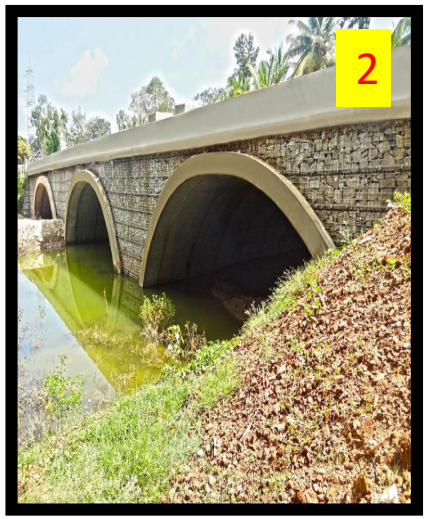
FULLY PRE CAST STRUCTURES- GOOD GREEN TECHNOLOGY by Satander Kumar

PRECAST CONCRETE COMPONENTS

1. Box Culvert
2. Girder- Pre-stressed IRC:112/Pre tensioned IRC:SP:71
3. Retaining wall/wing walls
4. Drains and drainage spout
5. Piles and pile cap
6. Piers
7. Crash barriers
8. Kerb Stone
9. RE Panel and dirt wall
10. Panel for slop protection
11. Railway sleepers
12. Door Frames, Poles, drains for housing,
13. Pre Cast Cored Units for roofing developed by CBRI
14. Waffle Units
15. Prefabricated brick Panel for Housing

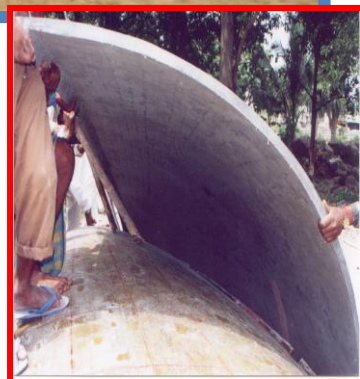
Over View RECAST CONCRETE COMPONENTS



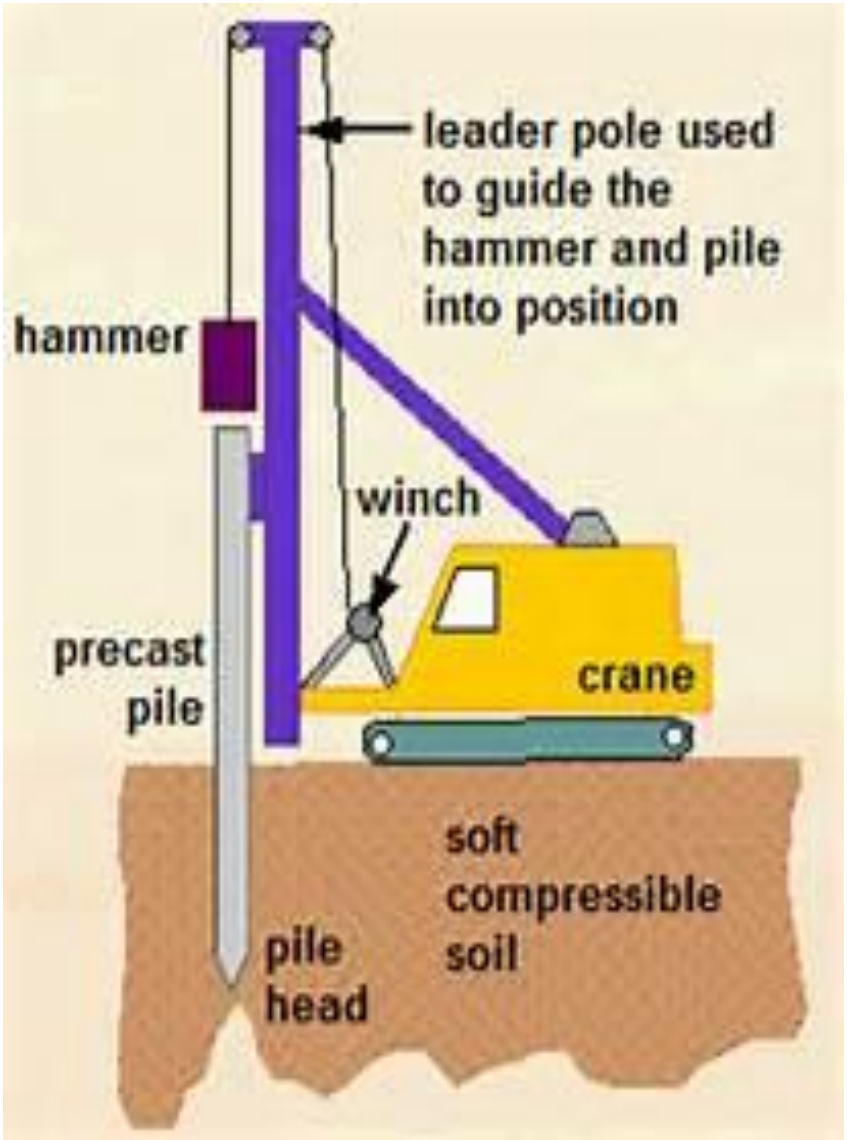
1. BC
2. Pre cast Arch
3. RE Panel
4. Panel slop protection
5. Girder and pier cap
6. Pre cast drain/kerbs

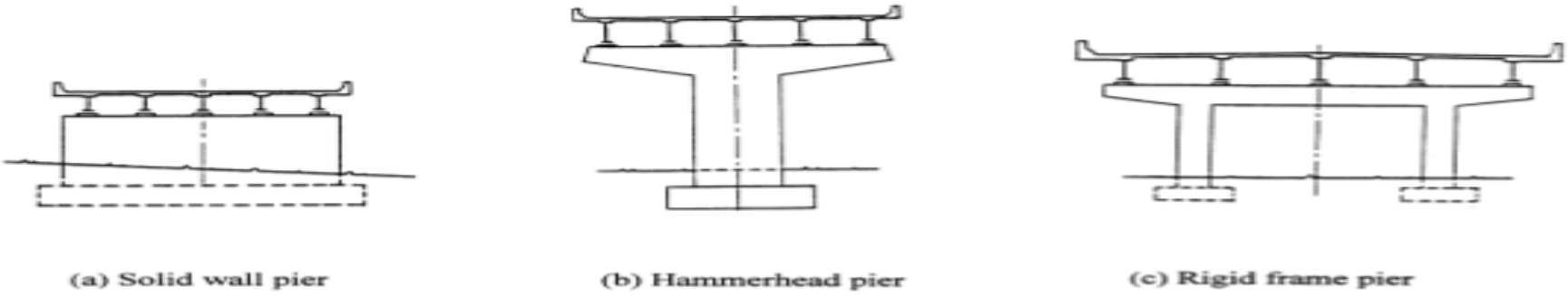
Weight and width-

DECREASING



Pre Cast Pre-stressed Concrete Piles- Less requirement for coffer dam





(a) Solid wall pier (b) Hammerhead pier (c) Rigid frame pier

FIGURE 27.3 Typical pier types for steel bridges.

FIGURE 27.1 Typical cross-section shapes of piers for overcrossings or viaducts on land.

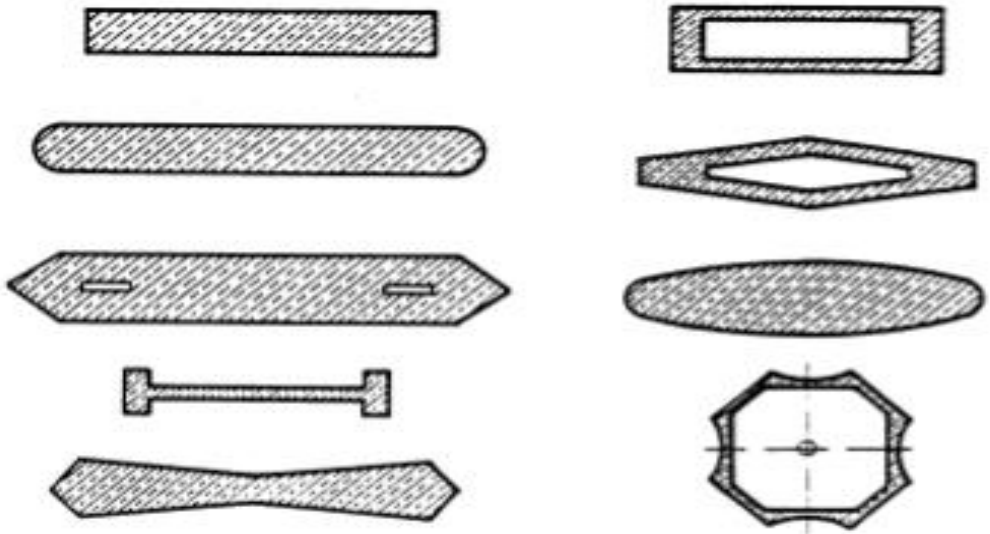
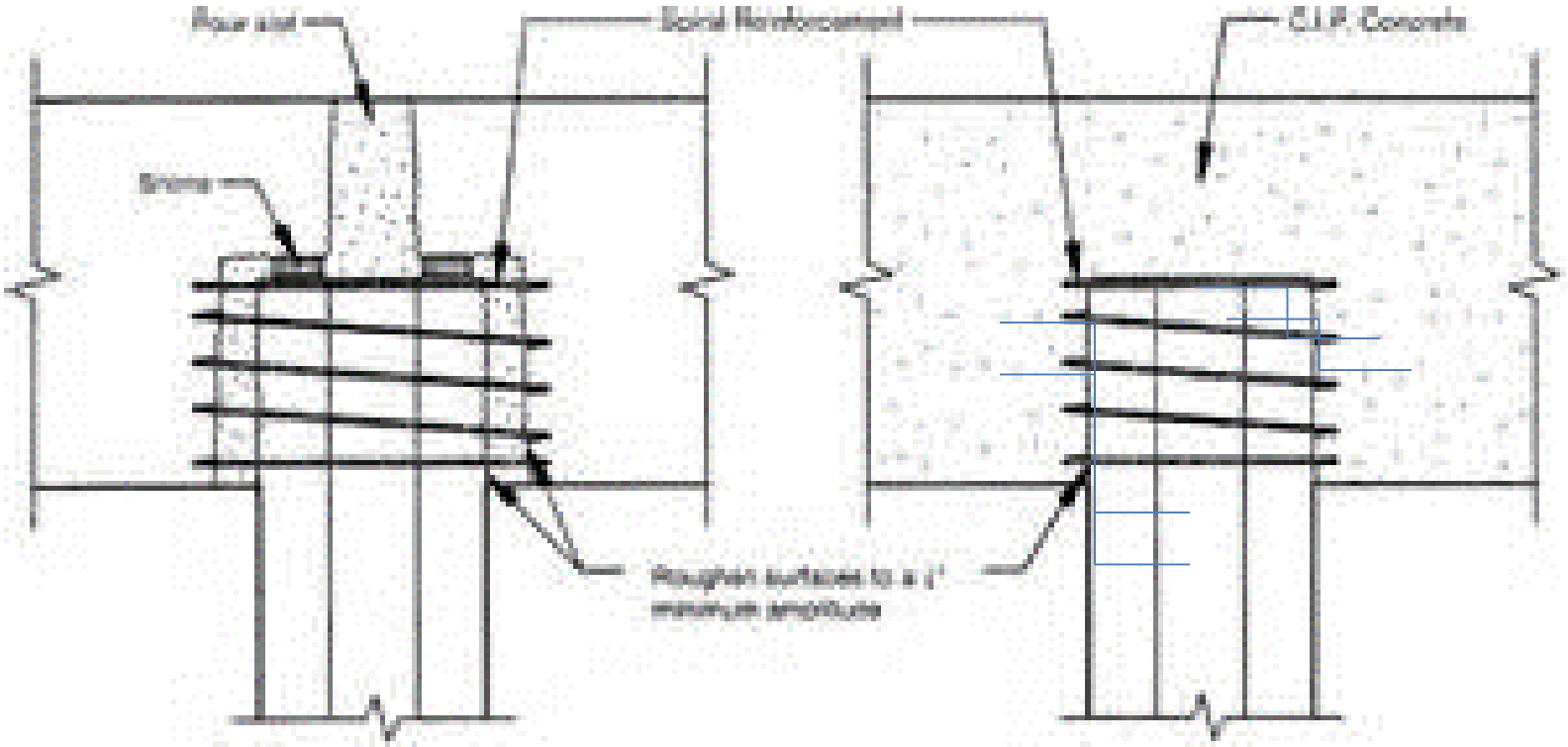


FIGURE 27.2 Typical cross-section shapes of piers for river and waterway crossings.

Pre cast Concrete Pile cap



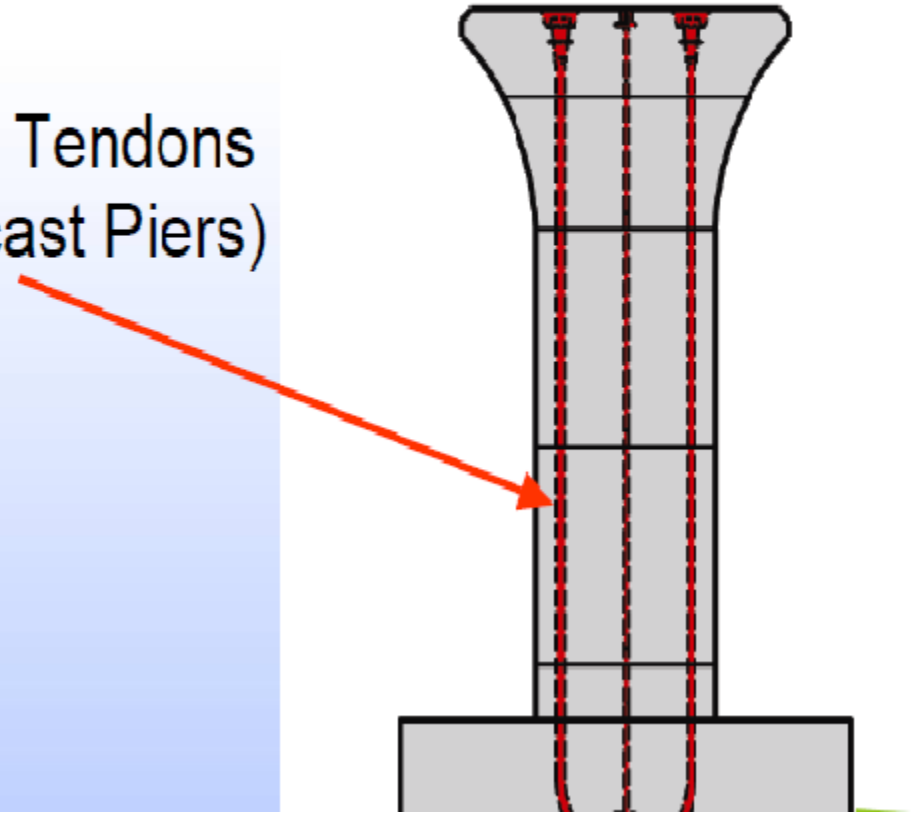
PILE EMBEDDED IN PRECAST PILE CAP

PILE EMBEDDED IN CAST-IN-PLACE PILE CAP

IRC Cofde Under Draft

Post-Tensioning (PT) Arrangements

- Vertical Tendons (in Precast Piers)



- INSITU CONSTRUCTION
- MORE THEFT
- MORE SPILLAGE
- MORE SPACE

Machinery required at site for small work- Space required

Small Gen Set

Joint Cutting

Plate compactor Screed Vibrato

Dewatering Set

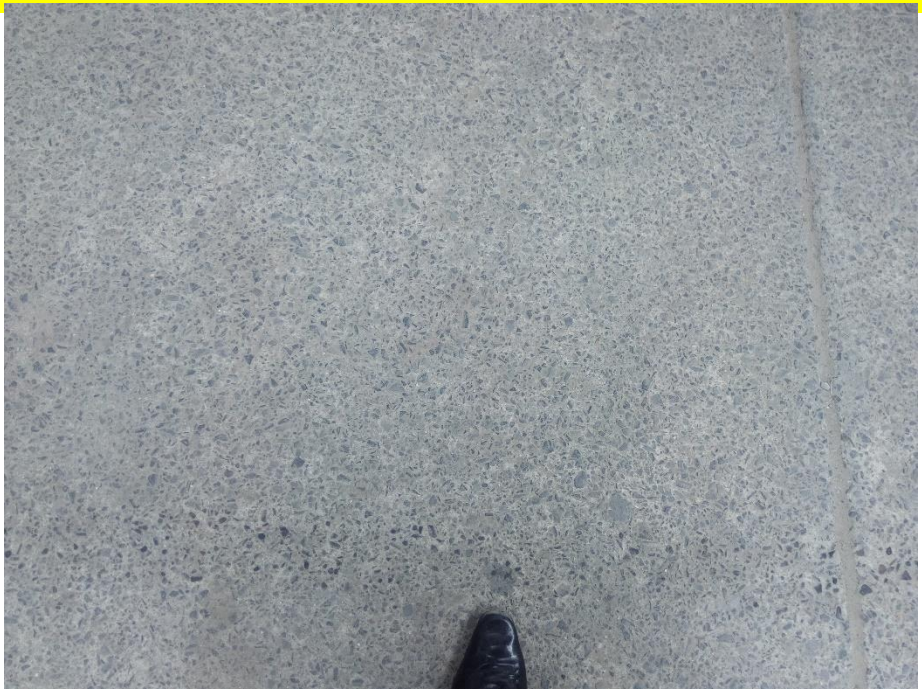
Floater

Near Loha Mandi DElhi

CONVENTIONAL IN SITU METHOD

Insitu and Pre cast construction for roads

Side Effects Conventional Rigid Pavement (non Pre cast Pavement)
- More wear and tear – As difficult to control traffic in City roads

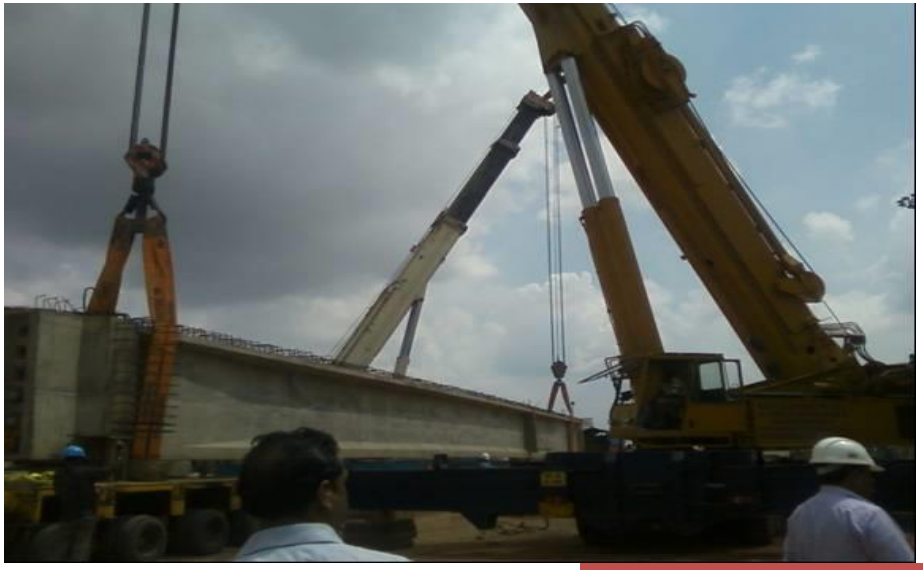


1. CONSTRUCTION
2. TRANSPORTATION
3. Laying
4. Pre stressing
5. Grouting

Hawara Bridge under Construction

Methodology almost similar to Pre cast Technology

Pre cast Mould, Spine segment at Pre cast yard



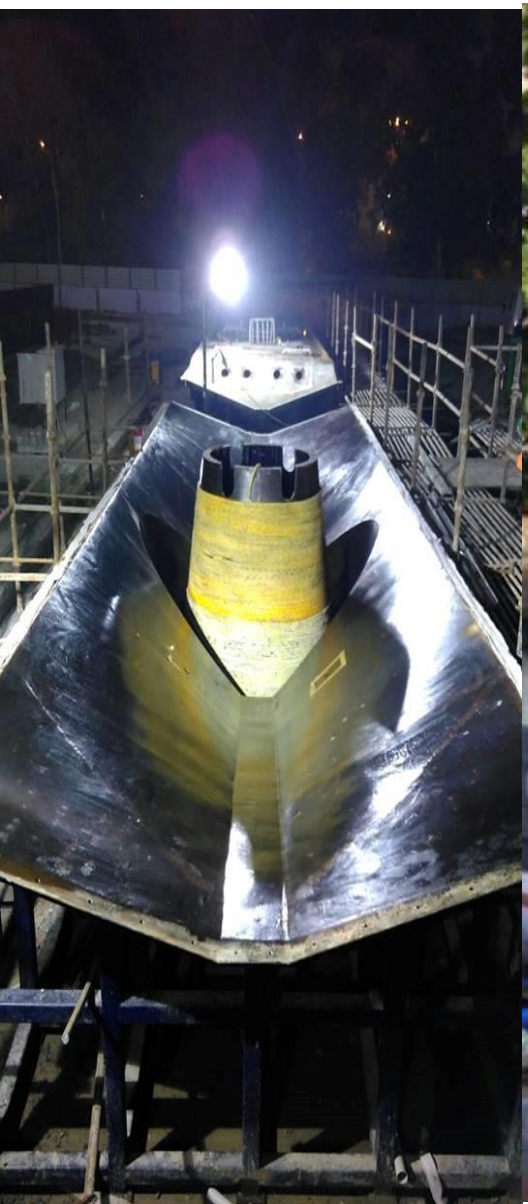
PROPER METHOF OF LIFTING HEAVY PRE CAST GIRDERS

Transportation 80-90 ton Pier Head

Transportation 180 ton Girder (Prestressed)- each side of Pier Head

- Haldor Fottland, Area Manager of Awilco Offshore, said, “Awilco Offshore Semi AS congratulates YRS on the christening of the 20,000 MT crane.”

Individual Pre cast components Piers/Mould
NH 2 L&T



Launching/Lifting Pre cast panel NH-2


AIP
HR06W1709

PRE CAST GIRDER

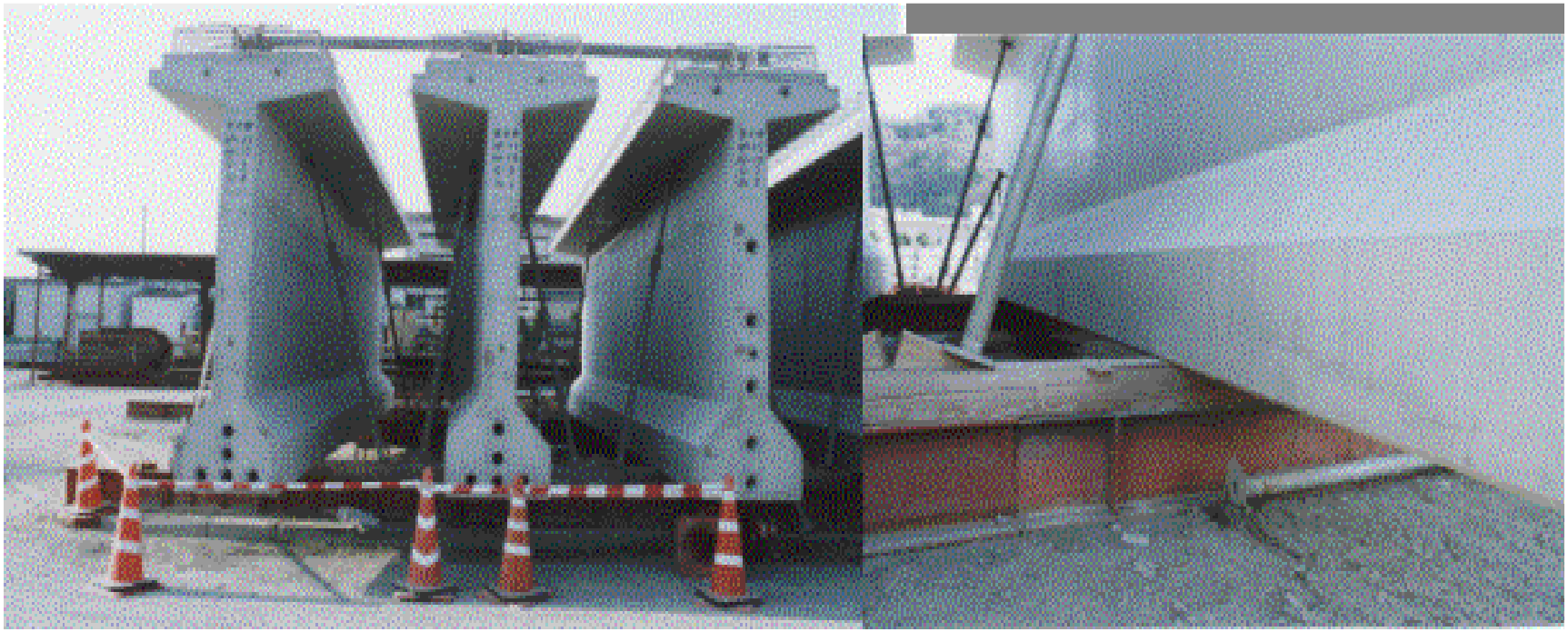


Figure 3 Condition of Concrete of SCC (Higashi-Oozu Viaduct, Japan)

Segm

Precast Concrete Spine Segments- 60 tonnes


Launching


Sheath and
steel bars
for stitching
Holes for
Lifting/anchorage

Wing Segment

Prestressing cables

How to Join ?

stitch segments for joining

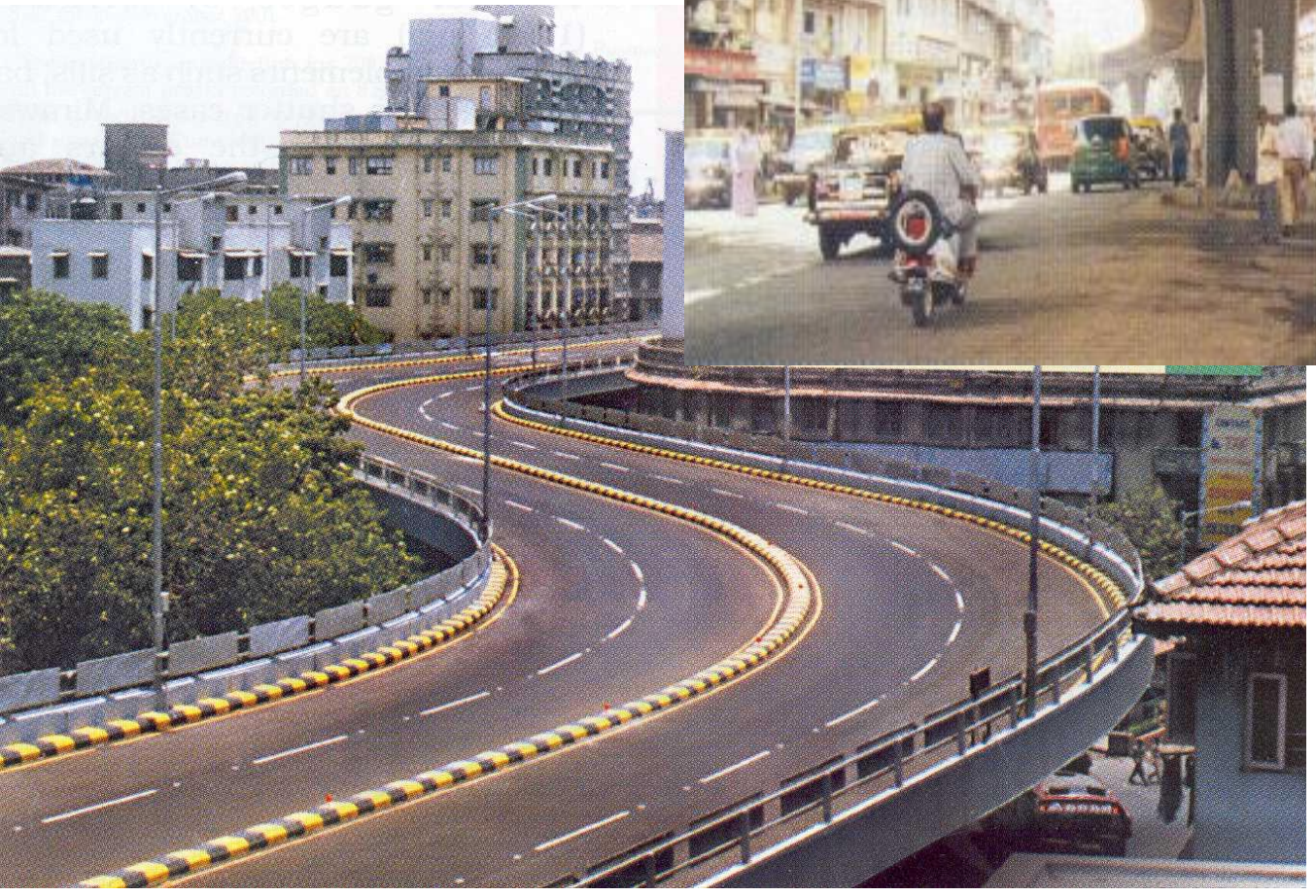
Precast Joints

- Keys (i.e. no reinforcing across joints)
- Epoxy
  - Temporary Clamping
  - Temperature

JJ HOSPITAL FLYOVER, MUMBAI

USE OF High Performance Concrete

JJ FLYOVER



Pre cast Pier Head Wider at Curve portion of –NH 2 near Badarpur

Pre-stressing and Construction in Progress – Pre cast Bridges


Pre cast Push segment

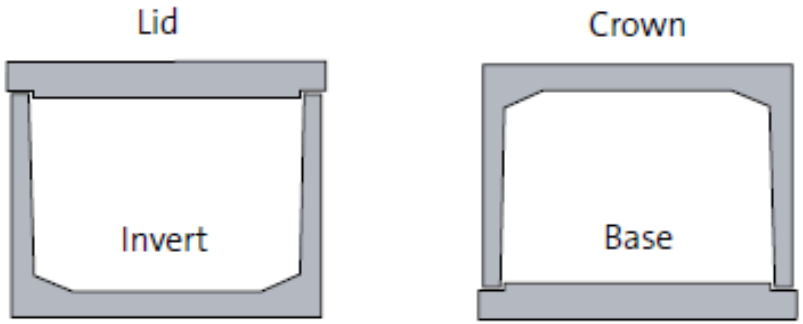
Pre cast Concrete wall

Pre cast Retaining wall

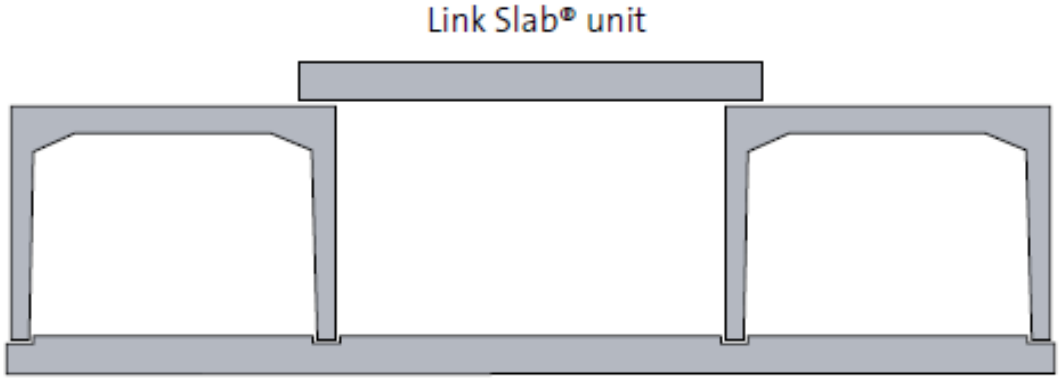
Pre cast Components- Wing Wall, Deck, stair, segments

Drains and panel

- Growing trees- insitu ?



USUAL SHAPES



Method 1. Wet Cast

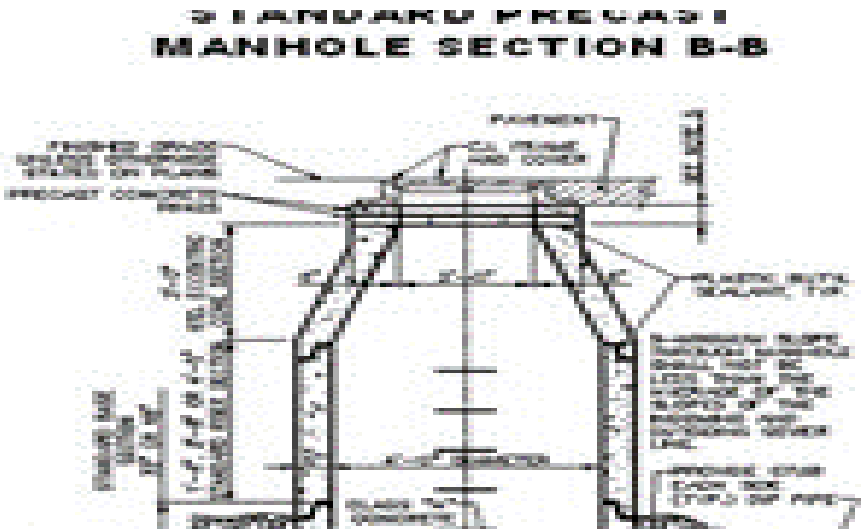
Method 2. Dry Cast

Causeways

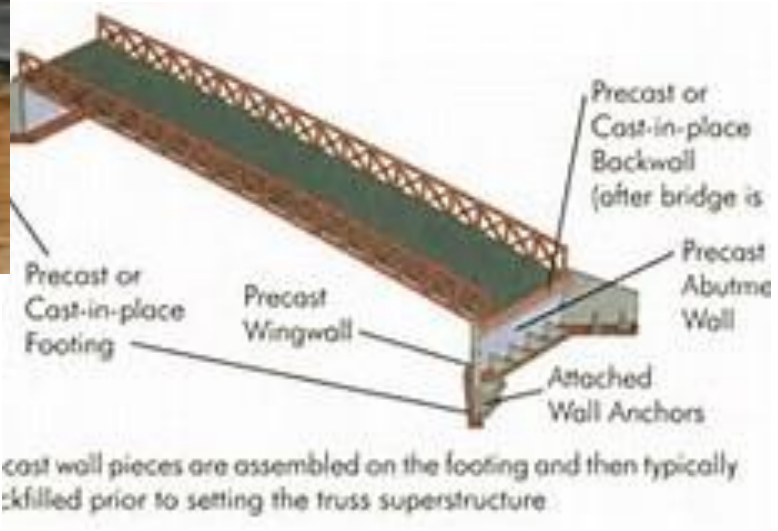
Pre Cast Causeway

Pre cast Concrete Bridge Elements

Pre cast Beam/Manhole cover/drainage spot



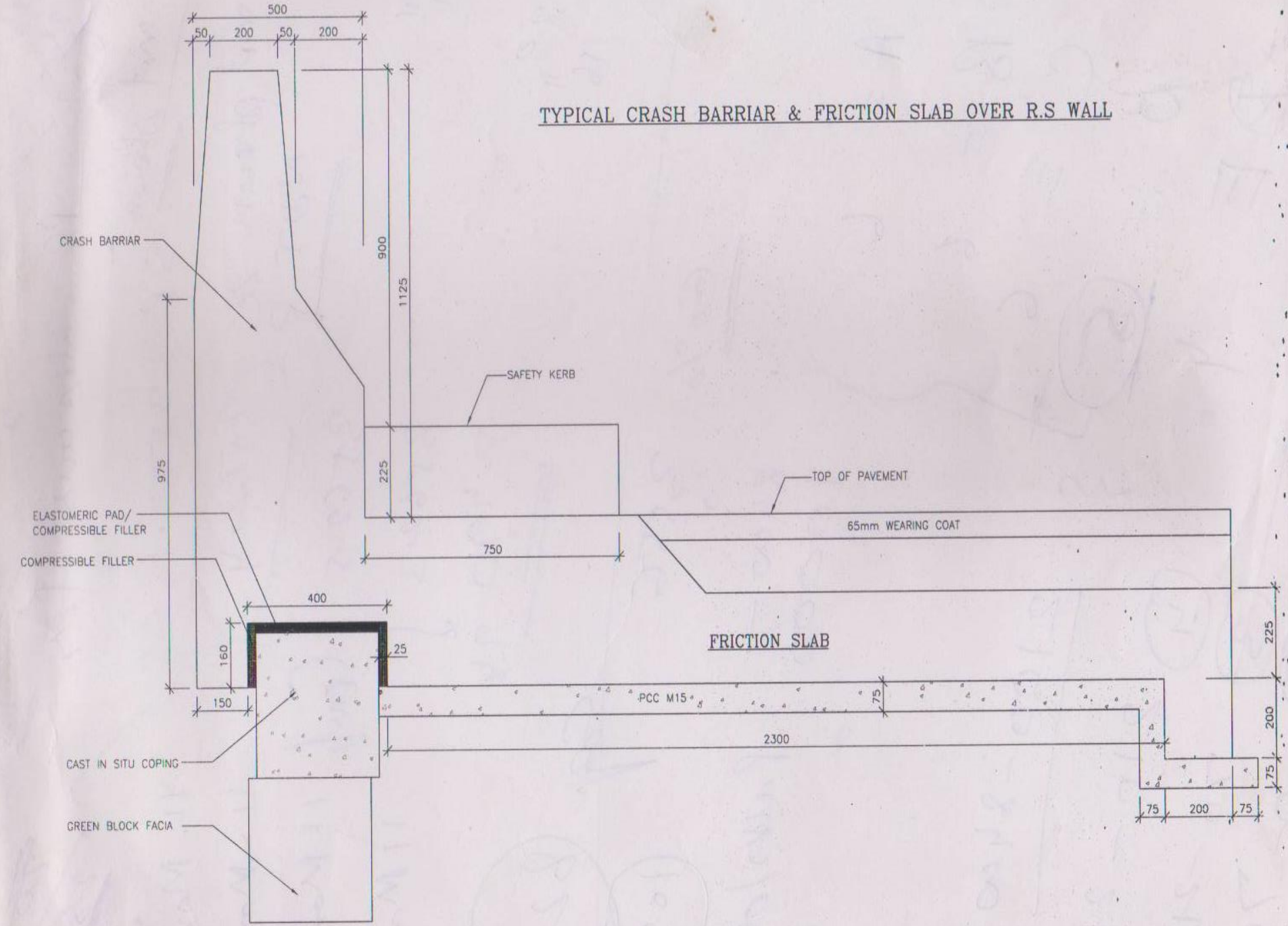
Pre cast Dirt wall



cast wall pieces are assembled on the footing and then typically
ckfilled prior to setting the truss superstructure

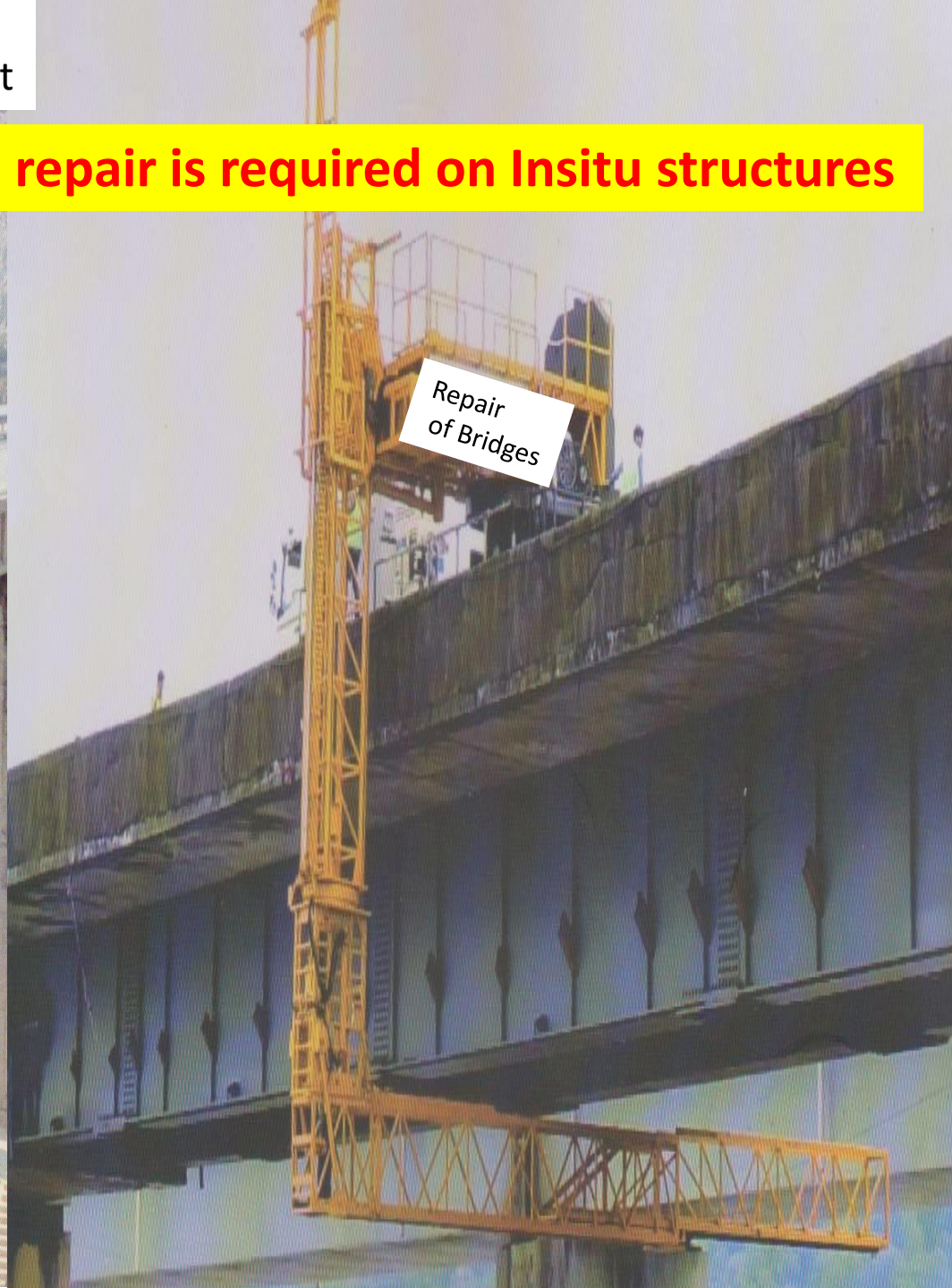
Precast RE Concrete after castingPanel

TYPICAL CRASH BARRIAR & FRICTION SLAB OVER R.S WALL

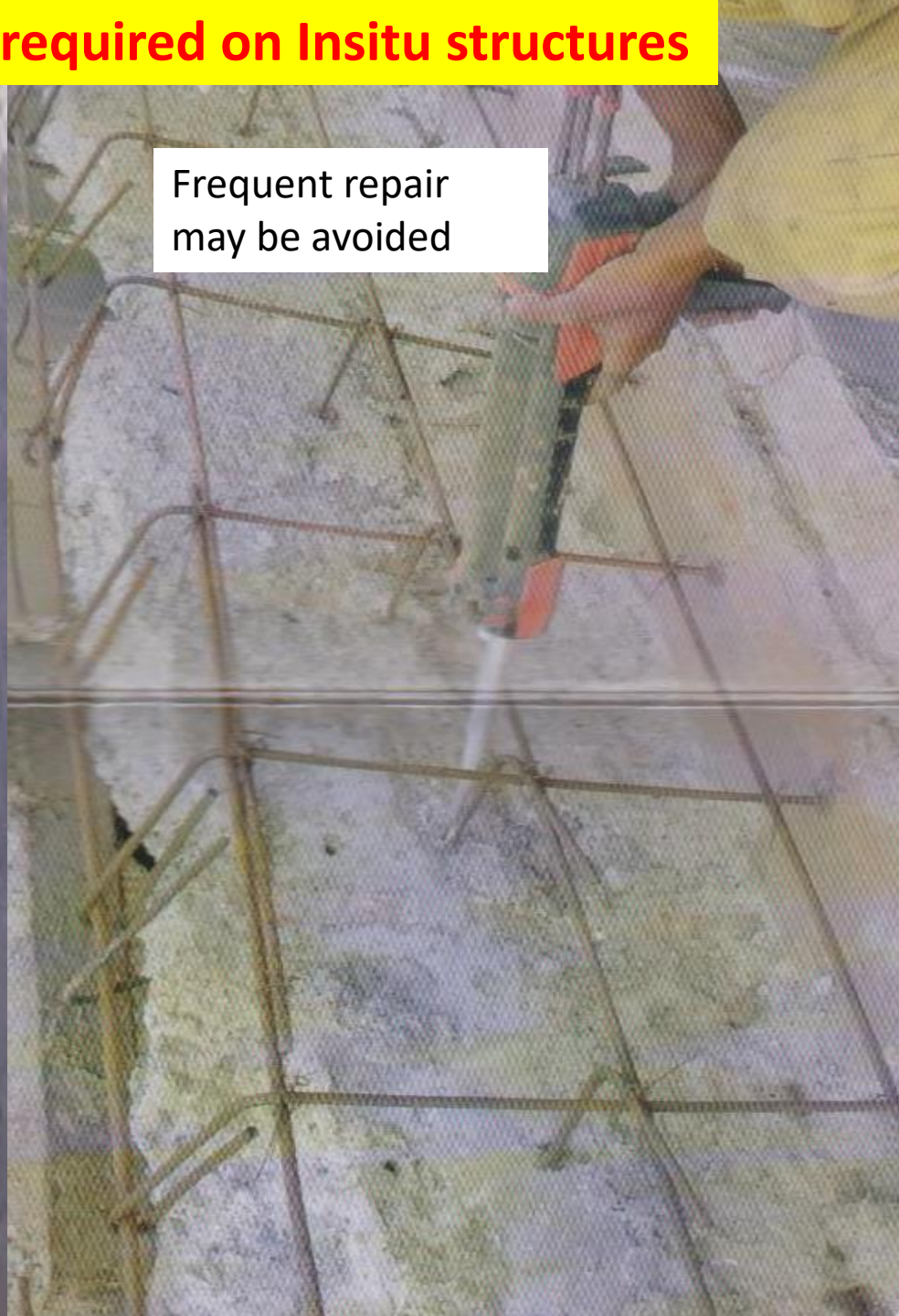


Machine for rep[air may be modified, and used for lifting precast concrete component

More repair is required on Insitu structures



More repair is required on Insitu structures

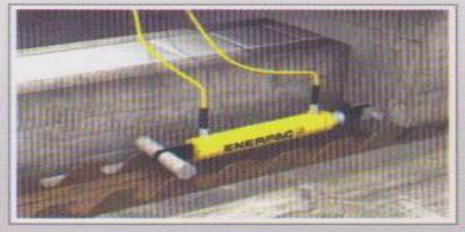


Frequent repair may be avoided

More repair is required on Insitu structures

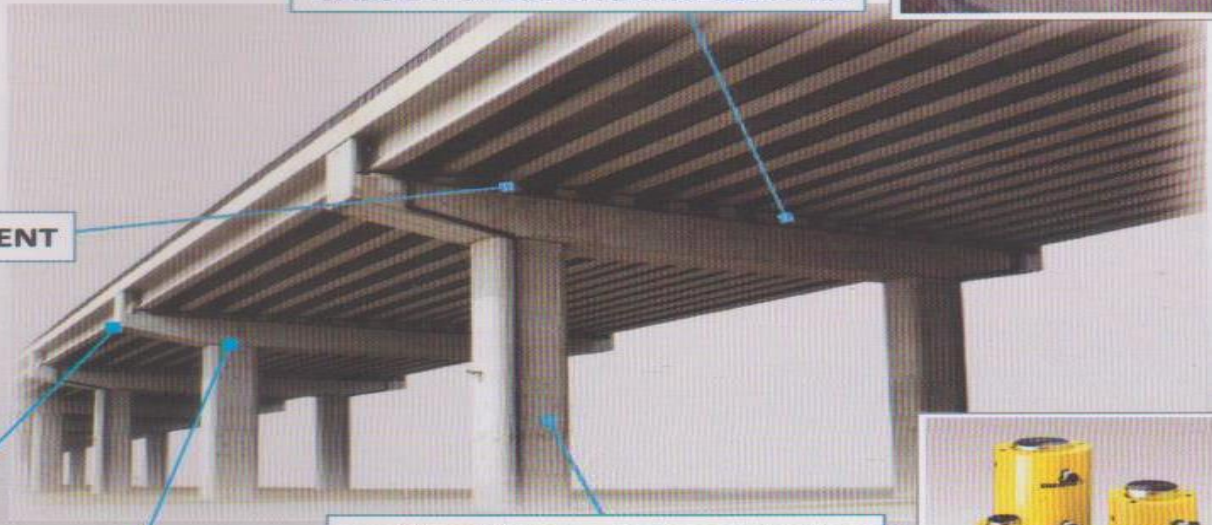
Heavy Machine Tools for repair may be Avoided or may be less used

LIFTING and BEARING REPLACEMENT



SLIDE JACKING

ANCHOR BOLT, ROD and CABLE TENSIONING and TESTING



PILE TESTING and DE-PROPPING

Machine for lifting precast concrete component

Heavy Load Displacement

Limitation – Pre cast

Damage in Conventional may be more as Pre cast is monolithic and One Component or component wise

Height and horizontal gauge must


Pre cast is monoli
or component wis
Height and horizontal gauge must

SEGMENTAL CONSTRUCTION OVER RAILWAY TRACK- Pre cast must

Bally Bridge- MAY BE TRIED WITH PRECAST CONC RETE GIRDERS

Application in India

- 6 Lanning of Chandikhole- Jagatpur Bhubneshwar Km 419- km 62, NH 5 Cuttack Orissa - NHDP - V

Brigade, Kanakpur

Techspan® Bangalore BC

Mould

Delhi MCD

Subhash Nagar Delhi

ADVANTGES OF PRE CAST Bridges

1. High strength with reduced size
2. More utility space
3. No difficulty in erection forms
4. Avoid theft and Less spillage/wastage of material
5. Full curing- faster in use
6. Less disturbance to public

Pre cast Bridge Deck/Replacement

FHWA INTERNATIONAL TECHNOLOGY SCANNING PROGRAM

Prefabricated Bridge Elements and Systems in Japan and Europe

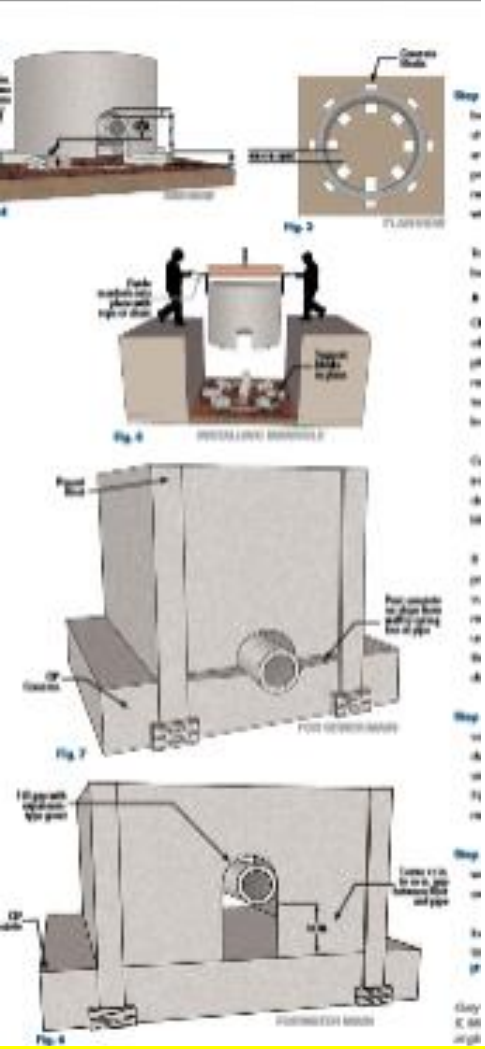
Pre cast Longest span Bridges









Installing a Pre cast Man Hole

Pre cast Box Culverts with Pre cast Wing Walls

Typical Small Stream Crossing

Concrete Road as Parking above Pre cast Box Culverts

CONCLUSION

1. Strong and durable and easy recoverability
2. Faster under very poor condition
3. Construction speed not affected due to rains/winds
4. Good finish & Low maintenance
5. Green Technology
6. Minimum pollution

Figure 28. Precast, prestressed concrete bridge.

THANK

YOU