INCOLD
Indian National Committee on Large Dams

INTERNATIONAL DAM SAFETY CONFERENCE

DRIP
Dam Rehabilitation & Improvement Project

Central Water Commission

Rehabilitation and Replacement of 136 no's of Sluice Gates and Their Hoisting Equipment's of 100 years old KRS Dam, Karnataka

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Salient Features of the KRS Dam *(from KRS Sluices by M.C. Sampatiegner Book)*

General	
River	Cauvery
Location	Near Kannambadi Village of Srirangapattana taluk, Mandya Dist. Karnataka State.
Year of Construction	1911 - 1931
Geophysical Features	
Catchment Area	10,619 Sq.Kms.
Nature of Catchment Area	The Malnad portion of the catchment is hilly and thickly wooded. It gets heavy rainfall mostly in the South-West monsoon.
Climate	37.22^0 C maximum
Mean annual precipitation	160.96 Cms (63.37”)

Annual yield at Dam site	189 TMCft.
Geological features at dam site	Gneissic Granite with bands of horn-blend schist.
Technical	
Length of the Dam	2.62 Kms. (8597 ft.)
Height of the Dam above the River bed	130.8 ft.
Gross storage capacity	49.452 TMC
Live storage capacity	45.051 TMC
Dead storage at RL 60 ft. (732.74 M or 2404 ft.)	4.401 TMC
Lowest River bed level	714.45 M (2344 ft. MSL)
FRL/MWL	752.489 M (2468.80 ft. MSL) – 124.80 ft. above River bed

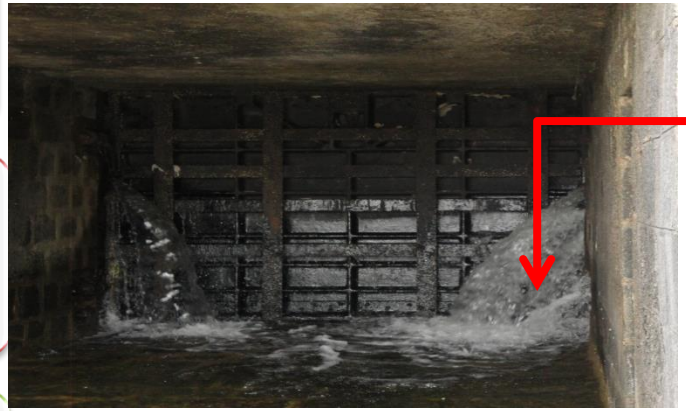
Type of Dam	Gravity Dam, Stone masonry with surki mortar
Purpose of project	Multi purpose
Catchment Area	10,619 sq.km (4100 sq.miles)
Maximum designed flood discharge	3,50,000 Cusecs

Details of Sluice Gates for proposed Rehabilitation *(from KRS Sluices by M.C. Sampatiegner Book)*

Description	Type	Size	No's
+103 Level Sluice Gates	• Fixed roller type • Operated with Gantry (16T capacity)	10'x 8'	48
+106 Level Sluice Gates	• Fixed roller type • Operated with Gantry (16T capacity)	8'x 12'	40
+114 Level Sluice Gates	• Automatic gates	10'x 10'	48

Condition Assessment of Sluice Gates at EL +106, +106 and +114 Level

- Heavy Leakage through Sluice Gates
- Corroded/Damaged Gates and Embedded Parts
- Non Closure of Gates
- Operational Difficulties



Leakage of Water

Corroded Top Seal *(Made up of Bronze pad)*

Broken Wheel

RESULT

Loss of Flood Discharging Capacity

+

Increased Chances of Gate Failures

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Leading to poor management of Impounded Water

As a part of ongoing Dam Rehabilitation and Improvement Project (DRIP) under government of India, the age old KRS Dam was considered for repair and rehabilitation in order to improve the structural safety, flood discharging capacity, operational flexibility and overall better management of impounding water

An MOU between WRD Karnataka and CWC was signed for providing the design consultancy work

Status of Sluice Gates and before Rehabilitation work

Out of 136 No's, only 56 Gates are operational

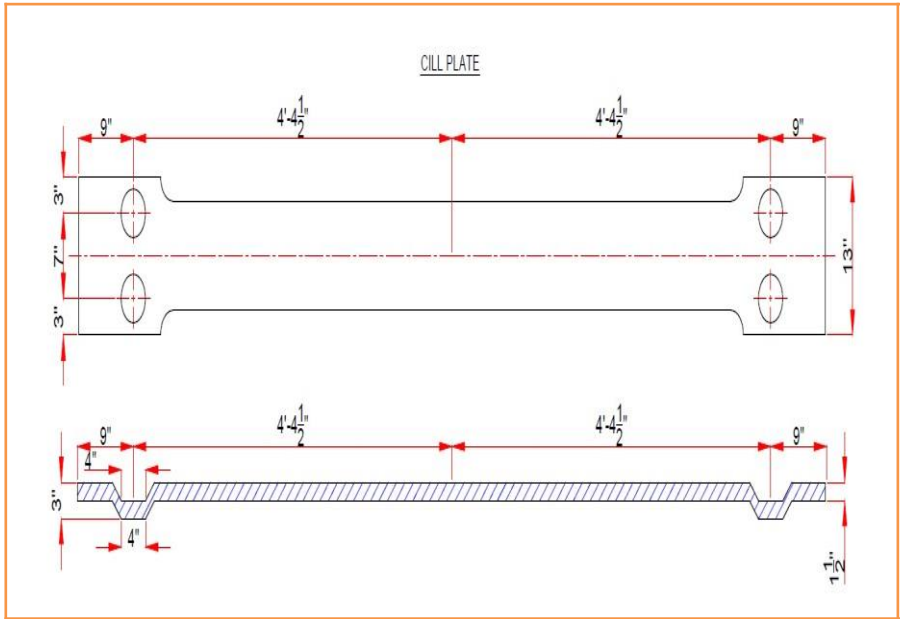
- Out of 40 no's of +106 Sluice Gates 9 gates are out of order
- Out of 48 no's of +103 gates are 23 Gates are out of order
- Out of 48 no's of +114 gates are all Gates are out of order since Inception

Planning and Design Phase for Rehabilitation of KRS Dam Sluice Gates at EL +106, +103 and +114 Level Gates

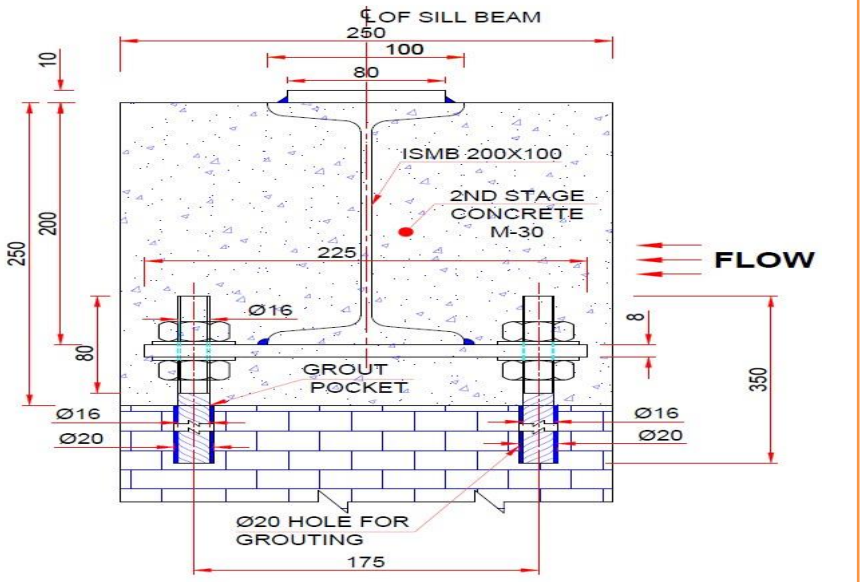
- Refurbishment/Replacement of EM Parts
  - Replacement/Erection of Sill Beam
  - Provision of Side Guide
  - Refurbishment of Track Wheel Track & Provision Seal Seat
- Replacement of Gates
- Provision of Individual Rope Drum Hoist for Each Gate

Rehabilitation Measures

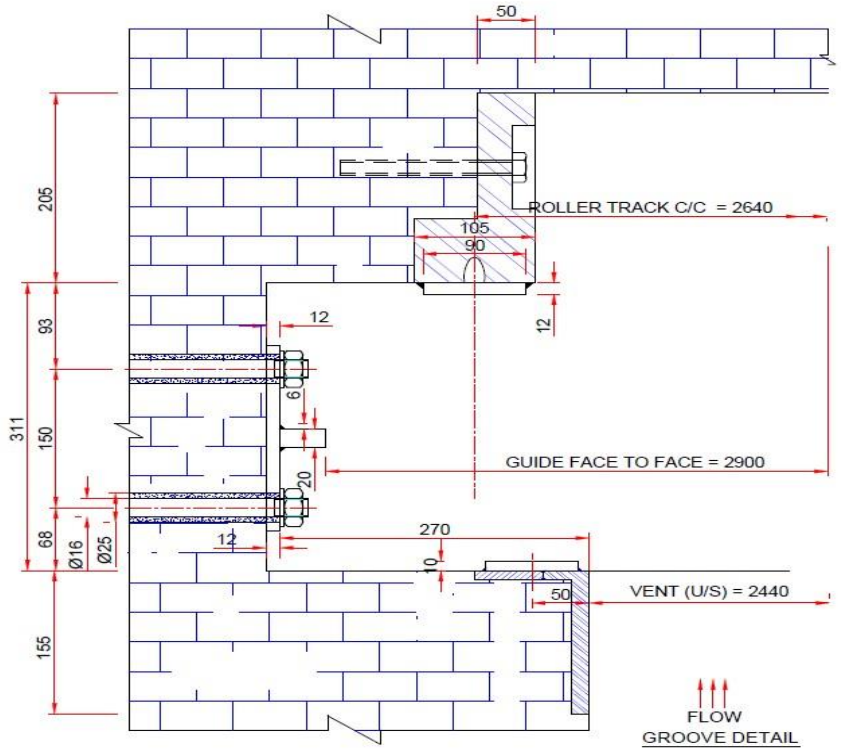
- Rehabilitation of Embedded Parts of EL +103 & +106 Level Sluice Gates

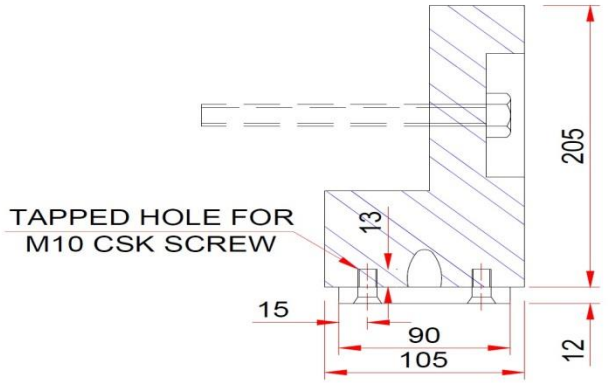


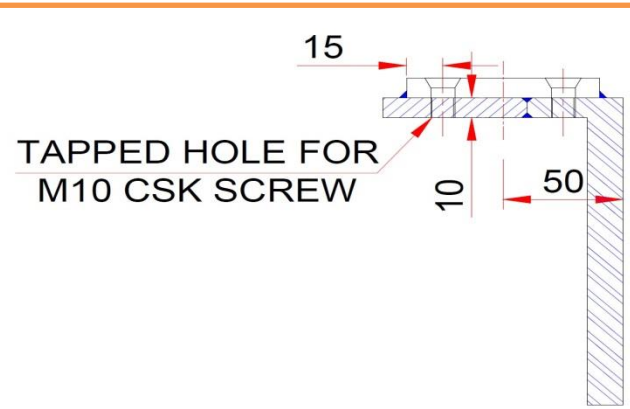
Sill Beam of +106 & +103 Gates Before Rehabilitation (*KRS Dam Sluices by M.C. Samaptiegner*)



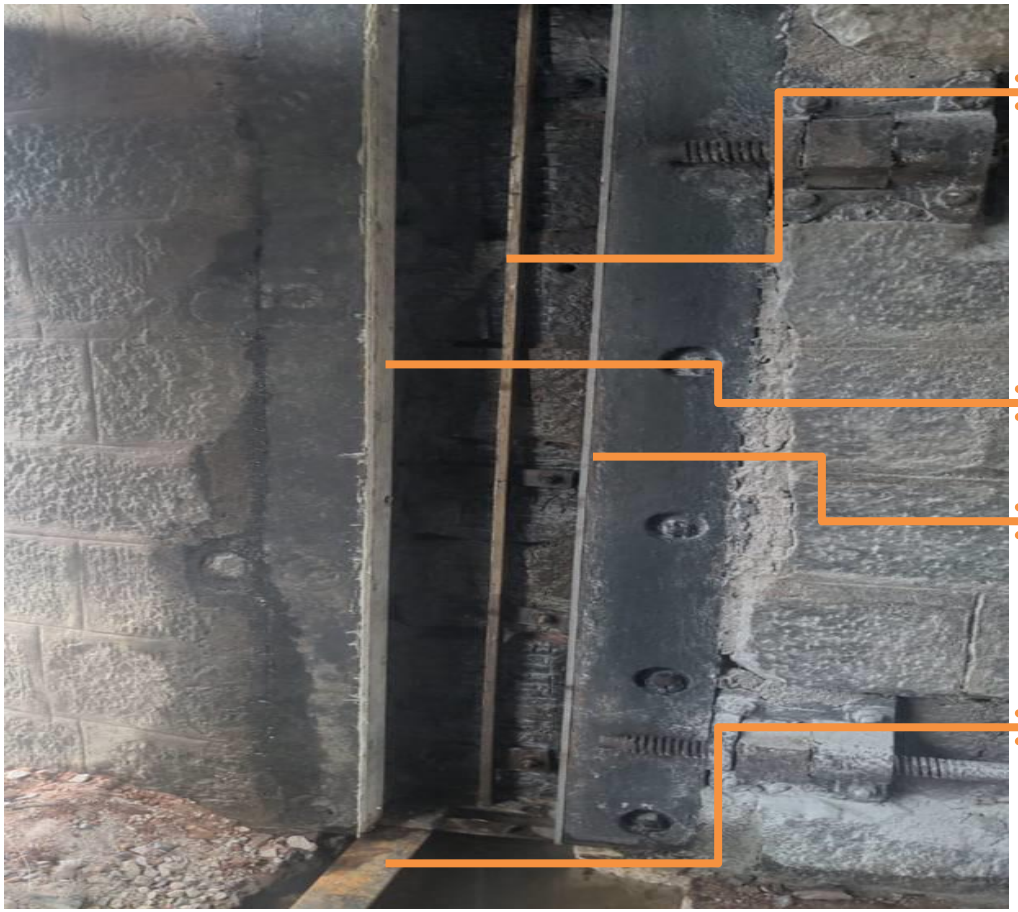
Sill Beam of +106 & +103 Gates After Rehabilitation (Approved Drg No. HTMPL/KRS/106'/GATE/04)







Groove Details, Track & Seal Seat details of +106 & +103 Gates After Rehabilitation (*Approved Drg No. HTMPL/KRS/106'/GATE/04*)



New Side Guide erection using through and through pier bolts

90×12 mm Thick SS Plate over existing Cast iron for Roller & Seal Track

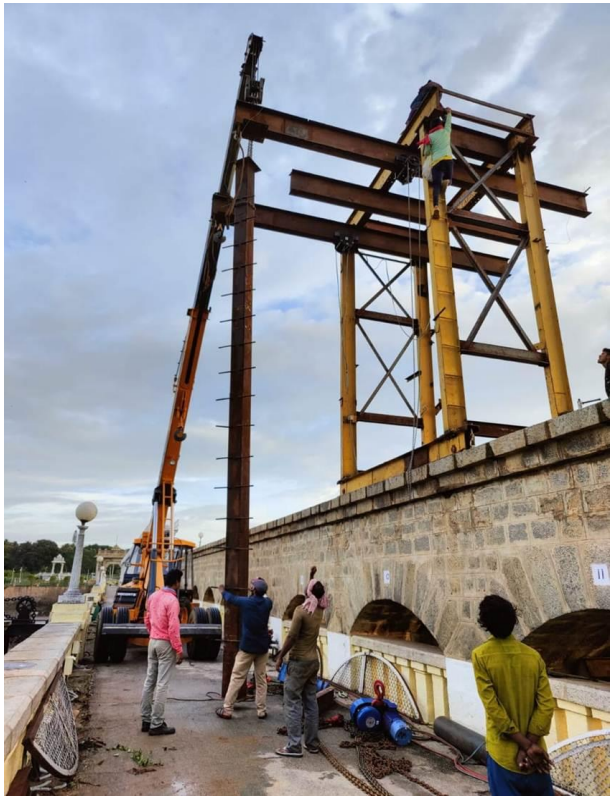
New I Section sill beam 100×200 mm & 90×12 mm SS Bottom Seal over I Section

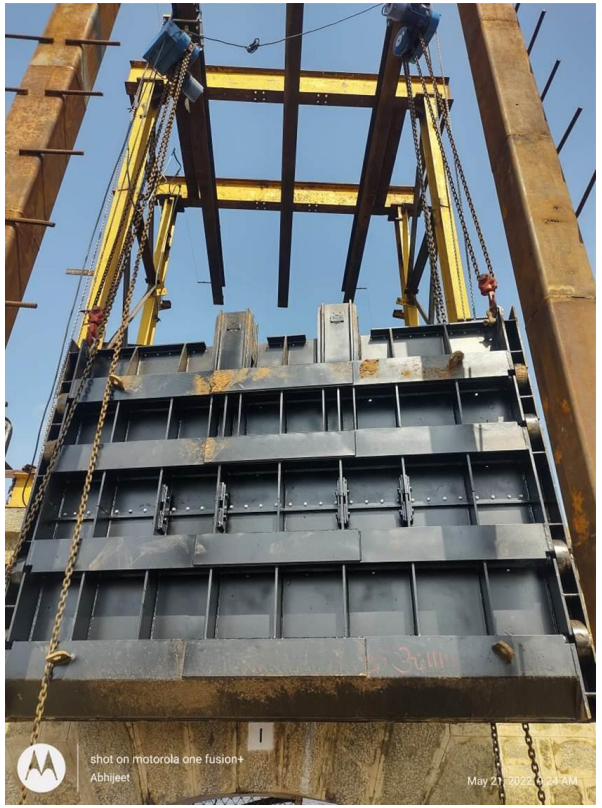
Details of +103 & +106 Embedded Parts after rehabilitation (*from KRS Dam site erection*)

- Replacement of Sluice Gates of EL +103 & +106 Level

Removal of +106 Old Gate (*from KRS Dam site erection*)

Erection of +106 New Gate (*from KRS Dam site erection*)

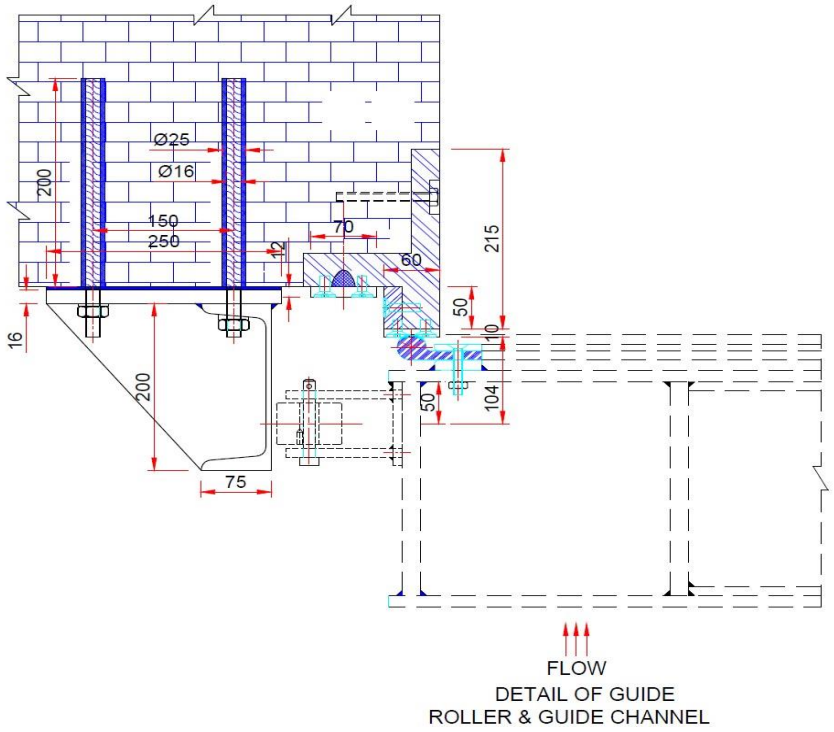


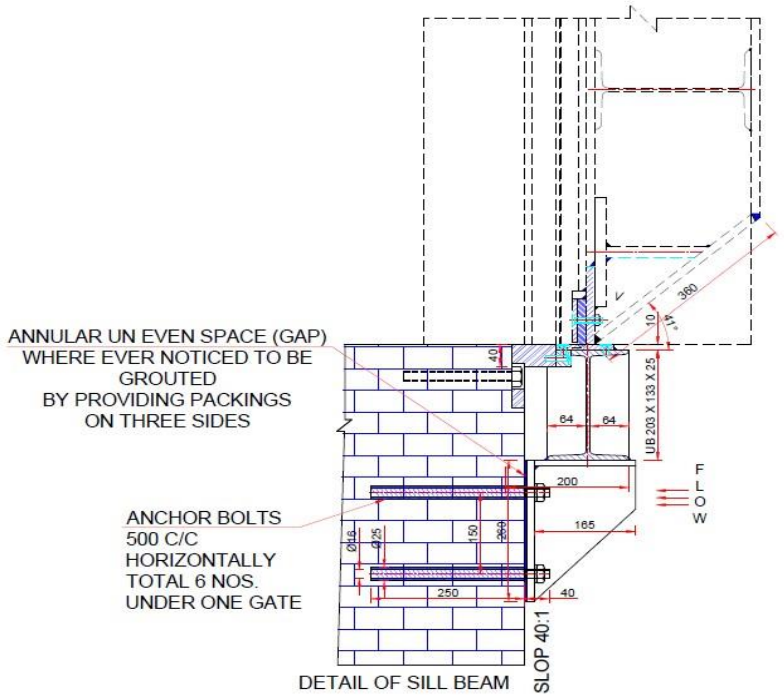


Removal of +103 Level old Gate (*from KRS Dam site erection*)

Erection of +103 Level New Gate (*from KRS Dam site erection*)

- Rehabilitation of Embedded Parts of EL +114 Level Sluice Gates





Details of Embedded parts of +114' Level Sluice Gates after Rehabilitation (*Approved Drg No. HTMPL/KRS/114'/GATE/01 Sheet 1 of 2*)

Embedded parts of +114’ Level Sluice Gates after Rehabilitation (*from KRS Dam site erection*)

- Replacement of Sluice Gates of EL +114 Level Sluice Gates

Removal of +114 Old Gate (*from KRS Dam site erection*)

Erected of +114 New Gate (*from KRS Dam site erection*)

Key Achievements

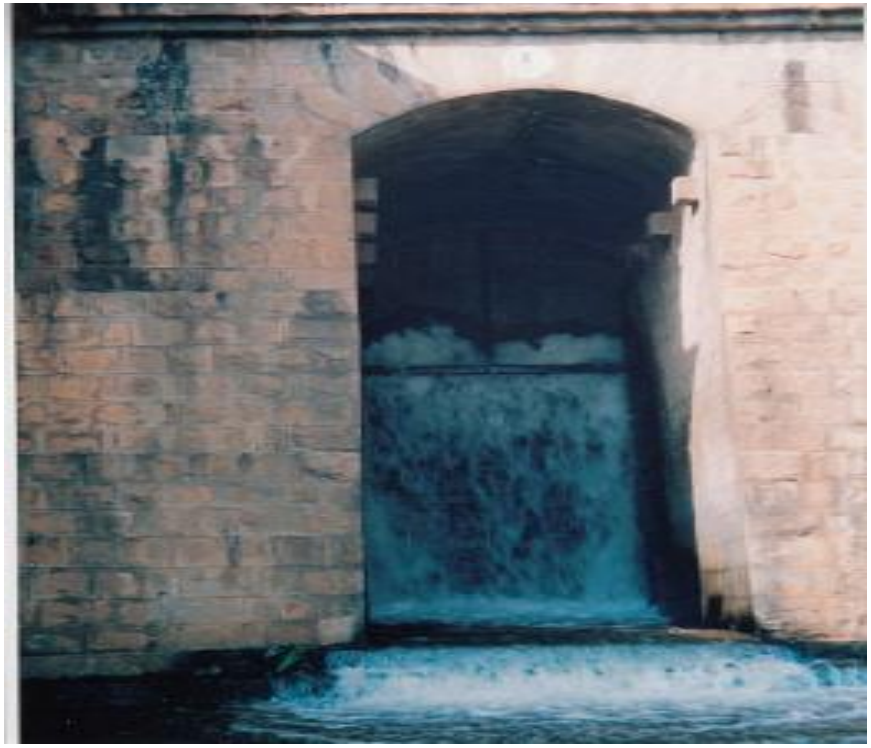
Improvements of HM after Rehabilitation of +103, +106 & +114 Sluice Gates

- The Replacement of all 136 numbers of sluice gate and their Hoisting equipment's at elevation +103', +106', +114' (except the combined trestle of +103 & +114, which is under progress) have been successfully achieved within budget and time schedule
- Restored flood discharging capacity by preventing the leakages
- Extended their useful lives by Reducing the Failures
- Gate Operation without Difficulty

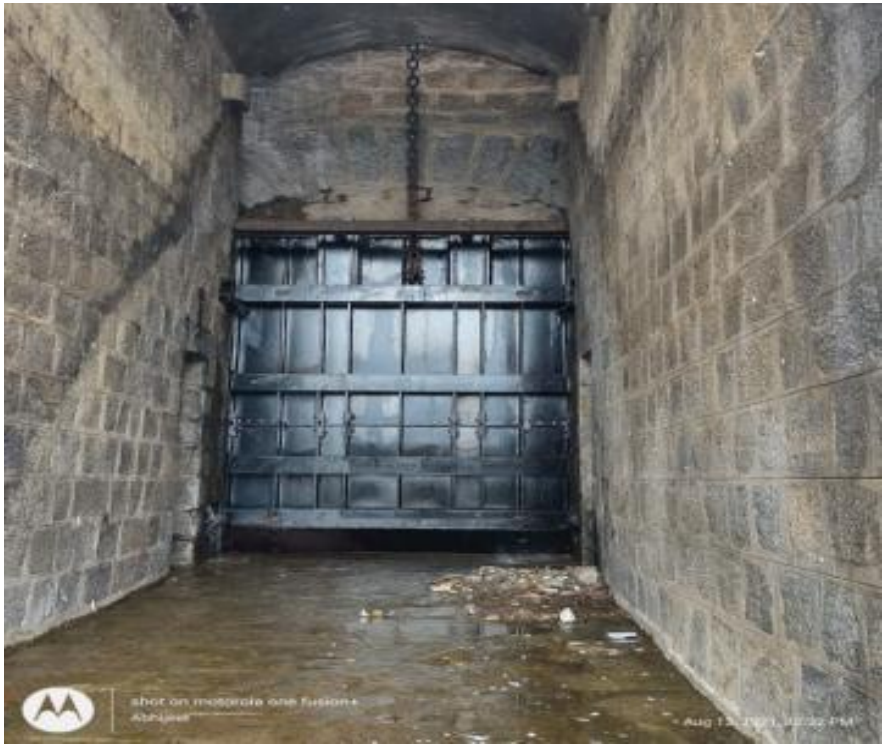
After Rehabilitation Sluice Gate Assessment

Leakages in +103' Level Sluice Gates before Rehabilitation *(from KRS Dam site erection)*

Leakage *arrested +103' Level Gates after rehabilitation (from KRS Dam site erection)*



Leakages in +106' Level Sluice Gates before Rehabilitation *(from KRS Dam site erection)*



Leakage arrested +106' Level Gates after rehabilitation *(from KRS Dam site erection)*

Leakages in +114' Level Sluice Gates before Rehabilitation *(from KRS Dam site erection)*

Leakage arrested +114' Level Gates after rehabilitation *(from KRS Dam site erection)*

Lesson Learnt in Rehabilitation of Sluice Gates

Challenges Faced in Rehabilitation work of +103, +106 & +114 Level Sluice Gates for KRS Dam

- No provisions of Stoplogs there gate erection works were only be carried out when the water level is below the sill of the Gate
- Existing Track Base is made up of cast iron material there welding will leads to the development of the Cracks
- Due to the widespread pandemic of Corona Virus, the country is in the lock down condition which forced the project authorities to extend the project schedule and likely expenditure
- Heritage structure, retaining of originality in architecture, aesthetics and the monumental ambience to be the upper most concern

Acknowledgment

KRS Dam Authorities

- Sri. Shankare Gowda., KES
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  EE, KRS Division, K.R. Sagara
- Sri. Kishore Kumar K
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- Shri. M. Lal
  Former Chief Engineer, Design (NW&S)
- Shri. Amit Ranjan
  Director Gates Design (EN&E)

CPMU-DRIP

- Chief Engineer, CPMU-DRIP
- Director, CPMU-DRIP

Thank You

Backup Slide


+103 & +114 Sluices= 48 Nos. Each.
+106 Sluices = 40 Nos.

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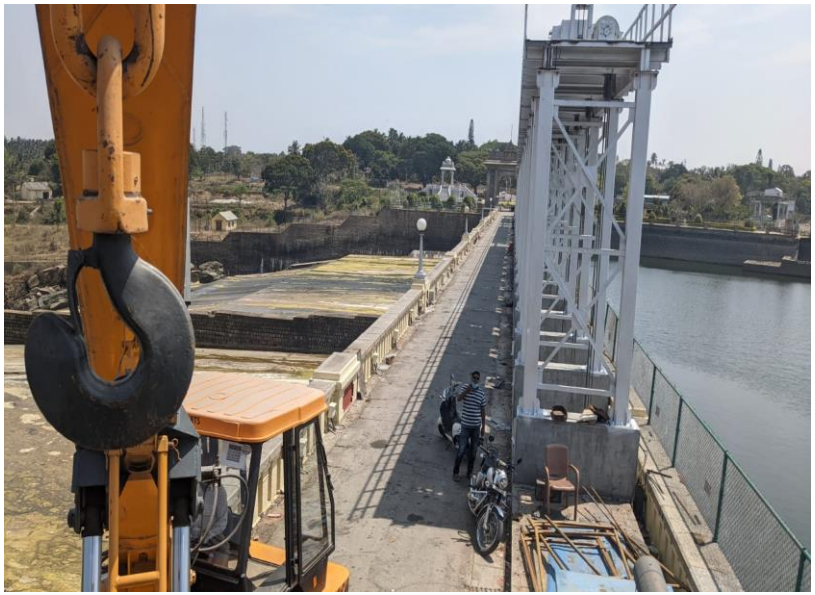

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