SOP ON ACCOUNTING, MAINTENENCE, STORAGE, CONDITIONING AND SERVICEABILITY ASSESSMENT OF BAILEY BRIDGES IN BRO

INTRODUCTION

1. Bailey bridges are extensively used in the Border Roads Organisation for the construction of temporary/semi-permanent bridges as it offers unmatched flexibility in bridging the gap and speedy construction. The entire bridge is retrievable and can be reused, once the permanent bridge is constructed.

BACKGROUND

2. Earlier, Bailey bridge components were procured as Cat "A" stores against MH 5054 capital outlay (Non Plan). However, classification of Bailey bridges as cat "A" store led to inordinate delay in their procurement as it was mandatory to obtain prior government sanction and budgetary allocation for procurement of cat "A" stores. In order to avoid delay in procurement, Government approval was obtained vide Sectt BRDB letter No. F-157(7)/BRDB/S-85-III dated 06 Dec 1991 and Bailey bridges sets and its components were classified as cat "B" stores. The centralized procurement of Bailey bridge sets by DGBR on the basis of projections made by the Chief Engineers of various Projects was also approved. An amendment to earlier issued letter was further issued by BRDB vide letter No. F.No. BRDB/04/696/BB Comp/2014/Wks dated 20 Nov 2014 whereby DGBR was made responsible for centralized procurement of complete equipment bridging sets on the basis of projections made by Chief Engineers of various projects however; Chief Engineer Projects were empowered to procure loose BB/BSB components under CE's delegated powers as per ground requirement.

OBJECTIVE

3. Bailey bridges though temporary in nature and launched during emergencies are vital links to maintain road communication and shall remain in use for a long period, till they are being replaced by a permanent bridge. Thus, it becomes imperative that adequate care should be taken while accounting and during storage, transportation, maintenance and subsequent conditioning of these bridges. The objective of this SOP is to assist the end user in better maintenance, accounting and conditioning of the Bailey bridge components being widely used in BRO.

ACCOUNTING OF BAILEY BRIDGES

4. **Booking of Cost and Adjustment thereof**. Bailey bridge sets/components are procured against a specific job and expenditure directly booked to the job as an Adjusted Expenditure. As and when the job is completed, its financial accounts are closed. Bailey bridge being a temporary bridge, on delaunching is taken back into stock, after assessing its serviceability by a BOO. On delaunching, due credit will be given to the job under which; the BB had been originally launched, in case the job has not been closed. In case the original job has been financially closed, the retrieved BB components from the delaunched bridges will be taken back, initially to the stock of the RCC and subsequently transferred to the SS & TC and considered as fresh arrival. The retrieved serviceable bridge can be re-used as a whole on a new job or its components for the repair/maintenance of existing Bailey bridge. Whenever, the

retrieved Bailey bridge components are used for a new job, the credit for the bridge components is afforded to the 'Central head' and the cost is debited to the respective Job, at the prevailing rates of year of use, as circulated by HQ DGBR every year.

5. **Accounting Procedure at RCC/BCC/Unit Level**. The Bailey bridge components receipt from the SS&TC will be taken on the Bailey bridge equipment ledger of the RCC/BCC/Unit. soon as the equipment is used for launching a bailey bridge, it will be shown on the distribution page the ledger, as issued against a particular job along with the Job no. and entries are made in the committe Bailey bridge ledger. Report and return will also be accordingly updated. As and when the road is handed over, the committed Bailey bridge will also be handed over as per the Bailey bridge register. All other relevant documents will also be handed over, along with details of all committed equipment, including loan items, if any. Details of Bailey bridge components handed over will also be deleted from the report and return of committed bailey bridges.

6. **Accounting by the SS&TC at the TF Level**. The Bailey bridge equipment received by the TF will be accounted for component-wise, in the Bailey bridge stock ledger by the store coy. Once released to an RCC/BCC/Platoon, the components will be issued by the issue coy on a regular issue voucher and will be priced at the current price circulated by HQ DGBR for that year. The price issue voucher will then be given to AO of the TF for booking of the expenditure in the construction account against the concerned sanctioned job, as adjusted expenditure. Once de-launched, the Bailey bridge components will be subjected to conditioning BOO and will be returned to the store Coy/Platoon. The store Coy/Platoon will price the receipted copy of the consignors issue voucher, as per the approved copy of BOO proceedings and schedule the same to the AO of the TF for affording credit to the respective Job in the construction account. No credit for the de-launched equipment is to be done to a job, if it has already been closed and Part "A" & "B" have been rendered. In such cases, the credit will be afforded to 'Deduct head Recoveries'. When retrieved Bailey bridge components are reused on a new job, the relevant job should be debited the reassessed value of the bridge/components based on the rate per component prevalent at that point of time. Once the bridging equipment is issued from Store Coy/Platoon, an RCC/BCC/Platoon and taken off from the bridging stock ledger, it will be recorded on a separate Bailey bridge stores committed stock ledger. It will keep a check and ease accounting of the total bridging equipment.

7. **Accounting by the Base Depot**. The Bailey bridge equipment in the base depot will be accounted for in a stock ledger, component-wise and will be issued on a regular issue voucher to the TF, as per the release order issued by HQ DGBR.

8. **Accounting Procedure in Case of Replacement of Parts for Maintenance/Damage Repair of a Bridge**. Whenever required for maintenance or damage repair, the expenditure for the replacement of Bailey bridge components can be made out of the funds allotted for the maintenance of the same road on which the original bridge exists. Since the scale of maintenance grant does not cater for this provision, separate demand will be forwarded to HQ DGBR for the procurement of Bailey bridge parts and funds will be allotted under a separate sub head "Maintenance of Bailey Bridges". This allocation of fund will be based on an Annual forecast requirement from the CE Project on the same analogy, as for the maintenance of buildings.

9. **Accounting of Launching Gear**. While Launching gear for Bailey bridge will be permanently held on charge of the store coy/platoon, it will be issued on loan to the RCC/BCC/Platoon for a specific duration. The launching gear will be returned back after launching the Bailey bridge. The usage rate will be debited to the job on proforma basis, which can be worked out considering the original cost of the launching gear, its estimated life and the number of times, it has been used. A survey of the components of the launching gear must be done periodically, at least twice in a year (on a six monthly basis) to assess its condition at each stage. Replacement of the launching gear will be done by the CE Project after down gradation of the launching gear for disposal.

MAINTENECE OF BAILEY BRIDGES

10. Even though, Bailey bridge requires very little maintenance however, certain maintenance aspects need deliberation as under:-

(a) Visual inspection of all bridge parts and components for corrosion, crack, bend or any physical distress.

(b) Check for any surface pitting beyond acceptable limit as per IS Standard.

(c) Regular tightening of bracing bolts, chord bolts, transom clamps, sway braces and any other joinery parts in the bridge which are likely to become loose during the course of movement of traffic over the bridge.

(d) Examine base plates and grillages periodically (once in every three months) and check that there is no uneven settlement. Check chassis for splitting/crack. In bailey bridges where wooden chassis are being used, timber wearing surface may be provided.

(e) Check the condition of raised patterns on the chequered plate of the deck unit. Check for the convexity/concavity of decks.

(f) Check that packing under transoms and ramps remains tight and check them for any deflection/sag. Inspection for any damage/crack on the weld joints, signs of corrosion/pitting on the panels, transoms, deck units, stringers, bracing frame, raker and base plate needs to be done (once in every three months).

(g) Regular inspection to check for corrosion/rusting. Grease around all pins to prevent water from entering joints, exposed threads, bearing plate, rollers and other moving parts.

(h) Repainting of bridge to be carried out once in every two years depending on the condition of the bridge.

(j) In certain cases where Bailey bridges have been in existence for a long time, certain amount of sag may set in due to substantial loading over a period of time. Whenever, the sag exceeds the permissible limits, the bridge should be de-launched and re-launched either at same site or elsewhere. Care need to be taken to turn the panels upside down. This will assist in maintaining longevity of the equipment.

(k) The year of manufacture and year of launch must be marked on each component. Preferably feasibility of engraving needs to be explored otherwise, marking by paint needs to be ensured.

(l) Load class, road width and head clearance of the bridge needs to be clearly marked at the entry and exit of each bridge.

11. Although there is no hard and fast rule regarding frequency at which the installed bridges should be examined, the following inspection/maintenance schedule are recommended:-

(a) **Monthy Inspection**.

(i) Visual inspection of all Panel pins.

(ii) Check all split/safety pins.

(iii) Check all transom clamps.

(iv) Check all HD bolts, nuts, washers on steel decking.

(b) **Half-Yearly Inspection**.

(i) Clean base plate and bearing assembly. Check for smooth movement of all moving parts. Greasing of moving parts, if required.

(ii) Check sway braces, replace/tighten, if found sagging.

(iii) Check all transom clamps.

(iv) Check deflection/sag of bridge. As per instructions issued by GRSE Ltd., deflection due to vehicular live load only should not exceed (span/800)mm, where span is in millimetres.

(v) Check horizontal sway/deformation of top chord.

(c) **Yearly Inspection**.

(i) Check for corrosion/pitting of bridge parts.

(ii) GRSE Ltd. recommends repainting at an interval of two years. Before painting, all parts should be visually inspected and corroded portions, if any, should be thoroughly wire-brushed to clean metal and thereafter suitable primer paint (2 coats) and finishing paint (2 coats) should be applied.

STORAGE AND STACKING OF BAILEY BRIDGES

12. In order to keep and conserve the non committed bailey bridge sets/components in fair and serviceable condition, following guidelines may be adopted while storing and transporting the bailey bridge components:-

(a) As far as possible, covered storage needs to be provided to prevent direct exposure to water, heat and dust.

(b) Components need to be stacked at a minimum height of 6-8" above the floor level.

(c) Since panels are susceptible to bending and distortion, they should be stored in upright position resting on the long side. In case unavoidable to store them horizontally, these should not be stacked more than 10 numbers on a flat base.

(d) All loose components to include bracing bolts, chord bolts, transom clamps, safety pins and other joinery parts and fasteners used in the bridge are to be stacked in boxes.

(e) Regular inspection (once in every three months) of the bridge components for corrosion and rusting should be done. Greasing of movable parts is recommended as under:-

(i) **Panels**. Jaws and inside of all holes to be greased regularly.

(ii) **Bracing Frame, Rakers and Tie Plates**. The conical dowels to be greased properly.

(iii) **End Posts**. Curved bearing surfaces and pin holes to be greased.

(iv) **Bearings**. Big segments need to be greased.

(v) **Panel Pins**. Shanks should be greased.

(vi) **Sway Braces**. The threads and pins to be greased.

(vii) **Bolts**. The entire bolt should be greased.

(viii) **Launching and Erection Equipments**. Rollers, Jacks, Levers, Pin extractors, Wrenches etc; should be protected by regular cleaning and lubrication to prevent corrosion.

(f) As far as possible, stacking and storage of Bailey bridge parts need to be done set-wise and mixing of new components/set with the old components for launching of bridge should not be carried out. (Refer policy in this regard issued vide HQ DGBR letter No. 40530-H/BB-Pol/DGBR/62/Br Dte dated 15 Jun 2003).

(g) Bailey bridge sets/components should be stored and segregated manufacturer-wise. As far as feasible, components procured from GRSE and Bridge & Roof shall not be mixed. Separate sets of Bridges & Roof and GRSE will ensure design as per firm and also facilitate to give performance report of all parts in the bridge as a whole.

(h) Segregation of old retrieved Bailey bridge components from new components/bridge s to be ensured. All old/retrieved loose components to be given permanent identification throug proper marking by engraving/painting and stocked separately.

CONDITIONING OF BAILEY BRIDGES

13. There are more than 650 committed serviceable equipment bridges under various Projects within BRO. A large number of these equipment bridges have a vintage of more than 25 years. The vintage of committed equipment bridges varies from 1965 to 2020. Moreover, a large number of equipment bridges are in a state of disuse as alternate crossing with permanent bridge/ higher classification bridge already exists. Moreover, BOO for survey conditioning of de-launched Bailey bridge is pending in a few cases.

14. Whenever any bailey bridge is delaunched, a BOOs will be convened to assess the serviceability of the retrieved components. The serviceable components will be taken on ledger charge by the RCC and subsequently transferred to the SS&TC of the respective TF. Unserviceable components will be taken on a salvage ledger by the RCC and disposed off in as per approval of the Board proceedings by the competent authority. Simultaneously, the components will be struck off from the ledger of committed bridge components of the RCC. On delaunching, due credit will be given to the job under which; the Bailey bridge had been launched, if the job has not been closed. In case the original job has been financially closed, the retrieved Bailey bridge components from delaunched bridges will be taken back, initially to the stock of the RCC and subsequently transferred to the SS&TC and considered as fresh arrival.

SERVICEABILITY ASSESSMENT

15. Avoiding intermixing of Bailey bridge components for reasons of compatibility and accountability has already been highlighted earlier. Intermixing of retrieved/old loose components with new Bailey bridge components should also be avoided. All the retrieved/old loose Bailey bridge components should be given permanent identification through marking made by engraving/painting and stored separately.

16. While most of the Bailey bridge manufacturers/suppliers in BRO have quantified the fatigue life of their respective bridges in terms of number of load cycles it can sustain, however, actual life span of Bailey bridge is dependent on many factors and no fixed life span can be attributed to it. Fatigue life of bailey bridges as confirmed by respective manufacturers/suppliers is summarized below:-

S No.	Manufacturer/Supplier	Recommended Fatigue Life (Load Cycles)	Remarks
(a)	Bridge & Roof Co.(India)	$2x10^6$	
(b)	GRSE Ltd.	No data exists on fatigue life	Min. design life of at least 25-30 years or more with proper maintenance.
(c)	Mc Nally Sayaji Engineering Ltd.	$2x10^6$	Normal life span of 25 years with regular maintenance
(d)	Shiba Industries	$2x10^6$	Design life of at least 20 years with regular maintenance.

17. Majority of Bailey bridge sets/components held in the inventory of BRO are either from GRSE Ltd. or more recent ones from Bridge & Roof Co. (India). Since, Bridge & Roof Co. has recently started delivering the Bailey bridge components, their life span are not yet critical. GRSE Ltd. has recommended parameters for inspection and test guidelines to be carried out on various old retrieved/used components to ascertain their serviceability condition. List of tests recommended by GRSE Ltd. are appended to this SOP as Annexure I.

CONCLUSION

18. Bailey bridges though temporary in nature and launched under time critical situations, are vital links to sustenance of road communication and remain in use in BRO for a long period till being replaced by a permanent bridge. This SOP should be considered as a guideline to facilitate better accounting, storage, maintenance and conditioning of bailey bridges. It should not be read in isolation rather in conjunction with the manuals and literature being promulgated from time to time. This should in no way discourage the executives on ground from exercising their better judgement, but instead act as a guide to assist them in better management of these critical bridging resources.

दीपक बासकंडी

(दीपक बासकंडी)

कर्नल

निदेशक / त.यो. (संसाधन)

कृते सीमा सड़क महानिदेशालय

11

Headquarters
Dte General Border Roads
(Dte of Bridges)
Seema Sadal Complex
Ring Road, Delhi Cantt
New Delhi-110010

40530-H/BB-Pol/DGBR/ 62 Br Dte

15, Jan 2003

HQ CE (P)...
C/o 56 APO
(All Projects)

CONSTRUCTION/MAINTENANCE BAILEY BRIDGES

1. Further to our letter No. 40530-H/BB/Policy/DGBR/08/Br Dte dated 22 July 2002 wherein detailed guidelines on launching and maintenance of Bailey Bridges were issued.

2. In this connection it is intimated that procurement of certain Bailey Bridges particularly for CSG Roads and Agency works are being under taken by TP Dte /TA Dte as complete sets. It is however understood that the components of such Bailey Bridges where procurement is being done in sets are also being mixed up with the other available old components and thereafter being used for launching. This practice is however not in order for the durability of the bridge and as also the consideration of accounting procedure.

3. In order to have proper accounting of Bailey bridges being procured in complete set against specific jobs and to ensure durability and proper compatibility thereof, it is hereby directed that in future the Bailey Bridges procured in complete sets for a particular job will be launched as such against that job and no mixing of components thereof with the old one will be carried out for making sets for launching of bridges in general. Only balance components if any, available due to change in span or configuration could be mixed up with the other holdings.

4. Suitable directions on the subject may please be issued to the ground executives including the concerned SS&TC at your level, so that practice of mixing the components of a complete set with the other bridges is avoided.

5 Please acknowledge receipt.

(Anil Kumar)
SE (Civ) SG
Offg DDG (Br)
For DGBR

Copy to:-

HQ DGBR/TP Dte/E2 Res

HQ DGBR/TP Dte/E2 Wks

For information please

(8) FR 1-9, A17
BR 42(Vol-II)

(9)

☎ - 011-5687066

Headquarters
Dte General Border Roads
(Dte of Bridges)
Seema Sadak Bhawan
Ring Road, Delhi Cantt
New Delhi- 110010

22 Jul 2002

40530-H/BB/Policy/DGBR/ 08 /Br Dte

HMP, BCN, DPK, SPK, CTK, HRK, SSK, SWK
STK, PSK, UDK, VTK, DTK
C/o ..... APO
(All Projects)

POLICY ON BAILEY BRIDGES

1. Further to this Dte letter No. 40530-H/BB-Pol/DGBR/42/Br Dte dated 31 May 2002.

2. Bailey bridges have been in existence in the Army service since the second world war and with the BRO since inception of this organisation. A considerable degree of proficiency has been achieved by the organisation in launching/de-launching and maintenance of these bridges. However, there is always a possibility of executives tending to become over confident, resulting in complacency, which could prove fatal. As such, there is a need for executives to refresh themselves about the various procedures and the DOs/DONTs before any bridge is launched/de-launched in their sector.

3. The aim of this policy letter is to act as a guide and should in no way discourage or dissuade the executives on ground from exercising their judgement. This letter should be read in conjunction with the Engineer Reconnaissance Pocket Book (ERPB), ME Vol III and Vol IV, Working Instructions for Bailey Suspension Bridge No.2 and the GRSE Technical Manual. The above manuals are quite comprehensive by themselves and a copy of these should be kept at least down to the RCC level and all executives up to OC RCC should be well conversant with them.

Selection of Site

4. The site selection is of paramount importance as it determines the type, configuration and load classification and the risk factor of the bridge to be launched. Although the Bailey Bridge is very versatile and can be launched almost anywhere, adequate precaution need to be taken to ensure enhanced life of the equipment/the bridge and avoid accidents. It is with this in view that site selection assumes added significance.

5. CEs must ensure the following, prior to sending the estimates to this HQ for sanction.

(a) It is to be ensured that under no circumstance a Bailey bridge of desired load class of more than 200' is launched. In case the site requires launching of bridge

which is more than 200', efforts be made to launch a broken span/ continuous span bridge. In case the nature of terrain does not permit launching a broken span/ continuous bridge, then a Bailey Suspension Bridge (BSB) will be planned.

(b) It will be ensured that both the banks are adequately strong to sustain the load of the bridge including live load. In case the banks require strengthening by way of river training works or construction of retaining walls etc., these must be carried out prior to launching of bridge in order to obviate chances of caving in or scouring of the banks.

(c) The load classification decided upon to finalise the bridge configuration should be in consonance with the prevailing or likely traffic pattern. At no stage should any vehicle of a load class higher than the bridge be permitted. In this connection, reference is invited to Table III and Para.6 of TI No.12.

(d) Sign boards with name of road, location and load classification of the bridge warning that more than one vehicle will not pass on the bridge at a time must be displayed at either ends of the bridge. Photographs of these boards must be taken and maintained as record which are essential documents required to be produced in the Court of Law for claiming damages from Civil truck owners in case of any failure of bridge due to overloading of the bridge.

(e) It may be ascertained that the hydraulic nature of the river/gap permit the launching of the type of bridge selected. Hydraulic details of the river, mainly the HFL, nature of flash flood etc. be studied, by actual ground study, local inquiries or by contacting agencies like CWC working in the area. The deck level and the span of the Bailey Bridge will be decided accordingly.

(f) Generally, Bailey Bridges are launched as temporary bridges. Even if at times a Bailey Bridges may be launched as semi permanent bridge, it would have to be replaced by a permanent bridge at a later stage. Hence, while selecting a site executives must select a site keeping in mind the requirement of a permanent bridge. While sending AEs the statement of case should mention availability of a site for a permanent bridge and the site plan should indicate tentative location for a permanent bridge also.

6. Bailey Bridge being a communication bridges to be launched in emergency many a time it may not be possible to check hydraulic details at HQ DGBR, before launching a Bailey Bridges. Therefore, all estimates reaching HQ DGBR for sanction must be accompanied by a certificate duly signed by the Chief Engineers state that instructions contained as per Para.5 of this letter have been complied with.

Importance of Each Part.

7. The Bailey Bridge is a time tested equipment with little chance of failure if used in the laid down and prescribed manner. Each part of the bridge has a specific purpose and should in no way be neglected during construction or its use. Failure to adhere to the stipulated design could result in damage to eqpt or even loss of life. eg: rakers and sway braces are important to provide lateral stability to the bridge. It is often noticed that importance of these parts is neglected resulting in excessive lateral deflection and subsequent damage to the bridges

8. Whenever old parts or parts from de-launched Bailey Bridges are used, care shall be taken to examine each part for corrosion, cracks and damages. Rusted parts will have less strength and these shall be avoided as for as feasible. Whenever old parts are used, these shall be painted with corrosion resistant paint before use in launching or before committing.

Design of Bridge

9. The design of the bridge should be strictly as laid down in the manuals mentioned at Para.3 above. In case the original Bailey equipment is being used then the design as per ERPB and ME Vol-III be followed. However, in case the GRSE manufactured equipment is being adopted then the design as given in the technical manual of the GRSE be followed.

10. Bailey Bridge components are also being procured from M/s Bridge & Roof, Kolkata. As far as feasible, components procured from GRSE and Bridges & Roof shall not be mixed. Separate sets of Bridges & Roof and GRSE will ensure design as per firm and also facilitate to give performance report of all parts in the bridge as a whole.

Launching of the Bridge

11. Exhaustive launching procedure for various configurations is given out in ME Vol-III, Part-III. However, special emphasis must be given to the following.

(a) Ensure that the balancing moment is at all times greater than the overturning moment. Executives at site must calculate the same for various stages of construction and comply with same. No compromise or change be made in the design of the nose and sequence of launching.

(b) Efforts will be made to try and select a site where the home bank and far bank are almost level. However, if it is not possible, the following precautionary measures may be adopted.

(i) Launching on to a higher bank. The problem may be over come b including one or two launching nose links or by adjusting the heights of th launching and landing rollers or a combination of the two.

(ii) Launching on to a bank lower than the home bank. Preventer tackles must be fitted to each side of the bridge, to control it during the launch. Launching nose links should also be fitted to overcome the sag in the launching nose and to help clearance of nose on the for bank.

(c) It is observed that many a times, because of improper calculations or improper use, the load in bailey jacks increase and jacks fail. Failure of jacks may cause damage to bridge or hamper launching/de-launching incidence. Hence sufficient precaution be taken to calculate requirement of jacks and in case of emergencies, sand bags may be used to support the bridge at bearing sites.

(d) Soon after completion of launching or de-launching a BOO be convened to check all components as per guidelines issued vide SOP for accounting of Bailey Bridge components.

(e) Soon after launching tack welding of panel pins, transom clamps etc be done to avoid theft etc as per guidelines issued earlier.

Maintenance And Repairs

12. Maintenance - The bridge requires very little maintenance. However certain aspects may be borne in mind at all times.

(a) During Transportation. The following parts should be kept clean from dirt and properly greased.

(i) Panel jaws and inside of all holes.
(ii) Panel pins.
(iii) Bracing frames, rakers tie plates - the conical dowel.
(iv) All bolts and screw threads.
(v) Rollers.
(vi) Jacks, cord jacks and pin extractors.
(vii) Levers.
(viii) End posts and bearings.

(b) In Bridge. It is imperative that periodic checks and maintenance is carried out. At no stage should the periodicity of these checks be less than once in six months. The points that will have to be watched are as given below.

(i) Check that all bracing bolts, chord bolts, transom clamps and sway braces are fixed and remain fully tightened.

(ii) Examine base plates and grillages periodically and check that there is no uneven settlement.

(iii) Check that packing under and transoms and ramps remains tight.

(iv) Check that there are no chassis splitting or warped, and bearing unevenly. In case of wooden chassis and if the bridge is to be kept for a long time then timber wearing surface may be provided.

(v) Grease around all pins to prevent water from entering joints, also bracing bolts and any exposed threads, bearing plate, rollers and any other parts as per the manual. Check carefully that no rusting occurs.

(vi) All bridges must be painted to prevent corrosion. Further, repainting may be carried out once in every two years depending on the condition of the bridge.

(vii) The year of manufacture and that of launch must be marked on the bridge. For new equipment being procured, the manufacture be intimated to engrave the year of manufacture. For old equipment the possibility of engraving be explored, failing which it may be painted.

(viii) All panels at the time of launch should be marked for their position from the far bank as also the side of the panel which is on top. This should be done by paint.

13. Damage Assessment and Repair. The effect of damage to any particular member on the load carrying capacity of a bridge will largely depend on the position of that member in the bridge. For instance, damage to panel chords which take bending stresses will be most serious if it occurs at the center of the bridge where bending moment is maximum. Similarly the effect of the damage to verticals and diagonals which take shear stresses is most severe in the end bays of the bridge.

14. The theory of damage assessment, the actual determination of damage assessment with reference to residual strength and the method of repair is given in great detail in the above mentioned manuals. Executives upto the level of OC RCC's should be well versed with the same to be able to detect and asses any damage as also take expeditious remedial action.

15. There may be cases where some Bailey Bridges have been in existence for a long time. In such cases a certain amount of sag may set in due to sustained loading over a period of time. These bridges, whenever the sag exceeds the permissible limits, be de-launched and re-launched either at same site or elsewhere. Care will be taken to turn the panels upside down. This will assist in maintaining longevity of the eqpt. The bridge will also be inspected for any other damage and the same will be rectified.

Conclusion

16. Bailey bridges though temporary in nature and launched during emergencies, are vital links to maintain road communication and remains in use in BRO for a long period till it is replaced by Pmt bridge. It thus becomes imperative on our part to ensure that we take adequate care during initial planning, launching and subsequent maintenance of these bridges. This policy letter should not be read in isolation and should be read in conjunction with the manuals and literature mentioned earlier. This should in no way discourage the executives on ground from exercising their better judgement, but instead act as a guide to assist them in their endeavor for a better task.

(Sarvajit Singh)
Lt Col
Jt Dir (Brs)
For DGBR

Copy to :-

1. TS to DGBR - for information please.
2. SO to Addl DG - -do-
3. DGBR/TP Dte
4. DGBR/WP Dte
5. DGBR/DAJ