



GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

Draft Manual of Instructions for
Railway Affecting Works

July—1987

(For official use only)

2

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

DRAFT MANUAL OF INSTRUCTIONS FOR
RAILWAY AFFECTING WORKS

JULY - 1937

3

C O N T E N T S

	<u>Page No</u>
Preamble	(1)
1. General	1
2. Criteria for and types of Railway Affecting Works	5
3. Effect on Safety of Railway Lines/ Bridges.	8
4. Inspection & Repairs	12
5. Appendices.	14

LIST OF ABBREVIATIONS USED

Cu m/Sec	Cubic metre per second
FSL	Full Supply Level
FTL	Full tank level
HFL	Highest flood level
Km.	Kilometre
m	Metres
m ³ M	Million cubic metre
MSL	Mean Sea Level
MWL	Maximum Water Level
TEL	Tank base level

.....

5

(11)

- (b) The State Governments should be entrusted with the responsibility for checking up and ensuring the maintenance of all Railway Affecting Works, their watch and issue of warnings.
- (c) The State Irrigation Departments should have the authority to take action against unauthorised excavation of channels from beds of active rivers.
- (d) It should be obligatory for the party constructing a work which is likely to become Railway Affecting to obtain prior approval of the Railway concerned.
- (e) In order that the directions in respect of maintenance and construction of Railway affecting works be comprehensive and unified for all States, a Manual of Instructions should be prepared on an all India basis, and the essential requirements of Safety, as set forth in this Manual, incorporated in a central statute either as an amendment to the Indian Railway Act or as a separate Act.

The above recommendations were accepted by the Government. Pursuant to the recommendation (e) of the Khosla Committee of Engineers, the present Manual of Instructions for Railway Affecting Works has been compiled by the Research, Designs and Standards Organisation, Ministry of Railways for uniform adoption by all the States and the Railways on an All-India basis. The Manual has been drawn up after discussions in various State Committees of Engineers and incorporates the experience gained by the Railways and State Governments for long years in inspection, maintenance, operation and effects of such works. It is hoped that the adoption of the Manual by all concerned would lead to uniform healthy and safe practice for the construction, inspection, maintenance and operation of such works, which will greatly mitigate the risk of damage by accidents on Railways due to such works.

Suggestions for improvement in the contents of the Manual are welcome and may be sent to the Director General (Research), Research, Designs & Standards Organisation, Ministry of Railways, Government of India, Manak Nagar, Lucknow-226011 through the State Committee of Engineers.

PREAMBLE

Railway Affecting Works such as irrigation and water supply tanks or reservoirs, canals in embankment, marginal bund and road embankments with inadequate waterway for drainage situated in the vicinity of the railway line and other works which might alter or impede the natural course or discharge of waterways, may be owned and controlled by a multiplicity of agencies e.g. Public Works, Irrigation, Revenue and Forest Departments of State Governments, Quasi-Government and local bodies, private parties and individuals, etc. The failure, improper design, malfunction, improper maintenance or operation or lack of inspection of such works could lead to serious breaches and failure in the railway embankments and bridges, which can be attended with catastrophic accidents to trains and loss of precious human lives, serious and prolonged disruption of railway traffic as also heavy losses to railway and other property. No statutory obligations have so far been placed on the owners of Railway Affecting Works which expose the Railways and the travelling public to great risk.

As a follow-up of the discussions between Union Minister of Railways and the Chief Ministers of the States on 5th June, 1957, a 'State Committee of Engineers' consisting of senior officers from Railways, Public Works, Irrigation, Revenue, Forests Local Self Departments of the States concerned has been set up in each State. The functions of these Committees have been laid down in para 4 of the Ministry of Railways letter no. 57/WIL/CH/20 dated 23.6.57 (Appendix III). These Committees have been charged with the responsibility of maintaining up-to-date lists of Railway Affecting Works and bringing about coordination between the Railways and the State Authorities in respect of policies and programmes, and for proper up-keep of such works whether belonging to the States or private agencies.

Recognising the danger posed by the Railway Affecting Works, Khosla Committee of Engineers which was set up by Government of India vide Ministry of Railways' Resolution No. R57C.1/2(-1) dated 4th March, 1967 (Appendix IV) to go into the design of bridges and other connected matters - recommended inter alia, as follows :-

- (a) The State Committee of Engineers should prepare a list of and notify all Railway Affecting Works; and arrange for submission of annual reports of inspection, system of watch and the issue of warnings of apprehended and actual breaches of tanks.

PREAMBLE

Railway Affecting Works such as irrigation and water supply tanks or reservoirs, canals in embankment, marginal bund and road embankments with inadequate waterway for drainage situated in the vicinity of the railway line and other works which might alter or impede the natural course or discharge of waterways, may be owned and controlled by a multiplicity of agencies e.g. Public Works, Irrigation, Revenue and Forest Departments of State Governments, Quasi-Government and local bodies, private parties and individuals, etc. The failure, improper design, malfunction, improper maintenance or operation or lack of inspection of such works could lead to serious breaches and failure in the railway embankments and bridges, which can be attended with catastrophic accidents to trains and loss of precious human lives, serious and prolonged disruption of railway traffic as also heavy losses to railway and other property. No statutory obligations have so far been placed on the owners of Railway Affecting Works which expose the Railways and the travelling public to great risk.

As a follow-up of the discussions between Union Minister of Railways and the Chief Ministers of the States on 5th June, 1957, a 'State Committee of Engineers' consisting of senior officers from Railways, Public Works, Irrigation, Revenue, Forests Local Self Departments of the States concerned has been set up in each State. The functions of these Committees have been laid down in para 4 of the Ministry of Railways letter no. 57/VII/CIR/20 dated 23.6.57 (Appendix III). These Committees have been charged with the responsibility of maintaining up-to-date lists of Railway Affecting Works and bringing about coordination between the Railways and the State Authorities in respect of policies and programmes, and for proper up-keep of such works whether belonging to the States or private agencies.

Recognising the danger posed by the Railway Affecting Works, Khosla Committee of Engineers which was set up by Government of India vide Ministry of Railways' Regulation No. 157C-1/70 dated 4th March, 1967 (Appendix IV) to go into the design of bridges and other connected matters - recommended inter alia, as follows :-

- (a) The State Committee of Engineers should prepare a list of and notify all Railway Affecting Works; and arrange for submission of annual reports of inspection, system of watch and the issue of warnings of apprehended and actual breaches of tanks.

1. GENERAL
- 1.1 This Manual deals with rules, procedures and general practice to be followed for the construction, inspection, maintenance and operation of Railway Affecting Works for uniform adoption all over the country. These may be considered obligatory.
- SCOPE
- 1.2 Railway Affecting Works are those, the construction, defective design, failure, improper or poor maintenance or operation of which may cause serious damages/breaches or flooding of Railway line or bridge. Examples of such works are :
- DEFINITION OF RAILWAY AFFECTING WORKS.
- i) Irrigation and Water Supply tanks or reservoirs;
 - ii) Canals in embankment and river bunds;
 - iii) Road embankments with inadequate waterway for drainage situated upstream or downstream of the railway line;
 - iv) Temporary channels cut for irrigation or other purposes from beds of active rivers;
 - v) Other works or operations which might alter or impede the natural course of flood flow or cause an increase in the volume of such flow. These may be new irrigation projects, new townships, new forest belts; large scale deforestation etc.
- 1.3 A work can be declared as Railway Affecting by an officer not below the rank of Executive Engineer(Irrigation) of the State Government or Divisional Engineer/Executive Engineer of the Railway. In the event of any dispute, the matter will be referred to the State Committee of Engineers subject to final decision by the Chief Engineer of the Railway.
- AUTHORITY TO DECLARE A WORK AS RAILWAY AFFECTING
- 1.4 The Irrigation Department of each State should identify the Railway Affecting Works in their State. The Chief Engineer/Irrigation of the State(or an officer of equal rank nominated by the State Government) should maintain lists of such works, review these from time to time and update the list at least once a year
- LIST OF RAILWAY AFFECTING WORKS

before the monsoon. In respect of works owned by quasi-government and local bodies, private institutions and individuals, the list of the works will be called for from the parties concerned, by the nominated Chief Engineer of the State Government who after scrutiny will incorporate such works in the final list. The nominated Chief Engineer of the State Government will send copies of the list at least one month before the onset of the monsoon every year to the State Committee of Engineers, Railway Chief Engineers, Railway Divisional Engineers, Executive Engineers of State Government and other owning bodies. He will also notify the list on behalf of State Committee of Engineers.

The list of such works shall be prepared in proforma prescribed at Appendix I(A) to I(L).

- 1.5 No new work or modification/re-modelling of an existing work, which is likely to be classified as Railway Affecting should be undertaken by any party (including a Govt. deptt.) without getting prior approval of the Railway Administration. For this purpose, the party concerned should apply through Irrigation deptt. to the Railway (Divisional/Executive) or Chief Engineer concerned along with necessary plans, hydrological data, standards of construction/specifications, proposed procedure and schedule of inspection, operation and maintenance and the undertaking to follow these procedures and schedules as approved by State Irrigation Deptt. and the Railway. Should the Railway Administration so required, additional plans, design data or details as requested by them should also be furnished by the party concerned to the Railway.

- 1.6 The parties owning the 'Railway Affecting Works' should regularly inspect and maintain Railway Affecting Works in accordance with the approved procedure and schedule referred to in para 1.5 above and the schedule laid down in Chapter 4 for this purpose, so as to ensure that the Works remain in a fit and sound condition. Any repairs or strengthening needed should be carried out with utmost expedition before the onset of the monsoon. The Railway's representative should have access and be given facilities to inspect the works, their maintenance and operation. Any request from the Railway Administration in connection with strengthening, repairs, maintenance or operation of such works to ensure the safety of the railway lines should also be attended with promptitude. Detailed instructions should be laid down by Executive Engineers of States Government Departments concerned, for operation of such works which should be followed by the parties concerned.

NEW
RAILWAY
AFFECT-
ING
WORKS.

INSPECTION
AND
MAINTENANCE
AND
OPERATION OF
RAILWAY
AFFECT-
ING WORKS.

ACTION
IN CASE
OF
APPREHENDED
DANGER

In the case of any apprehended danger or actual damage to a railway work, which might affect the safety of railway lines, immediate action should be taken by the party concerned to advise Station Master, Divisional Engineer/Executive Engineer and the Chief Engineer of the Railway concerned by telephone and telegram so as to enable the railway officials to take immediate precautionary and other measures to ensure safety of trains and to avoid accidents. For this purpose parties concerned should always keep the addresses and telephone numbers of the railway officials concerned, available with them.

1.8
ROLE OF
STATE
COMMITTEES
OF ENGINEERING

State Committees of Engineers have an important role to play in the matter of Railway affecting works. Their functions which have been set forth in Railway Board's letter no. 57/W-II/CMT/20 dated 23-6-57 (copy at Appendix III) are briefly as follows:

- a) Exchange of information about schemes envisaged by any one department and likely to affect the work or safety of assets of another department and consequential safeguards to be adopted.
- b) Keeping up-to-date the list of railway affecting works, etc., naming the officials responsible for joint inspection of each such work immediately after monsoons and, if possible, also in advance of monsoons; and watching that the department responsible for proper maintenance of such works promptly carries out the necessary repairs.
- c) Evolving a procedure for -
 - i) Obtaining and broadcasting, by departments concerned warnings or forecasts of heavy rains, floods, storms etc., as well as the actual heavy rainfall recorded and expected floods downstream, to the officers concerned in the various Departments; and

- ii) inducing public cooperation in promptly conveying to the department concerned any unusual occurrence, e.g., breaches etc.
- d) Assessing whether waterways, protection works etc., provided by any department in an area severely affected by floods have proved to be inadequate and improvements needed for future.
- e) Coordination of related schemes of the various departments represented.

State Committees of Engineers should meet at least twice a year preferably in April and November.

- 1.9 Chief Engineer or Divisional Engineer of the Railway concerned shall declare the sections of the railway that are likely to be affected by non-completion of the urgently required repairs and strengthening or for whatever compelling circumstances as vulnerable and shall make suitable arrangements like patrolling of the section during monsoon and also take other necessary precautions to ensure the safety of the railway line. The Railway official should also take action in this regard as detailed in para 1428 and 1429 of Indian Railways' Way and Works Manual, extract of which is at Appendix V.

DECLAR-
ING A
SECTION
VULNER-
ABLE

CHAPTER 2

CRITERIA FOR AND TYPES OF RAILWAY AFFECTING WORKS

GENERAL

2.1 Criteria for identifying the work as 'Railway Affecting' can at best be outlined under broad principles for the guidance of the Engineers. Every case has to be decided on merits taking into account some other factors i.e. local conditions such as location of the 'Railway Affecting Works' whether upstream or downstream of the railway line, slope of the ground, extent of discharge in the event of failure of work, capacity of the railway line to absorb the shock etc. Such criteria cannot be laid down on all India basis for every conceivable shape of "Railway Affecting" Works. Specific cases may be considered by State Committee of Engineers. However, general broad criteria for classification of a few common type of works being treated as Railway Affecting are given in the following paragraphs.

TANKS

- 2.2. 1) All tanks within 0.5 km. of the railway line irrespective of their capacity and having a full supply level higher than the formation level of the railway line.
- ii) Tanks within 10 km. of railway line having capacity of 0.05 m.c.m and more.
 - iii) Tank between 10 to 15 Kms. of Railway line having capacity of 0.15 m.c.m and more.
 - iv) Tank between 15 and 35 Km. of the railway line having capacity of 1.5 m.c.m and more.
 - v) Tanks with capacities and distances described in items (ii), (iii) and (iv) above, if lying downstream of the railway line, will be treated as 'Railway Affecting' if ETL touches the railway embankment.
 - vi) Tank through which railway line passes having bunds and surplusings works on downstream and liable to cause damage to the railway line and affect stability of its embankments and bridges due to lowering of the level on account of breach in the bund or escape works and having no proper protection.

- vii) Tanks through which railway line passes having crest level and surplusing weirs above danger level of the railway bridge and the railway line.
- Tanks on upstream of railway line having past history of breaches affecting working of the Railways and not remodelled to mitigate such affects. Tanks located upstream of the railway line constructed with unsuitable material or having inadequate slope until brought to the desired safe standards.
- ix) A tank or a series of tanks in the catchment of the stream crossing the Railway lines where the catchment area of the stream at crossing point is 250 sq. km. or more and the combined catchment area of the tanks is not less than 5% of the total catchment area of the stream at the crossing point.

2.3 Following may be considered as "Railway Affecting Works" :-

1) All channels crossing railway lines having discharge of more than 1.5 Cu m/Sec. Channels having discharge less than 1.5 Cu M/Sec. if the FSL is 0.30 m or more above ground level.

ii) Channels on upstream of the railway line running parallel or oblique including the drainage works as specified below :

- Discharge between 5 to 15 Cu m/sec., within range of 0.5 km. from Railway line and FSL being 0.30 m or more above ground level.
- Discharge between 15 and 30 Cu m/sec. and within range of 1 km. from railway line having FSL 0.30 m or more above ground level.
- Discharge more than 30 Cu m/Sec. within range of 1.5 Km. having FSL 0.30 m or more above ground level.

2.4

Road embankments higher than 3 m with bridges, culverts and retaining walls within 1 km. on either side of the railway line.

CANALS
AND
DRAINAGE
CHANNELS

ROAD
EMBANKMENTS

2.5 The following may be considered as
Railway Affecting Works :

BUNDS

- i). Marginal bunds on upstream or downstream side on one/both banks of the river crossing the Railway line.

Protection bunds or works for diverting flow from one channel to another or prevention of flow through a defunct channel crossing the railway line on upstream of the bund or works so constructed.

2.6

DAMS,
 BARRAGES
 AND WEIRS

Dams, barrages and weirs on stream crossing the railway line and located on upstream and dams, barrages and weirs on downstream side having HFL higher than the danger level of the railway bridge.

THE EFFECT ON SAFETY OF RAILWAY LINES/BRIDGES

3.1 The tanks may endanger the safety of the railway line in the following manner :-

- (a) Overflowing of the tank in the vicinity of the railway line, particularly when FSL of the tank is higher than the formation of the railway line.
- (b) In case of railway line passing through the tank, having surplusing arrangement on the downstream side, lowering of water level due to failure or breach in the bund or surplusing work may endanger the stability of the railway embankment.
- (c) In case of railway line passing through the tank, the crest level of surplusing work being higher than the danger level of the railway bridge may cause excessive discharge and scour around the railway bridge.
- (d) The series of tanks with catchment area more than 5% of the total catchment area of the stream at Railway bridge, may endanger the safety of the bridge in case of failure.

3.2 The canals/drainage channels may endanger the railway line.

- (a) By passage of discharge in excess of the designed discharge.
- (b) By defective regulation on account of closure or opening of regulators or outlets upstream or downstream due to any reason.
- (c) By keeping open the regulator gates when they are required to remain closed or closed when they are required to remain open, thus allowing additional quantities of water to flow downstream or to pond up on the upstream of the regulator, thereby causing danger to railway bridge/embankment.

CANAL
OR
DRAIN-
AGE
CHANNEL
CROSSING
THE RAIL-
WAY LINE.

- (a) Due to inflow of flood water from the surrounding areas through inlets, or through cuts made in the canal banks by the villagers, or due to heavy rainfall, where the canal bed is below the general ground level.

- (e) Due to breach in canal banks on account of any reason.
- (f) Due to chcking of flumes in syphon crossings under the railway track by floating debris carried down the canal.
- (g) Due to failure of canal structures such as falls, regulators, etc.

3.3

CANALS OR
DRAINAGE
CHANNELS
RUNNING
PARALLEL
OR OBLI-
QUE TO
THE RAILWAY
LINE.

- (a) Canals or drainage channels running parallel or oblique to the railway line may endanger the railway line by a breach/ cut in its banks, permitting excessive discharge to flow towards the railway line, leading to abnormal afflux on the railway culverts or threatening stability of railway embankment.

- (b) Inadequate cross drainage works on such canals or drainage channels may lead to heading up of water on the upstream side which can result in breaches in their banks and subsequent rush of excessive waters towards railway embankment endangering its safety.

ROAD EMBANK-
MENTS WITH
OPENINGS /
SLUICES OR
WALLS AND
SIMILAR
OBSTRUCTIONS
WITHIN 1 km.
OF RAILWAY
LINE.

- (a) Road embankments and openings therein may prevent axial flow through the railway bridges by virtue of their location. Inadequate waterway or insufficient roadway in these openings may cause heading up of water or breaches in embankment, thus creating serious situation by sudden rush of accumulated water towards railway embankments/bridges. Water overtopping the road embankments, choking up or neglected maintenance of road culverts may also lead to similar situation.

- (b) A number of factories, land-holdings and small townships have come up in the past and are still growing in number. Consequent upon the incidence of these developments, there has been a tendency of building permanent boundary walls or

(10)

barriers, on flat terrain, where there are no well defined channels for the storm water drainage. The storm water in such circumstances would change its course, flow along the boundaries and ultimately may find its way to any other railway culvert in the vicinity, by passing the one to which it would normally have flowed, had not these obstructions been caused. While such cases may not be large in number or be severe in extent, unless proper note is taken of, and further growth of such obstructions prejudicial to safety is stopped, it would at a later date present a major problem like in other cases, where developments in the past have affected and imperceptibly changed the characteristics of the surroundings and have caused concern now.

- 3.5 Marginal bunds cause increased discharge in the main river by reduction of valley storage. On the other hand, a breach in the marginal bund can result in the flood water attacking the railway line at other locations. Thus improvement as well as damage to the marginal bunds may affect the railway.

MARGINAL
BUNDS.

- 3.6 Protective works on rivers like groynes, repelling/deflection spurs, retired bunds are constructed either by State Governments or Railways or jointly by State Government and Railways, for regulating and controlling the flow. Failure of such works can endanger not only the bridge across the river but also the railway embankments at other places. A bund built many kilometers upstream of a railway bridge to seal off the flood water passing into another spill or drainage channel is not an uncommon feature. Existence of such works is not apparent from the site of the bridge, but failure of such works can affect the safety of the railway line.

PROTEC-
TION
WORKS
ON
RIVERS.

- 3.7 (i) A Railway bridge located downstream of such works may get affected if the total discharge from the surplus weir and penstocks provided at different levels of the dams, though designed to allow known discharges for different levels of water, at some stage exceeds the discharge which the railway bridge can cope with.

DAMS,
BARRAGES
& WEIRS.

- 4.1 For such barrages and weirs, the principles and rules applicable for canal head works and regulators will generally apply.

TEMPORARY
CANALS
TAKEN FROM
RIVERS AND
OTHER WORKS.

- 3.8 Many times channels are dug out from dry or nearly dry beds of streams or from active rivers to tap and divert the water for irrigation or other purposes. During heavy rains, a large quantity of water may find its way along these channels and flood the adjoining areas, especially near the tailends of these channels. In such a case, if the general slope of the ground is falling towards the railway line, it may cause danger to the railway line in the same way as a canal bursting its bank in the vicinity of the railway line would.

OTHER
WORKS.

- 3.9 New flood control, drainage and antiwater-logging schemes are planned from time to time for draining out such of the catchments which have either so far not been well drained or where the water has stagnated over the cultivable land for long periods detrimental to agriculture. Similar conditions can be caused by the presence of lakes, ponds and other caused by the presence of lakes, ponds and other such natural water-spreads, interspersed in the catchment, the drainage of which is also taken up as a developmental measure. In such cases, with the excavation of drains, the flood flow gets concentrated at the railway embankments where waterways have been provided for the previously known discharges. This would not only affect the bridges or culverts provided for the drain but also the nearby culverts because of inadequate discharging capacity of the drainage on the downstream.

Filling up of creeks and low lands in the vicinity of railway line for developmental works may cause flood water level to rise, which may affect the safety of railway embankment and running of trains.

CHAPTER -4-INSPECTION AND REPAIRS

- INSPECTING
AUTHORITY
- 4.1 The 'Railway Affecting Works' falling within the jurisdiction of concerned Assistant Engineers of the State Government Departments, will be inspected by them. For inspection of works owned by Quasi-Government, private bodies, individuals, etc., the Chief Engineer (Irrigation) of State Government shall nominate the Asstt. Engineer of his Department in whose area such works are located to inspect these.
- INSPECTION
SCHEDULE.
- 4.2 The concerned Asstt. Engineer or other nominated officer by the State Government shall inspect every railway affecting work in his jurisdiction soon after the monsoon and submit his report to his Head of Department and Chief Engr./Irrigation (or equivalent nominated officer of State Government) by the end of January every year. This report should be accompanied by certificate of soundness for the works in good condition and approximate estimate for repairs for those works not considered in sound condition. Two copies of this report will also be sent to the Divisional Engineers of the Railways, who if considered necessary, may bring some important points to the notice of his Chief Engineer.
- INSPECTION
REPORTS
- 4.3 Proforma for inspection of tanks and road bridges are indicated at appendices II-A and II-B respectively. For other works inspection notes should be recorded every year on separate sheets, covering important points. Divisional Engineer of the Railway will carefully scrutinise the reports received from the Asstt. Engineer of State Government, and take note of the works not considered in sound condition. He will then ask his Asstt. Engineer to jointly inspect such works with Asstt. Engineer (Rly.) will submit the joint report to the Divisional Engineer. The Divisional Engineer will correspond and request the State Authority concerned to carry out and complete necessary repairs well before the next monsoon.

TIME
REPAIRS

- 4.4 The concerned State Government authority Quasi-Government and local bodies, private institutions and individuals as the case may be, will arrange to carry out necessary repairs and complete priority before next monsoon. They will send the intimation of such repairs to Railways and nominated Chief Engineer of State Government.

ACTION
WHEN
REPAIRS
NOT DONE
IN TIME.

- 4.5 In case the repairs of the works, which were found in unsound condition are not completed in time for certain compelling circumstances, the nominated Asstt. Engineer of the State Government will advise his Executive Engineer, who shall send a separate list of such cases to the parties as well as the Divisional Engineer of the Railways, with a copy to the nominated Chief Engineer of the State. Arrangements will also be made by the State Government in consultation with Divisional Engineer of the Railway to inform immediately the nearest accessible railway Station Master and the concerned Asstt. Engineer of the Railway in the event of threatened/actual mishap.

Also, in case of repairs not undertaken or completed for any reason or whatsoever, by the owner of Railway Affecting Works, the Railway will be free to undertake such repair/ work within the Railway premises as deemed necessary for safety of the railway line. Execution of such works/ repairs and posting of the patrol by the railway in such cases will be at the cost of the party owning the "Railway Affecting Works".

STANDARD PROFORMA FOR PARTICULARS OF
THE EXISTING RAILWAY AFFECTING TANK
AND TANK BUNDS

Note:- All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.

ii) To be filled by the concerned railway is shown thus*

Sr. No.	Description of tank			Location of tank			
	Name of tanks & tank bunds if any.	Owner-ship	Party responsible for maintenance (address)	Opposite Railway Line Kilo-metres	Between Railway Stations	Direction with regard to Railway Line & distance from it in km.	Nearest Village & Tehsil with name & distance in km.
1	2	3	4	5	6	7	8

Reference to plot NO. and settlement map NO. showing location of tank	Details of tank					
	Average dimensions (Length, Breadth & depth/height in m.)	Height of Embankment above general level in m.	Catchment area in sq.km.	Capacity of tank in million cu.m.	Bed level of tank	Reduced level of top of embankments.
9	10	11	12	13	14	15

Details of tank			Details of surplusage arrangements						
Full tank level below top of embankments	Standard of the tank bund		Type of weir Masonry/ Earthen	Flank/ Central	Length of weir in m.	Drop of weir in m.	Total vertical drop	Details of	
	Top width	Side slopes						Type	Discharge in m ³ /Sec.
16	17	18	19	20	21	22	23	24	25

APPENDIX-I(A) Contd.

Quantity of surplus discharge over Weir in m ³ /sec.	Details of surplusage arrangements.		Particulars of Railway embankment, extent and height in m. (Maximum & Average)
	Direction of flow of water from tank in case of breach in permanent stream (Name of stream)	or other streams if so, name of streams	
26	27	27(A)	28

Particulars of Railway Bridge							
Bridge No. & Type Length & No. of spans *	Location (Railway Kilometer *)	Rail level at Bridge in m. *	Bottom level of girder or spring point of Arch. *	Type of foundation *	Type of flooring or any protection work provided *	H.F.L. and floor level or bed level *	Highest H.F.L. with year. *
29	30	31	32	32(A)	32(B)	33	33(A)

POSTAL				
Name and full postal addresses of local officials to be contacted for joint inspection, if necessary.		Name & full postal addresses of local officials for communicating, warning & contacting in emergency.		Reason for considering it Railway affecting
Railway *	State	Railway *	State	Remarks with special reference to past history.
34	34(A)	35	35(A)	36

PROFORMA FOR THE PARTICULARS OF ROAD BRIDGES
(INCLUDING CAUSEWAYS, CULVERTS, ETC.)

1

1. General

- a) Name of river
- b) Situation (Name of road and kilometrage)
- c) Year of construction
- d) Cost of bridge
- e) Maintenance agency
- f) Name and location of railway bridge/embankment liable to be affected.
- g) Distance from railway track
- h) Rail level with reference to MSL
- i) Lowest level of the top of road with reference to MSL.

2. Structural details of bridge

- a) Type of bridge-plate girder, trussed girder, arch, suspension cantilevers, etc.
- b) Number and size of spans.
- c) Class of bridge - I.R.C. 'AA' class or 'A' class or 'B' class loading.
- d) Width of roadway between the kerbs.
- e) Materials of construction and details of superstructure and substructure including present condition.
- f) Nature of soil and subsoils with depths and also depths of foundations.
- g) Protective works on approaches (hand rails or guard stones)

3. Bearing Arrangement

Type of bearing with brief details.

4. Protection works (guide-bunds, aprons, etc.) and flood details.

- 4.1 Description of protection works.
- 4.2 Condition.
- 4.3 Maximum flood level observed.
- 4.4 Maximum scour observed (extent and location).
- 4.5 General remarks on behaviour of river.

APPENDIX X-I (C)

LIST OF RAILWAY AFFECTING WORKS - CANAL CROSSING

Serial No. of the list circulated	Railway Kilometrage at crossing	Between stations and name of the Rly. division, section etc.	Concerned Railway Bridge	Span type and size of girder.
1	2	3	4	5

Rail Level	Level of Bottom of girders or slab or springing of arch	F.S.L. (Rail Supply Level)	Bed Level	Danger Level (Railway datum)
6	7	8	9	10

Level of top of the canal/ channel bund on U S side	Design Discharge	Whether F.S.L. has ever exceeded if so, year of occurrence	Extent of damage to bridge and approach banks since its constructions.
11	12	13	14

Can the operations of various works be certified?	If not, remarks to be executed now with approx. estimate.	Remarks
15	16	17

GENERAL LIST OF RAILWAY AFFECTING WORKS.
(OTHER THAN LAY AND L&D ARRIVES)

S.No.	Location		Name of work	Type of L&D affecting work and proforma in which technical data are det'd.
	District	Tehsil		
1	2	3	4	5

Particulars of owning agency	Particulars of agency for inspection and maintenance.	How Railway is affected ?	Railway kilometre likely to be affected
6	7	8	9

Between stations Name of Division and Section.	Name of the Railway and the address of Divisional/ District Engineer to whom it pertains.
10	11

(Items 1 to 11 are common for all the Appendices given below.
i.e., from I(P) to I(L).

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS
CANAL CROSSING WITH HEAD WORKS AND APPROACH BANKS

- Note : i) All levels should be given either in reduced M.S.L.
 or with respect to rail level at the bridge affected.
- ii) To be filled by the concerned railway is shown thus*

S.No. Same as in the General list)	Railway Kilomet- rage	Between stations and name of the Railway	Type of crossing (Bridge, syphon, aqueduct etc.)	Rail Level	Bottom of girder or spring- ing of arch.	Design - data	
						Danger level	Dis- charge
12	13	14	15	16	17	18	19

Design - data				Actual data at any time in the past				
F.S.L.	Bed Level	Top level of canal Bank on u/s side.	Dis- charge	F.S.L.	Bed Level	Water Level on D/S side	Water Level on U/S side	Whether Permanent or seasonal
20	21	22	23	24	25	26	27	28

History of damages if any.	Whether lined		Type of founda- tion (open, shallow or deep)	Whether flooring or any protec- tion work provided? If so, is it in good order?	Are there any dangerous gullies in the canal banks, which require immediate repairs?
	Cross- ing	App- roach			
29	30	31	32	33	34

Has the bed of the canal been silted or scoured?	Overflow Weir		Head Work and /or Regulators.	
	Whether the over- flow weir at site is as per the list or not? If exists present condition and remarks		Name of Head works or Regu- lators within 8 km. u/s or 1.5 km. d/s	Distance from Railway Bridge Design discharge above the Head works or Regulators
35	36		37	38

Head Work and / or Regulators.			
Whether manned (wholly, partly or unmanned)	Are the regulators and other masonry works in good order without leakage as not to allow excess water in the canal ?	When it was checked last and what action was taken on the same ?	Expected rise in water level above F.S.L. at the Railway Bridge by in- advertent opening of all the gates of Head work or regulators u/s or closing of all the gates of Head work or regulators d/s.
40	41	42	43

Officers responsible for carrying out joint inspection		Officials for communicating warning and contacting in emergency	Any other data or special remarks.	Inspection notes to be submitted each year in separate sheets.
Railway	State			
44	45	46	47	48

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING
WORKS- Canal running parallel or oblique.

Note:- i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.

ii) To be filled by Railway is shown thus *

PERMANENT RECORD

Name of canal	Distance from Centre Line of Track		At its nearest place or crossing		Corrosponding Railway Kilometrage.		At its farthest place		Corresponding Rly. Kilometrage	
	Classification (main branch, distributaries or field channel)	At its nearest place or crossing	Corrosponding Railway Kilometrage.	At its farthest place	Corresponding Rly. Kilometrage					
12	13	14	15	16	17	18				

p. of il vd.	R.L. of top of canal banks u/s, d/s	Lowest ground level.	Design discha- rge.	Actual maximum discharge during season	Design F.S.L.	Actual max. F.S.L. Any time in the past.	Actual max. F.S.L. in the season
19	20	21	22	23	24	25	26

Top width and side slope of the canal banks.	Free Board in m.	Length of canal (RD to RD) susceptible for damage in serial order	Cross drainage works in the long- the likely to affect the Railway independently or combined with canal damage.	Particulars of cross drainage work			
				Size of flood opening or regulated channel	Opposite Railway kilometrage	Total water way of such works in sq. m.	Approx. discharge & max. discharge.
27	28	29	30	31	32	33	34

Head works and Regulators	Distance from Railway Bridge along canal.	Lengths of Railway Line (in Railway Kilometrage) vulnerable to attack in kms.		Particulars of Railway bridges likely to be affected.	Particulars of Railway bridges	
		From km.	To km.		Bridge No.	width, type & span
35	36	37	38	39	40	41

APPENDIX-I(F) Contd.

Bottom of Girder/slab/ spring of Arch below	Type of founda- tion (open shallow or deep)	Whether flooring or any protec- tion work provided or not.	Officers respon- sible for carrying out joint inspection Rly. State	Official addresses for communicating warning and contacting in emergency Rly. State
*	*	*	*	*
42	43	44	45	46
			47	48

Any other data or special remarks/ past history.	Inspection notes to be submitted each year in separate sheets.
--	---

49

50

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS.
Road embankments in the vicinity of Railway line.

- Note:- i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.
ii) * Column will be filled by Railways.

Sr.No. Same as in the General List)	Name & Classi- fication (N.H. S.H. or local road).	Name of River.	Distance from Centre of Railway Track				Length of road suscep- tible to damage
			Railway kilomet- rage & between stations	At its nearest place of crossing	At its farthest point at Railway Kilomet- rage		
12	13	14	15	16	17	18	

Lowest level of the top of road.	Highest level of the top of road.	Height of Rail emb- ankment (R.L.or from G.L.) *	Details of cross Drainage works or culverts in road.	Particulars of each cross drainage work or culverts in road.		
				Br. No., Type & Span.	Road Kilo- metrage / correspond- ing rail kms.	Br. J.J., slab or Arch.
19	20	21	22	23	24	25

Total water- way of such cross drainage works, in sq.m.	Lengths of Railway line (in Railway Kms) vulnerable opposite to each such road drainage. *	Railway Bridges likely to be affected with section and between stations. *
26	27	28

Particulars of such Railway Bridges.			Total waterway of each bridge in metres. *	H.F.L. for each bridge in m.
Br.No. type and span. *	Kilomet- rage *	Br.G/slab/ Arch. *		
29	30	31	32	33

Danger Level	Type of founda- tion (Open, shallow or deep).	Whether flooring or any protection work provided or not ?	Officers responsible for carrying out joint inspection Railway * State	
34	35	36	37	38

Officials for communicating warning and contacting in emergency.		Special Remarks	Inspection notes to be submitted each year in separate sheets.
Railway *	State		
39	40	41	42

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS- Marginal Bunds

Note:- i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.

ii) To be filled by Railways as shown thus *

Sr.No. as in the General list)	Name of bund/ works	Name of river and bank (left/ right)	Location		Distance from Rly line (km)	Purpose of the bund	Const- ruction Agency
			Dist- rict	Tahsil			
12	13	14	15	16	17	18	19

Main- tenance Agency	Salient features of the work.						
	Extent of the bund	Dangerous length, breadth and height (m)	Cross level at or near the bridge site.	Direction of flow of water from the bund in case of its breach	Min. designed free Board.	Parti- culars of es- cape drain- age.	Past history if any.
20	21	22	23	24	25	26	27

Particulars of Railway affected bridge							
Particulars of Rly track vulnerable to attack in the event of damage to the bund (Length in Railway Kilometrage) *	bridge No. *	Location Rly. Kilomet- rage. *	Water way *	Bottom of girder/ slab, or spring of arch in (m). *	Danger Level *	Observed HFL with year *	Type of foundatn (Open, shallow or deep *)
28	29	30	31	32	33	34	35

Whether flooding of any pro- tection work provided or not	Past history if any.	Address of Officers		Reasons		Any other data or speci- al remarks	In- sta- tion not to be sub- mit- ted in so- ph
		Officials responsible for carrying out joint inspection Rly. State	Officials for commu- nicating warning & contacting in emer- gency. Rly. State	for consi- dering at Rly., affect- ing.			
*	*	*	*	*	*	*	
36	37	38	39	40	41	42	43

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS.

River protection works and Training Works

* To be filled by Railways

S.No. (Same as in Order list)	Name of the work like spill bund retired bunds etc.	Location		Location with respect to a known point on the Rly. line either by bearing or by off set. *	Between stations and name of the Rly. & sections. *
		Dist- rict	Tehsil		
12	13	14	15	16	17

Approx. length and height of the bund	Top level of the bund	Purpose of bund	How damage to these works affect the Rly.?	Lengths of the Rly Line (Kilomet- rage) vulnera- ble to attack *	Railway bridges likely to be affected *	Railway Kilometrage of each such bridge *
18	19	20	21	22	23	24

Water way of each such bridge.	H.F.L. of each such bridge in the year.	Danger Level	Type of founda- tion (Open, shallow or deep)	Whether flooring or any protection work provided. *	Officers responsible for carrying out joint inspection	
					Railway	State
25	26	27	28	29	30	31

Officials for commu- nicating warning and contacting in emergency Railway	State	Reasons for considering it Railway affecting.	Any past history or special remarks	Inspection notes to be submitted each year in separate sheets.
32	33	34	35	36

APPENDIX-I(J)

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS.

Dams, Barrages Weirs and Regulators

Note: * Column will be filled by Railways.

S.No. (As in the gene- ral list)	Description				
	Name of Dam or Barrage or Weir or Regulator	Name of River	Purpose of Dam/ Barrage/ Weir/ Regulator	Ownership (Deptt).	Construction agency.
12.	13.	14.	15.	16.	17.

Party responsible for mainte- nance	Location			
	Opposite Railway Kilomet- rage	Between Railway Stations & name of the Railway with section.	Distance from the Railway Bridge along the river.	Nearest village and Tehsil.
18.	19.	20.	21.	22.

Details of Dam, Barrage, or Weir or
Regulator

Dimensions (length, Breadth & Depth/height)	Capacity of Dam, Barrage or Weir or Regulator	Bed level of Dam or Barrage or Weir or Re- gulator on down stream side.	Reduced level of top of - Dam or Barrage or Weir or Regulator	Reduced level of full storage level of Dam, Barrage or weir, or regulator
23.	24.	25.	26.	27.

Reduced levels of pen-stock outlets at different levels.	Design discharges at each set of pen- stock working at a time.	Crest levels of different spillways and Waste weirs or sluice gates	Design discharge of each spill way or sluice gate, or other arrange- ments.
28.	29.	30.	31.

Total combined discharge of both penstocks and spills at different levels working at one time.	Any reduction in dis- charges in Col.29 between the work and the bridge due to canals taking off etc.	Direction & n. of flow of design water in free case of breach/ failure	M. n. of design board.
32.	33.	34.	35.

Appendix-I(J) contd.

APPENDIX-I(J) Contd.

Railway details affected.

Rly. Bridge No. span type	Rly kilo-meterage	Water way	H.F.L.	Danger Level	Bottom of girder/slab spring point of arch below top of rail level.	Type of foundation (Open shallow or deep).	Whether flooring or any protection work provided or not & RL, if provided, name and the type
*	*	*	*	*	*	*	*
36.	37.	38.	39.	40.	41.	42.	43.

Officials responsible for carrying out joint inspection.		Officials for communications, warning and contacting in emergency		Reasons for considering it Rly. affecting	Spl. remarks	Inspection Notes to be submitted each year in separate sheet
Rly.	State	Rly.	State			
44.	45.	46.	47.	48.	49.	50.

28 :-

APPENDIX-I(K)

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS-

Temporary Channels

(Cut from the bed of streams and tail ends of distributaries)

Note: 1)* Columns will be filled by Railways.

S.No. (Same as in General List)	Name of River	Name & type of work	Loca- tion of the Channel. (Vil) Teh., Dist.	Opposite Rly.Kilo- metrage.	Between Stations Section & Rlys.	Name of owner & address	Descrip- tive nature of obs- truction
12.	13.	14.	15.	16.	17.	18.	19.

Railway Kilometrage likely to be affected	Bridges or Culverts likely to be affected. *	Whether there is any outfall away from the place of attack or not?	Any other part of the Railway track likely to be affected in Rly.kilometrage *
20.	21.	22.	23.

Officers responsible for carrying out joint inspection.		Officials for communicating warning and contacting in emergency.		Reasons for considering it Railway affecting.
Railway *	State	Railway *	State	*
24.	25.	26.	27.	28.

Special Remarks	Inspection note to be submitted each year in separate sheet
29.	30.

-: 29 :-

APPENDIX -I (L)

PROFORMA OF PARTICULARS OF RAILWAY AFFECTING WORKS

(For works like long solid walls, Barriers, Townships, New drainage scheme etc.)

Note: i) All levels should be given either in reduced M.S.L. or with respect to rail level at the bridge affected.
 ii) * Column will be filled by Railways.

S.No. (Same as in the General List)	Name & type of work	Location, District & Tehsil	Opposite Railway Kilometrage	Between stations section & Railway	Name of owner (Govt. quasi-Govt. Individuals. etc.)
12.	13.	14.	15.	16.	17.

Construction agency.	Maintenance agency.	Details of obstruction	Rly. bridges & culverts by passed if any *	Railway kilometrage *	Waterway in sq.m.
18.	19.	20.	21.	22.	23.

Railway Bridges and culvert flooded *	Railway Kilometrage *	Water way of each bridge/culvert.	Approx. discharge due to disturbance in natural flow	Any other part of the Rly. likely to be affected in Rly. Kilometrage *
24.	25.	26.	27.	28.

Officers responsible for carrying out joint inspection.	Officials for communicating warning and contacting in emergency	Reasons for considering it Rly. affecting.	Special remarks.	Inspection notes to be submitted each year in separate sheet.
Railway *	State	Rly. *	State	
29.	30.	31.	32.	33.
				34.
				35.

APPENDIX -II(A)PROFORMA FOR THE ANNUAL INSPECTION OF RAILWAY AFFECTING TANKS

1. Sr.No. of Register/S.No. of the notified list.
2. District.
3. Village and Tehsil and P.S.
4. Name of tank, dam, local name if any, or bunded water course.
5. Number on the district map of railway affecting tanks.
6. S.No. in list of Railway affecting tank.
7. Agency responsible for the maintenance, viz. P.W.D., Irrigation, Agriculture or Private etc. (2)
8. Railway line/bridge affected, kilometrage & between stations.
9. Railway kilometrage of crossing of surplus course of the tank or water course.

10. Date of inspection.

11. Name and designation of inspecting officer.

12. Bund:

- a) Standards of the tank bund as per the Railway affecting tank list.
- b) Are there T.B.L. stones or other permanent marks to verify whether top of bund is at prescribed level or not?
- c) Is the top of bund anywhere below prescribed level? If so, specify changes and shortage in height.
- d) Are the top width and the slopes according to standards everywhere? Specify location where width/slope is less and indicate extent by which it is less.
- e) Are there any dangerous gullies and/or cart-track ruts etc. which must be repaired urgently? If so, specify locations.
- f) Any seepage noticed or reported during the year.
- g) Whether the bund is constructed with the suitable material and proper slopes?
- h) Action taken to rectify defects noted in (b) to (g) above.
- i) Progress of work if any on hand and the probable date of completion of the work.

13. Surplus Weirs:

- a) Length of surplus weirs as per the railway affecting tank list.
- b) Whether the surplus weirs at the site are as per the list or not? Specify the variations if any.
- c) Whether the M.W.L. has exceeded or anything has happened to indicate that the surplus weirs are inadequate or made inoperative by forming bunds in front, etc.
- d) If so, the remedial measures contemplated and action taken.

... contd. Appendix II(A)

-: 31 :-

APPENDIX-II(A)14. Sluices and other masonry works:

Are the sluices and other masonry works in good order as not to endanger the safety of the bunds?

15. Special remarks, if any, by the Inspecting Officer.

16. When was this last test check done by A.E./SDO and what action taken on the same?

17. Condition of spill channel.

18. General Remarks:

Is the maintenance of the work satisfactory so as to ensure the safety of the Railway line/track? If not, state the remedial measures necessary and probable date of completion of repairs together with approximate cost.

Date

Signature

Name in Block Letters.

Designation.

Department.

APPENDIX - II(B)

PROFORMA FOR ANNUAL INSPECTION OF ROAD BRIDGES (INCLUDING
CULVERTS, CAUSEWAYS ETC).

DIVISION SUB-DIVISION SECTION

REPORT ON THE CONDITION OF AND REPAIRS DONE TO ROAD BRIDGES,
CAUSEWAYS AND CULVERTS, ETC. DURING

Sl. No. of Bridge	Item No. of the list of notified Railway affecting works for the state of*	Situation (Name of Road and Kilometrage)*	Corresponding Railway Kilometrage*	Between stations & name of the railway division, section etc.*	Class of Bridge (IRC) or Class or 'A' class or 'B' class loading.*	No. & size of spans
1.	2.	3.	4.	5.	6.	7.

Type of bridge (plate girder, trussed girder, arch, suspension, cantilever etc.) and nature of materials and full particulars of superstructure and substructure. Ref. to Drg. No.*	Nature of soil and sub-soil with depths and also depth of foundations.*	Are there any cracks or any other defects noticed in the sub-structure & superstructure?*	If so, what steps are proposed?*
8.	9.	10.	11.

What was the max. flood level last marked over Rly. track affected. If so, has it been repaired to the original formation level and C.S.? @	Are the bridge flooring and aprons in good condition?	Is the river on the up & down stream side of the bridge having regime flow?*	Is the M.F.L. of previous years noted on the Bridge give the M.F.L.*
12.	13.	14.	15.

Is any scour observed in the vicinity of the bridge and if so, to what depth below bed level?	If not approx. nature of repairs to be executed now	cost of repair	Can the soundness of the works (in good condition) be certified?*	Date, initial and designation of the officer inspecting.
16.	17.	18.	19.	20.

contd.....

- 33 -

APPENDIX-II(B) Contd.

General remarks on load and speed restrictions etc. if any to be noted.	Officers responsible for carrying out joint inspection	
	Railway @	Owner *
21.	22.	

Officials for communicating warning and for contacting in emergency		Remarks
Railway @	Owner *	
24.	25.	26.

Note:- 1. Plans, cross sections and longitudinal sections of the the railway affecting work is to be furnished by the SDO/Asstt. Engineer to the Railway Divisional Engineer in the first year and changes if any are to be intimated in subsequent years.

2. All levels should be given either in reduced M.S.L. or with respect to rail levels at the bridge affected.

3. Columns to be filled by Railway - @

" " " Owner - *

Columns not filled should be filled during/after inspection

-: 34 :-

APPENDIX-III

(COPY)

Government of India
Ministry of Railways
(Railway Board)

No.57/W-II/CMT/20

New Delhi, dated 22/23-6-1957.

To

The General Managers
All Indian Railways.

Sub: Appointment of a Committee of Engineers P.W.D.,
Irrigation and Railways etc., for Railway affecting
and other Public Works.

.....

The above subject was discussed at the Conference of the
Chief Ministers with the Railway Minister on 5th June, 1957.

2. The attention of the Chief Ministers was invited to the fact that a number of works had been and are being carried out in the states, such as irrigation schemes, repairing or abandoning of bunds and tanks and deforestation of large areas, which affect the safety of railway track and bridges but no intimation of this activity is given to Railway Administration. These works may considerably change the pattern of flow of flood waters across the railway line. Some of the individual railway bridges designed for the original conditions may in the new circumstances be found inadequate. If such works are located at some distance from the Railway, the Railway Administrations have no means of knowing anything about them. In the interest of safety of railways, it is imperative that Railway Authorities are kept in touch with the broad details and progress of such works by the Authorities concerned so that steps to ensure safety of track, etc. if necessary, could be taken in time.

3. There was unanimity of opinion that close coordination between Railways and Civil Authorities was desirable. The State Governments offered full co-operation. The consensus of opinion of the Conference was that for each State there should be a Committee consisting of senior officers from the railway(s), and Public Works, Irrigation, Forest and local self Government Departments of the State Governments who should periodically review the position of Rly. affecting works. If any work proposed by one department was likely to affect another, it should have the prior approval of this Committee.

4. These Committees will frame their own procedural rules but it is suggested that the Committees should hold meetings at pre-determined intervals. Generally speaking, the functions might include:-

- (a) Exchange of information about schemes envisaged by any one department and likely to affect the working or safety of assets of another department and consequential safeguards to be adopted.

...contd ..(ii)

-: 35 :-

APPENDIX-III contd.

- (b) Keeping up to date the list of railway affecting works, etc., naming the officials responsible for joint inspection of each such work immediately after monsoons and, if possible, also in advance of monsoons; and watching that the department responsible for proper maintenance of such works promptly carries out the necessary repairs.
- (c) Evolving a procedure for:
 - (i) Obtaining and broadcasting, by departments concerned warnings or forecasts of heavy rains, floods, storms, etc., as well as the actual heavy rainfall recorded and expected floods downstream, to the officers concerned in the various Departments; and
 - (ii) including public cooperation in promptly conveying to the department concerned any unusual occurrence, e.g. breaches tanks, etc.
- (d) Assessing whether waterways, protection works, etc. provided by any department in an area severely affected by floods have proved to be in-adequate and improvements needed for future.
- (e) Co-ordination of related schemes of the various departments represented.

It would thus be seen that these Committees are principally concerned with safety aspect of Railway working and also the safety of other Public Works affected by railway track, bridges, etc.

5. Will the General Managers now kindly get in touch with the State Governments concerned immediately so that these Committees are constituted and start functioning very early. The Railway Board would like to be kept informed about the progress made. A copy of this letter has been endorsed to the Chief Secretaries of State Governments.

DA: Extra three copies
of the letter.

Sd/- H.D. Awasthy
Director, Civil Engineering
Railway Board.

(Copied from pages 55-56 'Report of the Committee of Engineers-
October, 1959).

.....

-: 36 :-

APPENDIX - IV.

Government of India
Ministry of Railways
(Railway Board)

New Delhi, the 4th March, 1957.

RESOLUTION

No. ES7C01/3(RB1). A large number of bridges including their protection works were designed and constructed in this country in the latter half of the last century on the basis of technical knowledge and with the data then available. Hydraulic Science and technical knowledge in this sphere have since advanced considerably and further data has become available. It would, therefore, be profitable at this stage to review the designs of bridges in the light of the latest knowledge and experience gained and to indicate the standards which should generally guide the design of new bridges in future. With this object in view, it has been decided to set up a committee of engineers to investigate and review the methods of estimating the maximum flood discharge from catchment areas in order to determine the water way etc., and other connected works required in connection with the design of bridges.

2. The committee will consist of :-

- i) Shri A.N.Khosla, Vice Chancellor, Roorkee University
..... Chairman.
- ii) Major General R.E.Asrappa, Engineer-in-Chief,
Ministry of Defence Member.
- iii) Shri N.K.Roy, Additional Member (Works),
Railway Board Member.
- iv) Shri H.P.Sinha, Consulting Engineer (Roads),
Min. of Transport Member.
- v) Shri D.R.Mehta, Chief Engineer, Central
Water & Power Commission Member.
- vi) Shri B.C.Ganguli, Jt. Director Civil Engineering
Railway Board Secretary.

3. The chairman and the Members of the Committee will do this work in addition to their existing duties.

4. The terms of reference of the Committee are as follows:-

- 1) to indicate for different regions the methods of determining the maximum discharge to design the waterway for bridges. In places where empirical formulae are recommended to be used, the values of constants to be prescribed for guidance;

contd....2

- ii) To indicate the general principles for determining the extent of bed scour for the design of foundations and the design of training works, the extent of afflux to be permitted at bridge openings for the peak discharge, the minimum freeboard for various types and sizes of bridges and waterways to be provided; and
- iii) to indicate measures to ensure safety of railway bridges against failure of various 'Railway affecting' works like tanks, canals, etc.

5. The Committee will, if necessary, co-opt as members any other engineers with knowledge and practical experience of construction and maintenance of bridges.

6. The Committee will endeavour to submit their report within six months..

Ordered that a copy of this Resolution be communicated to the Chairman, and Members of the Committee referred to above, the Private and Military Secretaries to the President, the Prime Minister's Secretariat, the Cabinet Secretariat, the Planning Commission, the Ministries of Govt. of India, all the State Governments in India and all Indian Railways.

ORDERED also that the Resolution be published in the Gazette of India for general information.

Sd:- D.C. Baijal
Secretary, Railway Board.

copy/-

APPENDIX-V .Extract from Way & Works Manual

1428. Railway-affecting tanks:- Where as per current Practice the Public Works or the Revenue Department forwards to the Divisional/District Engineers every year, inspection reports of their officials on the condition of those tanks which are classified as "Railway-affecting", action should be taken as follows:-

(a) The Divisional/District Engineer should peruse the reports carefully and mark those tanks which he considers are not in satisfactory state of repair. He should then forward the reports to the Assistant Engineers with instructions that the tanks so marked should be inspected and reported on.

(b) The Assistant Engineer should inspect the said tanks and report to the Divisional/District Engineer on details of action being taken by the Public Works or Revenue Department. The Divisional/District Engineer should prevail on the authorities concerned to carry out all necessary repairs before the ensuing monsoon.

(c) Copies of the inspection notes of "railway affecting" tanks as received from the Public Works or the Revenue Department with particulars of the date of inspection and notes of action taken or proposed by him should be included in the list of protective Works maintained by the Assistant Engineer, vide para. 542.

1429. Vigilance over railway affecting tanks during heavy rains:- The Divisional/District Engineer and Assistant Engineer should arrange with the Local Authorities for village headmen in whose jurisdictions "railway-affecting" tanks are situated, to watch them during periods of heavy rain and give timely intimation to the nearest Station Master if there is likelihood of any tank failing. The Station Master will telegraph reports received from village headmen to the Permanent Way Inspector, Assistant Engineer and Divisional/District Engineer.

When the railway line is threatened, the Assistant Engineer and Permanent Way Inspector shall take steps to ensure the safety of staff and arrange patrolling of the line or post Watchmen with necessary equipment at the place or places threatened and advise the Divisional/District Engineer accordingly.

.....

Errata

46

Page	Para/ Appendix	Line/ Column.	Incorrect	Correct
ii	(e)	7	incorporated	incorporated
3	1.7	13	kee	keep
4	1.9	9	Other other	other
6	VIII	6	Unsitabe	Unsuitable
7	3.3(a)	9	emabnkment	embankment
10	3.5	3	broach	breach
10	3.6	10	in	an
11	3.9	9 & 10	caused by ---- and other	delete being printed twice
11	3.9	21	Creaks	Creeks
13	Marginal heading	1	TIME	TIMELY
26	I-(J)	35	Min	Min.
27	I-(J) (Continued)	1	"Railway details affected"	delete
27	-do-	43	Protection Wor	Protection work
27	-do-	43	if prvided	if provided
27	-do-	50	shce	sheet
28	I-(K)	19	natur	nature