loose Jaws
- j) Elastic Rail Clip
- k) Rubber Pads
- l) GFNL
- k) Fish bolt

4. Ballast: Ballast is a layer of broken stone gravel etc.

Functions of Ballast

- i) To provide a level and hard bed for the sleepers to rest on.
- ii) To hold the sleepers in position during the passage of trains.
- iii) To transfer to and distribute the load from sleepers to a large area of formation.

Size: In BR we use 1.5” to 2” sizes broken stone ballast.

Types of Ballast

- (i) Sand Ballast
- (ii) Moorum Ballast
- (iii) Coal Ash or Cinder
- (iv) Broken Stone Ballast,

Testing of Ballast:-

- i) Mohs Hardness Test
- ii) Mill Abrasion Test
- iii) Magnesium sulphate soundness Test
- iv) Bulk Specific gravity test
- v) Ballast gradation
- vi) Deleterious substances

Ballast cushion 6” To 8”

5.Points And crossing:-

Parts of Points & crossings:

- c) Switch Rails
- d) Crossing
- e) Splice Rails
- f) Point Rails
- g) wing Rails
- h) Check Rails
- i) Switch stop
- j) Spherical Washers
- k) Flat Bearing Plates
- l) Tie Plates for crossing
- m) Tie plates for switch
- n) Heel blocks

Permissible wear in crossing :-

I) Main, branch and running lines in yards :- No crossing is to be changed which has less vertical wear than $\frac{1}{4}$ ” in the wing rails on nose where speed is 40 miles per hour or over, $\frac{3}{8}$ ” where speeds are under 40 miles per hour.

II) Sidings:- No Crossings is to be changed which has less vertical wear than $\frac{1}{2}$ ” in the rails or nose.

Different size of Points & crossing sleeper

(a) Crossing No- 1 in 12 (M.G), length 16'-10 ¼ “ Drawing no- CE/E-5099

SI. No	Size	No	Quantity
1.	6'x8"x5"	8 Nos.	13.33 Cft
2.	6'x10"x5"	1 Nos.	2.08 Cft
3.	7'x8"x5"	1 Nos.	32.66 Cft
4.	8'x8"x5"	9 Nos.	19.99 Cft
5.	9'x8"x6"	3 Nos.	7.50 Cft
6.	9'x10"x5"	2 Nos.	6.25 Cft
7.	10'x10"x5"	6 Nos.	20.83 Cft
8.	11'x8"x5"	4 Nos.	12.22 Cft
		47 Nos.	144.86 Cft

(b) Crossing No- 1 in 8 ½ (M.G) length 64'-6“ Drawing no- CE/E-5184

SI. No	Size	No	Quantity
1.	6'x8"x5"	6 Nos.	9.99 Cft
2.	6'x10"x5"	1 Nos.	2.08 Cft
3.	7'x8"x5"	1 Nos.	19.44 Cft
4.	8'x8"x5"	6 Nos.	13.33 Cft
5.	9'x8"x5"	3 Nos.	7.50 Cft
6.	9'x10"x5"	1 Nos.	3.12 Cft
7.	10'x10"x5"	5 Nos.	17.36 Cft
8.	11'x10"x5"	2 Nos.	7.63 Cft
9.	11'x8"x5"	3 Nos.	9.16 Cft
		37 Nos.	89.61 Cft

(c) Crossing No- 1 in 12 (B.G) length 134'-5" Drawing no- CE/E-5108

Sl. No	Size	No	Quantity
1.	9'x10"x5"	10 Nos.	31.25 Cft
2.	9'x12"x6"	1 Nos.	4.50 Cft
3.	10'x10"x5"	18 Nos.	62.49 Cft
4.	11'x10"x5"	9 Nos.	34.37 Cft
5.	12'x10"x5"	7 Nos.	29.16 Cft
6.	13'x10"x6"	7 Nos.	37.92 Cft
7.	14'x10"x6"	4 Nos.	23.33 Cft
8.	14'x12"x6"	3 Nos.	21.00 Cft
9.	15'x12"x6"	6 Nos.	45.00 Cft
10.	16'x12"x6"	2 Nos.	16.00 Cft
11.	16'x10"x6"	4 Nos.	26.00 Cft
		71 Nos.	331.68 Cft

g) Scissors Crossover 1 in 12 (M.G) Length= 272'-1" track CC = 16'-6"

Sl. No	Size	No	Quantity
1.	6'x8"x5"	32 Nos.	53.33 Cft
2.	6'x10"x5"	4 Nos.	8.33 Cft
3.	7'x8"x5"	56 Nos.	108.88 Cft
4.	7'x10"x5"	4 Nos.	9.72 Cft
5.	8'x8"x5"	32 Nos.	71.11 Cft
6.	9'x8"x5"	12 Nos.	30.00 Cft
7.	9'x10"x5"	8 Nos.	25.00 Cft
8.	10'x10"x5"	24 Nos.	83.33 Cft
9.	11'x8"x5"	24 Nos.	73.33 Cft
10.	23'x8"x5"	10 Nos.	63.88 Cft
11.	23'x10"x5"	27 Nos.	215.62 Cft
		233 Nos.	742.53 Cft

h) DUAL GAUGE TURN OUT (1 in 8 ½) length 96'-9" drawing no- RH/PC-2512

Sl. No	Size	No	Quantity
1.	9'x10"x5"	6 Nos.	18.75 Cft
2.	9'x12"x6"	1 Nos.	4.50 Cft
3.	10'x10"x5"	12 Nos.	41.66 Cft
4.	11'x10"x5"	8 Nos.	30.55 Cft
5.	12'x10"x5"	6 Nos.	24.99 Cft
6.	13'x10"x6"	3 Nos.	16.21 Cft
7.	14'x10"x6"	5 Nos.	29.16 Cft
8.	14'x12"x6"	2 Nos.	14.00 Cft
9.	15'x12"x6"	3 Nos.	22.50 Cft
10.	16'x12"x6"	3 Nos.	24.00 Cft
11.	16'x10"x6"	2 Nos.	13.33 Cft
		51 Nos.	239.68 Cft

i) DUAL GAUGE TURN OUT (1 in 12) length 134'-5 $\frac{1}{8}$ " drawing no- RH/PC-1853

Sl. No	Size	No	Quantity
1.	9'x10"x5"	7 Nos.	21.87 Cft
2.	9'x12"x6"	1 Nos.	4.50 Cft
3.	10'x10"x5"	14 Nos.	48.60 Cft
4.	11'x10"x5"	11 Nos.	42.00 Cft
5.	12'x10"x5"	9 Nos.	37.49 Cft
6.	13'x10"x6"	7 Nos.	40.83 Cft
7.	14'x10"x6"	7 Nos.	40.83 Cft
8.	15'x12"x6"	6 Nos.	45.00 Cft
9.	16'x12"x6"	4 Nos.	32.00 Cft
10.	16'x10"x6"	2 Nos.	11.11 Cft
11.	17'x10"x5"	3 Nos.	17.70 Cft
		71 Nos.	339.01 Cft

Schedule of Dimensions

S.No	General	Broad Gauge	Meter Gauge
1.	Min.horixontal distance from centre of track to any structure from rail level to 1 ft. above rail level	5'-6"	4'-6"
2.	Min. horizontal distance from centre of track to any structure, except a platform, from 1 ft. above rail level to 14 ft. 6 inch above rail level	7'-0"	6'-3"
3.	Max and Min. distance from centre of track to face of passenger platform coping	5'6"	6'-3"
4.	Min Height above rail level for a high passenger platform	Max 2'-9" Min. 2'-6"	Max-1'-0"
5.	Max height above rail level for low passenger platform	1'-6"	1'-4"
6.	Minimum formation width in Embankment for Single line	22'	18'-0"
7.	Minimum formation width in Embankment for Double line	37'	31'-0"
8.	Minimum Formation width in cutting for Single line (excluding side drains)	20'-0"	16'-0"
9.	Minimum Formation width in cutting for double line (excluding side drains)	35'-0"	29'-0"
10.	Vertical Clearance for Flyover/Overpass for BG, MG	23'-7"	23'-7"
11.	Curve:-		
12.	Max . degree of curvature	10	16
13.	Min. clearance of check rail for a curve	$1\frac{3}{4}$ "	$1\frac{5}{8}$ "
14.	Level Crossing :-		
15.	Min. Clearance of check rail at a level crossing	2"	2"
16.	Max. clearance of check rail at a level crossing	$2\frac{1}{4}$ "	$2\frac{1}{4}$ "
17.	Min. depth of space for wheel flange from rail level	$1\frac{1}{2}$ "	$1\frac{3}{8}$ "
18.	points & Crossing :-		
19.	Max clearance of check rail opposite nose of crossing	$1\frac{7}{8}$ "	$1\frac{3}{4}$ "
20.	Min. clearance of check rail opposite nose of crossing and at heel of switch rail	$1\frac{3}{4}$ "	$1\frac{5}{8}$ "
21.	Max. clearance of wing rail at nose of crossing	$1\frac{7}{8}$ "	$1\frac{3}{4}$ "
22.	Min. clearance of wing rail at nose of crossing	$1\frac{3}{4}$ "	$1\frac{5}{8}$ "
23.	Min. clearance between toe of open switch and stock rail	$3\frac{3}{4}$ "	$3\frac{1}{2}$ "

