PMO Sindh Barrages Improvement Project Rehabilitation and Modernization of Sukkur and Guddu Barrage

THE WORLD BANK

News letter

Edition 1st

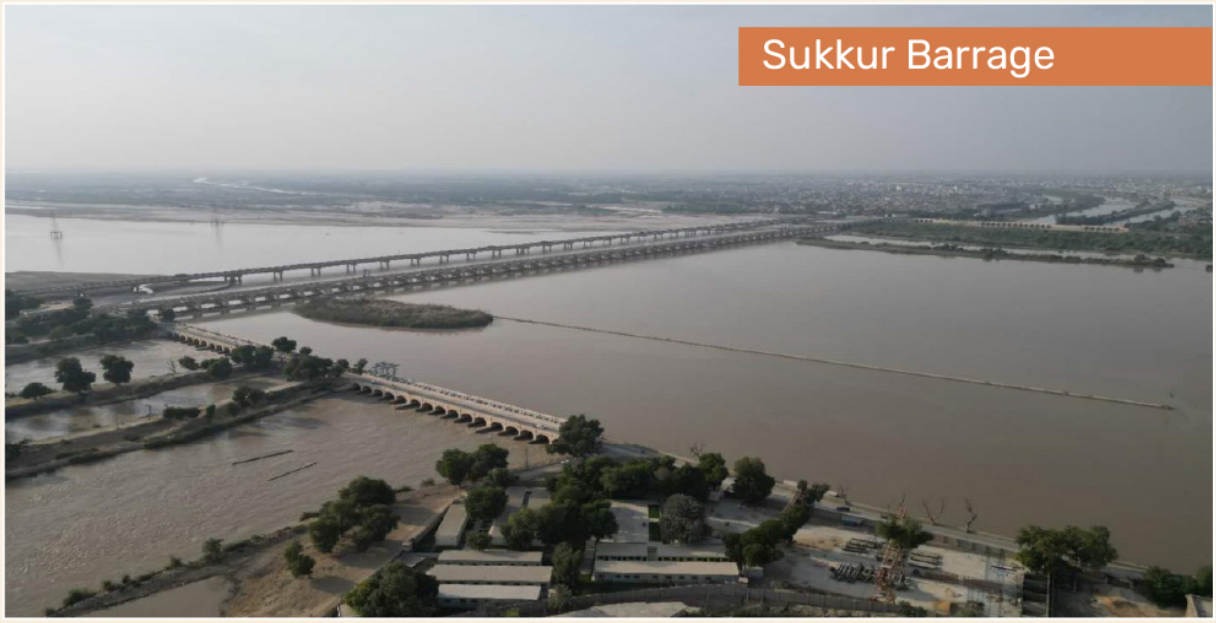
Brief of the Project along with components and progress

Sindh Barrages Improvement Project (SBIP)

The River Indus is the backbone of Pakistan's economy and the principal source of irrigation, food security, and livelihoods in Sindh Province. The Sindh Barrages Improvement Project (SBIP), financed by the World Bank, focuses on the Rehabilitation and Modernization of Guddu and Sukkur Barrages to ensure the continued, safe, and reliable operation of the Indus Basin Irrigation System.

Its command area spans the districts of Ghotki, Kashmore, Sukkur, Shikarpur, Larkana, and Jacobabad in Sindh, as well as Naseerabad and Jafarabad in Balochistan, thereby ensuring inter-provincial water security.

Sukkur Barrage, located about 170 km downstream of Guddu, is one of the most vital hydraulic structures of the Indus Basin Irrigation System. It supplies water to seven major canals—Da-



Sukkur Barrage

Dadu, Rice, North Western, Rohri, Nara, Khairpur Feeder East, and Khairpur Feeder West—irrigating over 3.2 million hectares, which represents nearly 25% of Pakistan's canal-irrigated land and about 70–80% of Sindh's irrigated command. Consequently.Sukkur Barrage is widely regarded as the lifeline of Sindh's agriculture. Agriculture contributes approximately 19% to Pakistan's GDP, with Sindh as a major contributor.
SBIP ensures reliable and uninterrupte-dirrigation supplies, sustained agricult-ural growth, food security, and rural livelihoods. Dadu, Rice, North Western, Rohri, Nara, Khairpur Feeder East, and Khairpur Feeder West—irrigating over 3.2 million hectares, which represents nearly 25% of Pakistan's canal-irrigat-ed land and about 70–80% of Sindh's irrigated command. Consequently, Sukkur Barrage is widely regarded as the lifeline of Sindh's agriculture.
Agriculture contributes approximately 19% to Pakistan's GDP, with Sindh as a major contributor. SBIP ensures reliable and uninterrupted irrigation supplies, sustained agricultural growth, food security, and rural livelihoods. The proj-ect enhances sediment and flood man-agement, increasing the flood handling capacity of Sukkur Barrage to 1.2 million cusecs, reduces risks of structur-al failure and flood damage, and protects environmentally sensitive areas, including the Ramsar-designat-ed Indus Dolphin habitat. It also strengthens operation and mainte-nance capacity, extends the service life of the barrages by 30–40 years, and improves climate resilience.

Guddu Barrage

The total project cost is PKR 74,618.34 million (USD 314 million), comprising PKR 31,335.40 million for Guddu Bar-rage and PKR 43,282.94 million for Sukkur Barrage, financed primarily through World Bank (IDA) assistance with federal and provincial contribu-tions. Given the vast command areas protected and the economic losses avoided, the project offers high econom-ic and social returns and represents a critical investment in Pakistan's water security and economic sustainability.

Executive summary

Sukkur SBIP/ S1

The temporary cofferdam for the 2025/26 working season, from bays 15 to 46, is divided into two zones. Construction activities in zone 2(bays 24to 46) continued this month, with 22 out of 52 dewateringwells installed on the upstreamside and 27outof45 on the downstreamside.In parallel, desilting work within zone 2 for the concrete apron has been completed, while the downstream side is in progress. This month, a GPR and ultrasonic survey of the glacis, floor and piersof the up stream side within zone 2 from bay 24 to bay 41was conducted by M/s SGS.

Within zone 1 (bays 15 to 23) the civil repair works remain in progress, with the overlay concreting on both the up stream and down stream apron completed to date for bays 18 to22. In addition, installation of new filter blocks is in progress.

Main barrage and pocket gate fabrication continuedi n Sukkur. 24 gates for this working season are fabricated, and 20 have been shot blasted and painted. Fabrication of the last three remaining gates for this working season is in progress. In addition, fabrication of three scour gates (out of 12 in total) is in progress.

There maining 24 hoisting systems required for this working season areinthe assemblys tage in China, togetherwith anadditional three fort heinitials coursluice gates.

The preparation for FAT, planned tobeconducted in March, is delayed and the Contractorhas been requested to expedite assembly and preparations for testing.

The Contractor continued closingoutthe punch list items for the 17 already installed main barrage gates and hoisting systems.

For the dewatering and replacementworksfor gate 63, a scours luicegateinthe left pocket, the geo membrane sandbag filling has been completed on the downstream side this month. On the up stream side, the caisson gate has been installed.

PMO office finishing work remain sisinprogress, and construction of one of the PMO residence remains in progress.

In this month, the dredging works in the right pocket were completed on 9th February 2026 and post survey conducted on 11th February 2026.

The pre-survey for the approach channel was conducted on 3rd February 2026 and the dredger mobilised there on 10th February 2026, commencing dredging on 11th February 2026.

Variation Order 10 (replacement ratherthan repair of embedded parts for the mainbarrage gates) was signed on 4th February 2026. The Contractor has submitted a claim for Extension of Time (EOT) of 126 days (up to 30thJune 2027) with associated costs and a request for the Engineer's Determination. A consultation meeting was held on 12th December 2025. where in it

was mutually agreed to seek an amicable way forward acknowledging the Contractor's requirement for an additional 126 days to obtain a full working season to complete the Works. Part A of the EoT Claim (extension of monthly BoQ items) was agreed inprinciple, while costdetails for both Part A and-Part B (pro longation costs), together with supporting documents, are to be submitted by the Contractor for PIC's review, along with a revised work programme and cash flow forecast up to 30th June 2027. The Contractor submitted the cost estimate on 30thJanuary 2026 with further supporting documents provided on 22nd February 2026. These are under review by PIC.

The DAAB issued their decision for Dispute 1 on 12th November 2025. It was noted that one member hadadissentingview and their corresponding report was issue don 13th November 2025. The Contractor issued a Notice of Dissatisfaction witht he DAAB decisionon 6th December 2025 and requested a meeting to try to reach an amicable settlement in accordance with sub clause 21.5. The Employe rac knowledge dreceipt of the Contractor's noticeon 16th December 2025 and requested the Contractor to propose the agenda and venue for the meeting.

The DAAB issued arequest for informationto PIC on 19th November 2025. PIC provided the requested information on 1st December 2025. The DAAB issued-its Decisionon Quantum for Dispute 1 on 11th December 2025. As per the DAAB decision, the Employer is entitled to recover over paid foreign currency price adjustment amount stotalling USD3. 803 million.

The Contractor issued a further Notice of Dissat is faction with the DAABD ecisionon Quantumon 16th December 2025.

The DAAB decision is being implemented. The parties are seeking an amicable settlement in accordance with subclause 21.5 of the GCC. In this regard, a meeting was held on 12th January 2026 between the Contractor and the Employer, wherein a settlement offer was made by the Contractor. It was agreed that a follow up meeting would be held. Minutes of the meeting were issued on 16thJanuary 2026.

On 15th January 2026, the Contractor issued a letter to the Employer regarding the implementation of DAAB decision for IPC-13 (certifiedon 29th November 2025) querying the methodology for applying the correction factor.

On 20th January 2026, the Contractor issued a letter to PIC requesting a phased / deferred recoveryarrangement for implement ation of DAAB decision at acritical stage of the works. The recovery schedule remains under discussion.

A meeting was held on 22nd January 2026 regarding IPC-14. Accordingly, at the request of the parties, the Engineer deducted USD 100,000 from the certified amount in IPC-14 (certified on 23rd-January 2026) and a further USD 100,000 from the certified amount in IPC-15 (certifiedon 24th February 2026) as the initial instalments of the recovery of the overpaid foreign currency price adjustment.

On 4th February 2026, a meeting was convened with PMO, PIC, and Contractor in the presence of World Bank.

The parties have agreed that advice

that advice would be sought from the DAAB, in accordance with sub clause 21.3 [Avoidance of Disputes] regarding the methodology for applicationofthe correction factor for foreign currency price adjustment and regarding the scope of work for the canal hoisting system.
The Contractor, with the consent of PMO, requested advice on the former point from the DAAB on 24th February 2026.

Guddu SBIP / G2

The Factory Acceptance Tests (FAT) of six pocket scourhoisting systems werestan. completed at JHMC in China on 7th February 2026.Two setsof hoisting systems along with four mainweir gates and four pocket scour gates are currently in transit from China to Pakistan The Site Acceptance Tests (SAT) for the third sequence of gates and hoists, in bays 10, 23, 27, 30 and 33, were undertaken this month. The SAT certificates have been signed for gates 10, 23, and 27. In this month, the welding and painting of the embedded parts and gates is in progress for the fourth sequence of gates bays 2 and 4, following the deployment of BHGs.
The Contractor continued to address the punch list items for the already installed gates and hoistingsystems. The latest punchlist meeting for JHMC main barrage gates was held on 13th February 2026. The punchlist works continued for the canal head regulator gates and hoists, including the installation of the top seal plates.

In this month, the SS-ESMP for the works in the left pocket was finalised following joint meetings with the World Bank and PMO in Karachi. Further approvals have been received from the various stakeholders including National Highways Authority (NHA). Discussions are being finalised with Sui Northern Gas Pipelines Limited (SNGPL).
The construction of the downstream and upstream cofferdam for the left pocket works commenced.
The Contractor requested forearly closure of Ghotki Canal which was grantedon the basis of the consultations with water users and temporary supplies to be provided.
The construction of the diversion channel for diverting water from Rainee Canal to Ghotki Feeder Canal has reached the final stages of completion, including the installation of sandbags and stone protection.
In addition, de-silting on the upstream side of Rainee Canal remained in progress.

Guddu SBIP/ G3A

Dismantling of old stone pitching is on going with the stone beingre-used for placement of stone apron.
Deliveries of newstone have increased.
The armourstone for the apron and dumping of stone under water has been completed from RD 1+300 to 1+700 and RD 1+700 to 2+100, and further stone dumping work is in progress.
Earth works for widening and raising of the em bank mentisin progress from

RD1+300to1+700 and RD2 + 245 to RD2 + 628. Inaddition, excavation work for the stone apron from RD2 + 245 to 2+628 is in progress.
The works remain behind the accepted work programme.
Meetings were held with the Contractor this month regarding expediting the works.
Addition almachinery and resources were deployed accordingly.

Model Study of Sukkur Barrage

Artelia submitted their Final Reporton 31st January 2026.
PIC and PMO provided commentson 20th February 2026 and final revision was submitted by Artelia on 26th February 2026.
The model study is now concluded.

1. Introduction

Consultancy Agreement

Sukkur Barrage

Mott MacDonald Ltd inassociation with MM Pakistan (Pvt) Ltd has been appointed as the Project Implementation Consultants (PIC) for SBIP – Rehabilitation and Modernisation of Sukkur Barrage after a competitive bidding process following World Bank procurement guidelines.
The Consultancy Agreement was signed on 2nd September 2021, and PIC Sukkur commenced their services the same day.

Guddu Barrage

Mott MacDonald Ltd (MML) in association with MM Pakistan (Pvt) Ltd, was appointed as the Project Implementation Consultant (PIC) for the Rehabilitation and Modernisation of Guddu Barrage.

The consulting services were divided into two assignments, Assignment 'A' and Assignment 'B'. Assignment 'A' covers the preparation of feasibility report, detailed designs, biddingdocuments, and project preparation studies including advance procurement activities; and Assignment 'B' for construction supervision, contract management, and support for project management. After the success fulc ompletion of Assignment' A', the contractfor Assignment 'B' containing (Construction Supervision, Contract Management, and Support for Project Management) was signed on 23rdFebruary 2016.

Amalgamation

The amalgamation of Guddu and Sukkur Barrage assignments, via a Variation Order on Sukkur Barrage assignment, has been approved and was effective from 1st November 2022.

Message from the Project Director, PMO SBIP

I am pleased to share this message through the PMO SBIP News Bulletin, which serves as an important platform to communicate progress and achievements with our direct and indirect stakeholders.

PMO SBIP continues to make steady progress through strengthened coordination, improved project controls, and focused implementation of planned activities. Our teams are working diligently to ensure adherence to project timelines, quality standards, and governance frameworks, while addressing challenges through proactive planning and collaborative problem-solving.

We remain committed to transparency, efficiency, and continuous improvement in all aspects of project execution. The collective efforts of our teams, partners, and stakeholders play a vital role in advancing project objectives and ensuring sustainable outcomes.

I would like to acknowledge and appreciate the dedication and professionalism of everyone involved in supporting PMO SBIP. Your continued cooperation and commitment are key to maintaining momentum and achieving upcoming milestones.

We look forward to further progress in the coming period and to strengthening our engagement with all stakeholders.

Noor ul Arfeen Baloch
Project Director
PMO SBIP

Message from Ex- PD, PMO SBIP

I am pleased to share this update through the PMO SBIP News Bulletin, which serves as an important platform to connect with our direct and indirect stakeholders and to reflect our collective progress.

Over the recent period, PMO SBIP has continued to strengthen its project governance, delivery discipline, and stakeholder coordination. Key initiatives are progressing as planned, with focused efforts on schedule adherence, quality outcomes, and transparent reporting. These advancements are the result of sustained collaboration across teams and the continued support of our partners and stakeholders.

Our priority remains to ensure effective planning, timely execution, and value-driven outcomes aligned with organizational objectives. PMO SBIP is committed to continuous improvement, proactive risk management, and clear communication to support informed decision-making at all levels.

I take this opportunity to thank all team members, partners, and stakeholders for their dedication and cooperation. Your contributions are instrumental in driving progress and reinforcing our shared commitment to excellence.

We look forward to maintaining this momentum and achieving further milestones in the coming phases.

Pritam Das
Ex-PD, PMO SBIP

Message from Message from Project Coordination Specialist

I have had the privilege of being associated with the Sindh Barrages Improvement Project since its inception, witnessing its journey from initial planning to execution on the ground. Over the years, I have seen the project evolve through a wide spectrum of challenges and milestones, each contributing to its growth and learning.

From the early stages of detailed design and feasibility assessments to the mobilization of contractors and resources, the project has navigated technical, environmental, and operational complexities with steadfast commitment. I have observed the meticulous rehabilitation of aging barrage structures, installation and testing of mechanical and electrical systems, and the integration of modern engineering practices that enhance safety, efficiency, and sustainability.

The project has also faced and overcome real-world scenarios—seasonal river fluctuations, logistical constraints, coordination with multiple stakeholders, and adherence to stringent environmental and social safeguards. Each challenge has reinforced our approach of careful planning, proactive risk management, and constant supervision.

Being part of SBIP from inception has provided me with a unique perspective on how every component—civil, mechanical, electrical, environmental, and social—interconnects to ensure the success of such a complex infrastructure project. It is heartening to see the tangible benefits already reaching farmers, communities, and the province at large, and I am confident that the continued dedication of our team will realize the project's full potential.

This journey has been both challenging and rewarding, and I take pride in having contributed to a project that will strengthen Sindh's water infrastructure for generations to come.

A Razak Memon
Project Coordination Specialist

Message from the Accounts Officer, PMO SBIP

It is a privilege to share my thoughts with you through this edition of the PMO SBIP Magazine.

At PMO SBIP, our work goes beyond project management—we are building robust systems, strengthening institutional processes, and contributing to long-term, sustainable development. Within this framework, the finance function plays a vital role that extends far beyond managing numbers. We are entrusted with ensuring transparency, accountability, compliance, and the prudent utilization of resources that drive every initiative forward.

Financial discipline forms the cornerstone of successful project execution. Through careful planning, vigilant monitoring, and accurate reporting, we establish a solid foundation that empowers our teams to perform with confidence and clarity of purpose. I take great pride in being part of a committed team that consistently upholds the values of integrity, professionalism, and excellence.

I deeply value the spirit of collaboration across all departments, which enables financial management to remain smooth, responsive, and effective. Together, we continue to strengthen operational efficiency while maintaining the highest standards of governance.

Let us carry this momentum forward with renewed dedication, teamwork, and vision as we strive to achieve even greater milestones in the year ahead.

Wishing everyone continued success.

Warm regards,
Ms. Saba Shaikh
Accounts Officer, PMO SBIP

Message from the Manager Admin

Administration is the backbone of effective operations. The Admin Section remains committed to ensuring efficiency, coordination, and a supportive working environment for the success of the organization.

Akbar Hussain Thebo
Manager Admin
PMO SBIP

Scope of Sukkur Barrage

Sheheryar Aslam
Cheif Resident Engineer
Mott MacDonald

The Sukkur Barrage rehabilitation project is focused on modernizing and strengthening the barrage to improve safety and operational reliability.
It comprises replacement of 56 barrage gates, and 55 canal gates alongwith hoisting systems.
The project aims to ensure dependable irrigation supplies, enhance flood management capacity, and extend the service life of the barrage.

Sukkur Barrage SBIP/S1 Civil works

Gate 45 to 59 and 36, civil structure-repair works were completed during last year. Civil and structure repair works for another 28 gatescurrently is in progress.
A large cofferdam is in place covering the bays 15 to 46. 28 Bays Civil works are expected to be finished by 1st June of this year (2026).
The progress as of now is 41% and expected to reach 65-70% by end of June 2026.
During this annual closure period 2026, three (3) left canal rehabilitation work has been completed whereas some of the repair works at one right canal completed, and the remaining works on 3 canals will be completed in next closure period.

The dredging works, the desilting alright pocket in ongoing, and desilting of right pocket is expected to be completed by 1st June 2026.

Sukkur SBIP/S1 Mechanical works

17 gates have been installed during the last working season from gate number 44 to 59 and gate 36, whereas the gates 17 to 43 and 63 are scheduled to be completed within the ongoing working season, 28 gates will be replaced this Year (2026).
The remain 12 main barrage gates, and 55 canal gates are scheduled to be replaced next year.

Sukkur SBIP/S1 Safeguarding (Enviro nment and Social)

The Project Environmental and Social Management Plan (CESMP) for the Sukkur Barrage Rehabilitation Project comprehensively addresses the environmental, social, health, and safety management measures, including mitigation plans, monitoring programs, roles and responsibilities, and reporting mechanisms.
CESMP components, such as environmental protection, Dolphin management plan, occupational health and safety, community health and safety, waste management, traffic management, emergency preparedness, and stakeholder engagementhave been

fully implemented on site in accordance with applicable national regulations, World Bank Environmental and Social Standards, and project-specific requirements.
Compliance with these plans is routinely monitored through regular inspections, audits, and reporting, and corrective actions are implemented as necessary to ensure continuous adherence to approved procedures and good international industry practice.

Scope of Guddu Barrage

The Guddu Barrage rehabilitation project is aimed at modernizing and strengthening the barrage to ensure safe, reliable, and efficient irrigation operations.
The scope includes replacement of 66 barrage gates and 25 canal gates along with hoisting systems.
The project also covers safety and operational upgrades to enhance flood handling capacity and long-term durability.

Guddu SBIP/G2 (Civil Works)

During the previous working season, civil repair works on 30 bays have been completed. In the current working season.
24 bays civil repair works is schooled to be completed by June 1st of this year (2026).
25 canal gates along with hoisting systems have already been completed.
The overall progress of the project is 81% cumulatively.

Guddu SBIP/G2 (Mechanical Works)

A total of 30 main barrage gates has been replaced to date, whereas the 24 main barrage gates are scheduled to be replaced within this working season.
All 25 canal gates have been completed in previous years.

Guddu SBIP/G2 Safeguarding (Environment and Social)

The Project Environmental and Social Management Plan (CESMP) for the Guddu Barrage Rehabilitation Project comprehensively addresses all required environmental, social, health, and safety management measures.
including mitigation plans, monitoring programs, roles and responsibilities, and reporting mechanisms.
All CESMP components—such as environmental protection, Dolphin management plan, occupational health and safety, community health and safety, waste management, traffic management, emergency preparedness, and stakeholder engagement—have been fully implemented on site in accordance with applicable national regulations, World Bank Environmental and Social Standards, and project-specific requirements

Modernizing the Heart of Sindh's Irrigation System

Electro-Mechanical Rehabilitation of Guddu and Sukkur Barrages under SBIP

By M.Mohsin Masood
EM Expert.
SBIP-PMO

Guddu and Sukkur Barrages are among the most critically acclaimed hydraulic assets in Sindh, sustaining irrigation, agriculture and livelihoods across vast command areas of the province.

Sukkur Barrage was constructed in 1932-- an era of fundamentally different engineering practices, this barrage has served the province for decades. However, the passage of time, evolving safety standards, and increasing operational demands made a comprehensive rehabilitation inevitable.

Under the Sindh Barrages Improvement Project (SBIP), funded by the World Bank, a major component of the modernization efforts focuses on the electro-mechanical (E&M) systems of both Guddu and Sukkur Barrages. While largely unseen by the public, these systems govern how water is controlled, regulated, and safely conveyed into the off-taking canal networks to reach and benefit the farmer communities and masses across the province.

The Role of Electro-Mechanical Systems in Barrage Safety

At a barrage, gates are the primary operational elements. Their performance depends not only on hydraulic design, but on the integrity of the electro-mechanical systems that raise, lower, hold, and secure them under varying flow conditions. Reliable gate operation is essential during normal irrigation supply as well as during floods, when rapid and controlled response becomes critical.

Most of the original E&M systems at Guddu and Sukkur had either reached or exceeded their intended service life. Components such as hoisting machines, braking systems, electrical controls, and load-bearing elements were increasingly difficult to maintain and no longer aligned with modern operational safety expectations. Rehabilitation therefore required more than replacement; it demanded a reassessment of the underlying engineering philosophy.

Legacy of Gate Systems and the Need for Change

Historically, the gates at Sukkur Barrage were of the Stoney roller type, operated through counterweights. This arrangement relied on gravity-based balancing to reduce the load on hoisting machinery. While effective in earlier decades, long-term operation revealed increasing challenges related to wear, maintenance, and structural interaction.

The historical structure of the Sukkur Barrage was built with stone masonry and it had already served for a century.- Detailed condition assessments and structural analyses carried out during SBIP highlighted that counterweight systems introduced complex load paths, additional dynamic effects, and increased demands on aging piers and superstructure. These findings triggered a critical interdisciplinary review involving both structural and electro-mechanical engineers.

Historically, the gates at Sukkur Barrage were of the Stoney roller type, operated through counterweights.
This arrangement relied on gravity-based balancing to reduce the load on hoisting machinery. While effective in earlier decades, long-term operation revealed increasing challenges related to wear, maintenance, and structural interaction.

A Defining Engineering Moment at Sukkur Barrage

As a result of this coordinated review process, a major design decision was taken at Sukkur Barrage: to replace the traditional Stoney roller gates with fixed wheel type gates operated entirely without counterweights.

This decision represents one of the most technically significant shifts under SBIP. Instead of relying on gravity-assisted balancing, the new gate system now transfers hydraulic loads directly and predictably to the barrage piers through fixed wheels and rails. Gate movement, positioning, and holding are now fully governed by engineered electro-mechanical systems.

Structural and Electro-Mechanical Integration

The transition to fixed wheel gates was not a standalone mechanical choice; it was the outcome of deliberate integration between structural and electro-mechanical design.

Structural engineers sought to minimize secondary stresses and dynamic effects on existing concrete elements, while electro-mechanical engineers responded by designing hoisting systems capable of safely handling the full operational loads without counterweight assistance.

This integration ensured that the final system is balanced as a whole. Structural safety, operational reliability, and maintainability were treated as interconnected objectives rather than separate disciplines.

Electro-Mechanical Response to the New Gate Philosophy

With the elimination of counterweights, greater emphasis was placed on the robustness of electro-mechanical components.

Hoisting machines were designed or

upgraded to provide controlled movement under all operating heads, with enhanced braking systems to safely hold gates in position during power interruptions or emergency conditions.
Electrical and control systems were modernized to improve reliability and operator confidence, while manual and emergency operation arrangements were strengthened to ensure continuity under adverse scenarios. The resulting system offers precise control while maintaining simplicity and operational resilience.

Rehabilitation Works at Guddu and Sukkur Barrages

components, and modernization of electrical power and control systems.
The works required careful sequencing, strict quality control, and rigorous Factory and Site Acceptance Testing to ensure performance under real-world operating conditions.

Scope of Electro-Mechanical Rehabilitation Works

The electro-mechanical rehabilitation works at Guddu and Sukkur Barrages under SBIP are extensive and represent one of the largest modernization efforts undertaken on Pakistan's irrigation

Construction of cofferdam of 1st season is complete and the site is ready for Gate replacement works

At both Guddu and Sukkur Barrages, electro-mechanical rehabilitation are being taken while maintaining live operations—an inherently complex task. Activities include refurbishment or replacement of hoisting machinery, upgrading of braking and load-bearing

the replacement of all sixty-five barrage gates, together with their complete operational systems, including hoisting machines. In addition, the rehabilitation of one navigation lock gate forms part of the scope. Beyond the main barrage, the works also cover the

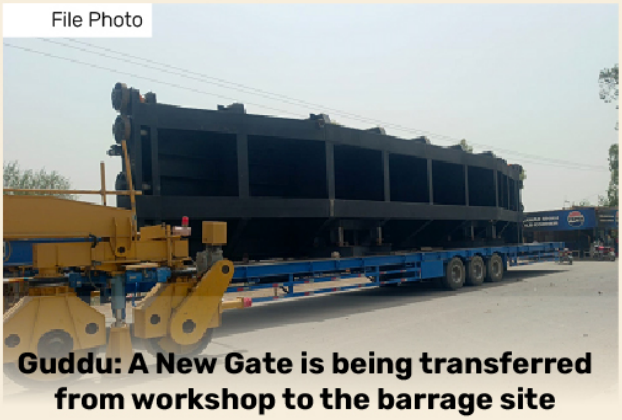
forms part of the scope. Beyond the main barrage, the works also cover the replacement of twenty-five gates on all four off-taking canals, thereby ensuring consistent operational performance across the entire system. To facilitate safe maintenance, the provision of one complete set of isolating bulkhead gates is included, along with the establishment of a modernized electro-mechanical workshop intended to support future operation and maintenance requirements at the barrage.

At Sukkur Barrage, the rehabilitation scope similarly addresses both the main barrage and its associated canal systems. Out of a total of sixty-six barrage gates, fifty-six gates along with their hoisting machines are being replaced under the project. In addition, fifty-five gates of all seven off-taking canals are included in the electro-mechanical replacement works. The scope further encompasses the rehabilitation of gantry cranes, the provision of two isolating caissons for barrage gate maintenance, and the installation of stoplogs for canal gates, ensuring safe and efficient maintenance operations throughout the barrage system.

Progress Till Today

At Guddu Barrage, significant progress has been achieved in the electro-mechanical rehabilitation works. To date, twenty-five canal gates and forty main barrage gates, together with their respective hoisting machines, have been successfully replaced.

By the end of the current working season in May 2026, it is anticipated that an additional fourteen main barrage gates will be completed, bringing the overall physical progress of electro-mechanical works to approximately eighty-five percent. With the contractual completion date set for March 2027, the current pace of works is considered satisfactory.



Guddu: A New Gate is being transferred from workshop to the barrage site

At Sukkur Barrage, electro-mechanical rehabilitation is progressing in a phased manner under complex site and hydraulic conditions.

To date, twenty main barrage gates have been replaced using cofferdam arrangements.

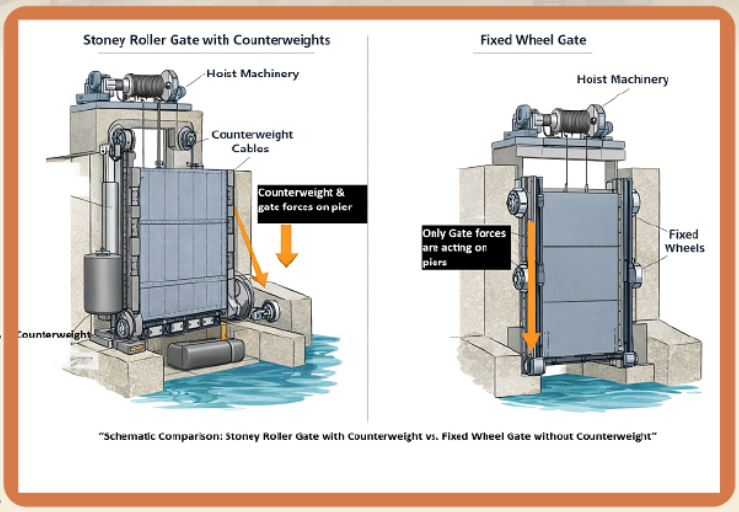
The planned target for the current working season is the completion of forty-four main barrage gates by May 2026, reflecting the scale and operational complexity of the ongoing works.

Guddu: New Gate is being lowered into the bay for installation

Sukkur: Fixing and field welding of new gate in the bay – A view from U/S side

Sukkur: Lowering down of the Gate-section into the bay – A view from U/S side

A Technical Insight: Why Counterweight-Free Gates?



"Schematic Comparison: Stoney Roller Gate with Counterweight vs. Fixed Wheel Gate without Counterweight"

Traditional Stoney roller gates rely on counterweights to partially balance gate loads, reducing the effort-required from hoisting machinery. While effective in the past, such systems introduce additional moving parts, complex force transfer mechanisms, and increased interaction with civil structures.

Counterweight-free fixed wheel gates eliminate these complexities. Hydraulic loads are transferred directly to the barrage piers through wheels and rails, while gate movement and holding are fully controlled by engineered electro-mechanical systems. This results in clearer load paths, reduced maintenance requirements, improved structural compatibility, and higher long-term reliability—particularly important for rehabilitated barrages with aging concrete structures.

Execution Challenges and Lessons Learnt

Rehabilitating electro-mechanical systems within operational barrages posed considerable challenges. Limited shutdown windows, heavy lifting in con-

The transition to fixed wheel gates at Sukkur Barrage marks a decisive advancement in safety, reliability, and climate resilience, strengthening Sindh's irrigation infrastructure to sustainably manage future hydrological challenges and safeguard millions of livelihoods.

fined spaces, and coordination among multiple stakeholders required meticulous planning.

The experience reinforced the importance of early interdisciplinary coordination, realistic scheduling, and thorough testing regimes.

Though experienced Chinese contractors in Sukkur and equipment suppliers in Guddu bring valuable expertise, the project reinforced the importance of active involvement of the PMO's own engineers.

Their hands-on engagement proved essential for ensuring flawless equipment quality, high workmanship standards, and detailed micro-level planning, particularly in complex rehabilitation works where precision and reliability are paramount

Securing the Future of Sindh's Barrages

The electro-mechanical rehabilitation of Guddu and Sukkur Barrages under SBIP represents a shift toward modern, integrated, and structurally compatible engineering solutions.

A key milestone in this effort is the transition at Sukkur Barrage from Stoney roller gates with counterweights to fixed wheel gates without counterweights—a decisive step forward in safety,reliability, and long-term maintainability.In the face of growing global climate challenges, strengthening water-regulating infrastructure is no longer an option but a compulsion.

Barrages must be resilient, adaptable, and robust to manage the uncertainties of future hydrological conditions.

This rehabilitation is therefore not just a modernization effort; it is a strategic preparation for the challenges of climate change, ensuring that these historic structures continue to function effectively under evolving conditions.

Through meticulous coordination between structural and electro-mechanical disciplines, Guddu and Sukkur Barrages are being equipped to meet both current operational demands and future uncertainties.

These works reinforce the sustainability and reliability of Sindh's irrigation network, safeguarding water resources and supporting the livelihoods of millions for decades to come.

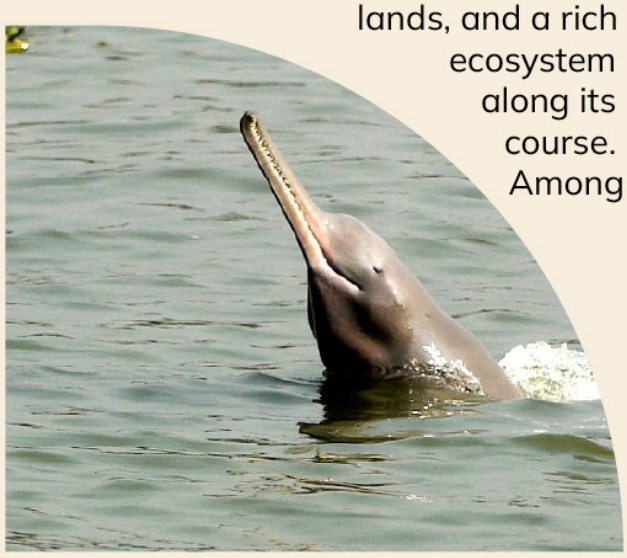
Author: M. Mohsin Masood
EM Expert, SBIP-PMO

The Indus River Dolphin,

Its Habitat, and the Role of Sindh Government and the World Bank in Conservation

Raheema Bhatti
Monitoring and Evolution Specialist
(SBIP) Guddu and Sukkur Barrage

The Indus River is the lifeline of Pakistan, stretching from the mountains of the north to the Arabian Sea, nurturing millions of people, vast agricultural lands, and a rich ecosystem along its course. Among



the most unique and endangered species dependent on this river is the Indus River Dolphin, a freshwater mammal found nowhere else in the world except the Indus River system. This dolphin is not only a symbol of Pakistan's natural heritage but also an indicator of the overall health of the river ecosystem. Its survival is closely linked with water flow, environmental balance, and responsible river management, making the role of government institutions and water in the way humans do; instead, it absorbs the required moisture from the fish and aquatic organisms it consumes. The dolphin feeds mainly on small fish, shrimp, and other freshwater species that live in muddy riverbeds. Because of its weak eyesight, the dolphin depends on echo location to navigate and hunt in the river's turbid waters. For this reason, it thrives best in deep, slow-moving stretches of the river with sufficient water flow and minimal disturbance. When the river ecosystem is healthy, with abundant fish and clean water, the dolphin remains active, healthy, and capable of breeding.

A suitable environment for the Indus River Dolphin requires consistent freshwater flow, safe migration routes, and protection from pollution and human interference. Barrages and irrigation canals, while essential for agriculture, often fragment dolphin habitats and isolate populations. Reduced water releases downstream, especially during dry seasons, create shallow pools that increase the risk of dolphin stranding and mortality. Industrial waste, agricultural runoff, and untreated sewage further degrade water quality, reducing fish populations and threatening dolphin survival. A clean, flowing river with balanced sediment and sufficient depth is essential for ensuring the

Sindh Government and World Bank Strengthen Indus River Dolphin Conservation Between Guddu and Sukkur Barrages

dolphin's long-term existence.

Sindh province holds global importance in dolphin conservation, as the largest remaining population of Indus River Dolphins is found between Guddu and Sukkur Barrages. Recognizing this responsibility, the Government of Sindh has taken several important steps over the years to protect this endangered species. The declaration of the Indus Dolphin Reserve between Guddu and Sukkur Barrages was a landmark decision, providing legal protection to dolphin habitats. Fishing restrictions, awareness campaigns, and rescue operations during low-water seasons have significantly contributed to reducing dolphin deaths.

The Sindh Wildlife Department plays a central role in monitoring dolphin populations and responding to emergencies. During canal closures or low-flow periods, trained rescue teams actively patrol the river and irrigation canals to locate stranded dolphins. These dolphins are carefully captured and released back into the main river channel. Such rescue operations have saved hundreds of dolphins over the years and demonstrate the government's commitment to wildlife protection. Public awareness programs targeting fishermen and riverine communities have also helped reduce accidental harm to dolphins.

In addition to provincial efforts, the World Bank has emerged as a key partner in strengthening environmental management along the Indus River. Through projects such as the Sindh Barrages Improvement Project, the World Bank supports infrastructure rehabilitation while emphasizing environmental safeguards and biodiversity protection. These projects integrate dolphin conservation measures into large-scale water management plans, ensuring that development and environmental protection go hand in hand.

The World Bank's role goes beyond

funding; it promotes international best practices in environmental assessment, monitoring, and stakeholder engagement. Environmental Management Plans under World Bank-supported projects require regular monitoring of water quality, aquatic life, and dolphin movement patterns. Technical assistance and capacity building have enabled local institutions to improve data collection and decision-making related to river ecology. By encouraging sustainable water releases and improved barrage operations, the World Bank indirectly supports the eco

Environmental Monitoring and Sustainable Barrage Operations Safeguard Endangered Indus River Dolphins

logical needs of the Indus River Dolphin. According to recent surveys and estimates by wildlife authorities and conservation organizations, the population of Indus River Dolphins in Pakistan is estimated to be around 1,900 to 2,000 individuals, with the majority found in Sindh. This figure represents a significant recovery from previous decades, when the population had dropped alarmingly due to habitat loss and excessive hunting. While this increase is a positive sign, conservationists warn that the species remains endangered and vulnerable to climate change, water scarcity, and increasing human pressure on the river.

Climate change poses an emerging threat to the Indus River ecosystem. Irregular rainfall patterns, glacial melt, and prolonged droughts affect river flows and water availability.

For dolphins, reduced water depth and increased temperature can be fatal. Extreme weather events also increase pollution loads and disturb aquatic habitats. Addressing these challenges requires coordinated planning at provincial, national, and international levels, with conservation integrated into climate resilience strategies.

Community involvement remains a crucial element in dolphin conservation. River-dependent communities are often the first to encounter stranded dolphins and can play a vital role in reporting incidents and supporting rescue efforts. Awareness programs led by the Sindh Government, with support from international partners, have gradually changed local attitudes, transforming dolphins from an overlooked species into a source of regional pride. When communities understand that a healthy river benefits both people and wildlife, conservation efforts become more sustainable.

The Indus River Dolphin is more than a rare animal; it is a living indicator of the Indus River's health. Its survival reflects the balance between development, agriculture, and environmental responsibility. The combined efforts of the Sindh Government and the World Bank demonstrate that economic development and environmental conservation can coexist when guided by strong policies and scientific understanding. Continued investment in river management, pollution control, and biodiversity protection is essential to secure the

Sustained Governance and International Cooperation Key to Securing the Future of Indus River Dolphins

Ghulam Mohiddin Mughal

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future of this iconic species.

In conclusion, protecting the Indus River Dolphin requires sustained commitment, effective governance, and international cooperation. The Sindh Government's conservation initiatives, supported by the World Bank's technical and financial assistance, have shown encouraging results.

However, long-term success depends on maintaining adequate river flows, reducing pollution, and strengthening community participation. By safeguarding the Indus River Dolphin, Pakistan not only protects a unique species but also preserves the ecological integrity of one of the world's most historic rivers for future generations.

Incumbancy of Project Director Project Management office (PMO) Sindh Barrages Improvement Project

Mr Mohammad Ehsan ul Haq Ieghari from 1/07/2014 to 10/12/2014

Mr Aijaz Shaikh from 10/12/2014 to 14/02/2017

Mr Shafqat Hussain Wadho 14/02/2017 to 21/05/2020

Mr Javid Ahmed Memon from 21/05/2020 to 13/11/2020

Women in the Development Projects:

A Journey of Purpose and Impact

Sadia mahar
social inspector

Development projects are not only about infrastructure and technical progress; they are equally about people, communities, and long term sustainability.

The participation of women in development initiatives adds meaningful value, bringing empathy, balance, and a strong sense of responsibility to project processes.

Being part of a development project provides an opportunity to contribute to positive change that extends beyond routine tasks. Women working in this sector engage with diverse teams and evolving challenges, requiring patience, adaptability, and dedication. Through this journey, they experience professional growth while contributing to outcomes that support communities and promote environmental and social well-being.

The presence of women in development projects reflects a commitment to inclusive growth and equal participation. Their contributions often carried out quietly and consistently, help strengthen transparency, social awareness, and sustainable decision-making. Each step taken, each process followed, and each challenge addressed contributes to the broader goal of responsible and ethical development.

SBIP is more than the rehabilitation of barrages. It is about restoring confidence, upholding dignity, and setting new standards for development. Through this journey, we are demonstrating that women have an essential place everywhere on project sites, in decision making spaces, and in shaping the future of Pakistan.

Women's participation in SBIP strengthens inclusive development, promotes transparency and sustainability, empowers communities, and demonstrates that true progress is achieved through equal opportunity, teamwork, and responsible leadership.

As a whole encouraging and recognizing women's participation in development initiatives is not only a step toward gender inclusion but also an investment in stronger organizations and sustainable progress.

At SBIP, true development is driven by teamwork, where the contributions of both women and men guided by shared values, mutual respect, and professionalism strengthen institutions and ensure sustainable progress for all.

Protecting the Indus River Dolphin During Sukkur Barrage Rehabilitation

Fayaz Muhammad
Designation: Assistant Director
Environment, PMO, SBIP.

The Indus River is essential for life in Sindh. It supports farming, livelihoods, and is also home to one of the world's rarest animals the Indus River Dolphin. This endangered dolphin exists only in Pakistan, and the river stretch near Sukkur Barrage is one of its most important remaining habitats. Because of this, protecting the Indus dolphin is a major priority for the Sindh Barrages Improvement Project (SBIP).

When rehabilitation work began at Sukkur Barrage, under SBIP, the gate replacement methodology was modified to adopt cofferdam based construction.

While this approach improved construction efficiency and safety, it introduced in-river activities that could potentially affect dolphins. To manage this risk construction methods were carefully planned to reduce risks to dolphins.

One important step was creating a Dolphin Exclusion Zone (DEZ) around active work areas. This zone, about 500 meters wide, is a safety buffer where dolphins must not be present before any in-river work starts.

The main function of DEZ to help keep dolphins away from construction areas, acoustic deterrent devices known as pingers are used.

These devices produce gentle sound sonar (echolocation) system and recognize as a warning.

Since dolphins rely on sound rather than sight to move around, the pingers help them sense danger and swim away from noisy work zones.

Pingers are placed around construction areas and also on boats working in the river.

Before work begins each day, trained Dolphin Observers and Ecologists monitoring the river to make sure no dolphins are near the work zone. If a dolphin is seen, work is delayed until it moves away naturally.

Construction only starts after the area is confirmed safe.

During active works, pinger monitoring checklists are completed each day to verify device functionality,

Closely monitored protection measures ensure dolphins remain safe during construction, with no injuries reported, and their return after work proves that development and conservation can successfully go hand in hand.

including battery condition and system performance. After completion of in-river construction activities, the Dolphin Exclusion Zone (DEZ) is also temporarily deactivated, acoustic pingers are removed from the site as part of standard operational control, as there is no longer noise or operational activity that could pose a risk to dolphins. This practice is consistent with international good practice, which recommends limiting the use of acoustic deterrent devices to active work periods only to avoid unnecessary disturbance, also supports natural habitat use and prevents potential habituation of dolphins to pingers.

These protection measures are closely supervised by Environmental team of Project Management Office (PMO) and Project Implementation Consultant (PIC), monitoring results show that dolphins stay outside the dolphin exclusion zones when pingers are in use. Importantly, no dolphin injuries or deaths have occurred due to project activities. Dolphins also return to the area once construction work is finished, showing that the measures protect dolphins without pushing them away permanently.

The Sukkur Barrage project shows that development and nature conservation can go hand in hand. By using simple technology, careful planning, and daily monitoring.

SBIP is helping protect Pakistan unique Indus River Dolphin while improving critical water infrastructure. This approach provides a strong example for future projects across the country.

A team of PMO SBIP led by DPD Mr Noor Ul Arfeen Baloch visited the Sukkur Barrage site. Technical Officer PMO SBIP Dr Imran Aziz Tunio and Consultant A Razak Memon also accompanied.

Minister irrigation Jam Khan Shoro, secretary irrigation Sindh Zarif Iqbal Khero PD PMO SBIP Pritam Das visited and inspected the Sukkur Barrage

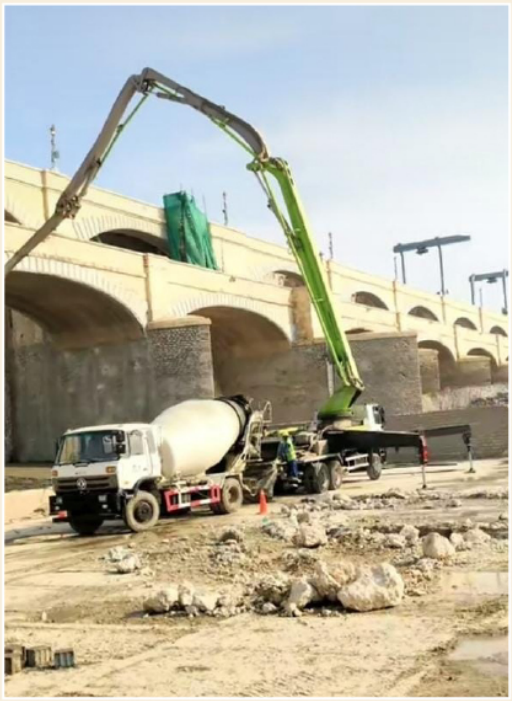
PD PMO SBIP Mr Pritam Das along with PIC ,Irrigation and PMO officers visited Sukkur Barrage. Deputy Project Director PMO SBIP Mr Noor Ul Arfeen Baloch, Technical officer PMO SBIP Mr Dr Imran A ziz Tunio, AXEN Mr Mumtaz Ghumro , XEN Ghazafar Mubeen and SE Khalid Jan Baloch accompanied.

Rohri canal of Sukkur Barrage

Photo Minister irrigation Mr Jam Khan Shoro and PD PMO SBIP Mr Pritam Das, spoke to the media in workshop at a local hotel in karachi.

Minister irrigation Jam Khan Shoro , secretary irrigation Sindh Zarif Iqbal Khero PD PMO SBIP Pritam Das, TTL WB Francois Onimus and other irrigation experts attended the workshop at a local hotel in karachi.

Rehabilitation and modernization work in progress at Sukkur Barrage.



Guddu barrage its photos now

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