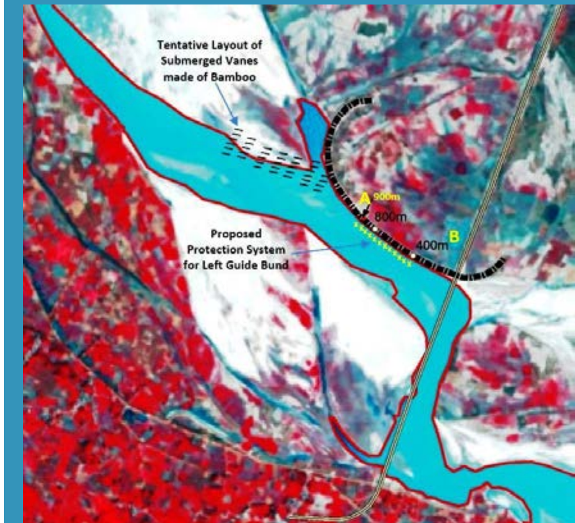
Satellite Image Processing



Geomorphic characteristics of particular interest to the highway/bridge engineer are the alignment, geometry, and form of the stream channel. The behavior of a stream at a highway crossing depends not only on the apparent stability of the stream at the bridge, but also on the behavior of the stream system of which it is a part. Upstream and downstream changes may affect future stability at the site. These changes can be reflected in aggradation, degradation, or lateral migration of the stream channel. The GIS-based analysis of channel change provided quantitative data on rates and positions of erosion in relation to bank characteristics.

Our products and services

- Design Flood Estimation (Climate Change)
- Dominant Discharge (Climate Change)
- River Bank Stability
- Geomorphological Changes
- Waterway
- Flow Regimes
- Flow Obliquity for Scour
- Scour Depth (Normal-General Constriction)
- Pile/Well of Bridge Foundation
- Low Water Level Estimation for Well Cap
- Guide Bund Alignment, Shape, etc.
- Hydraulics of Guide Bund
- River Training Work Design and Analysis
- Hydraulic study of Hydro Electric Project

Potential Clients

- IWAI, NHAI, NHIDCL, NHPC, SJVNL, UJVNL, HPPCL
- S. P. Singla Constructions Pvt. Ltd.
- BRPNL, WRD, Patna, Bihar
- PWD, West Bengal

Contact Us

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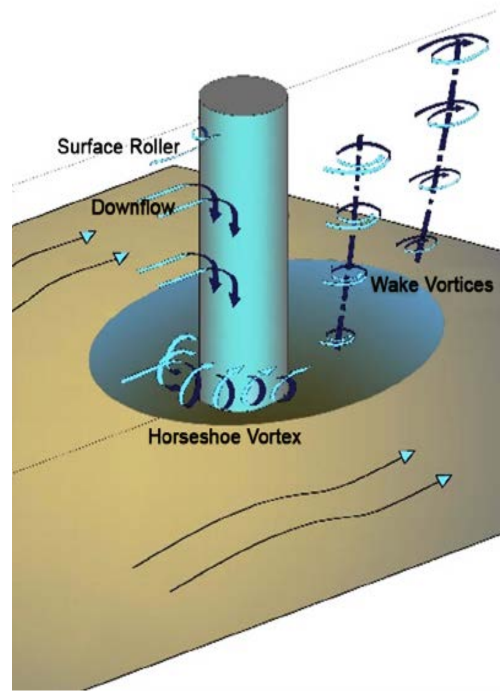
The Reports of Comprehensive Hydraulic Modelling may be vetted from IITs, if requested by the Client.

Innovante Water Solutions



Comprehensive Hydraulic Design and Modelling Group

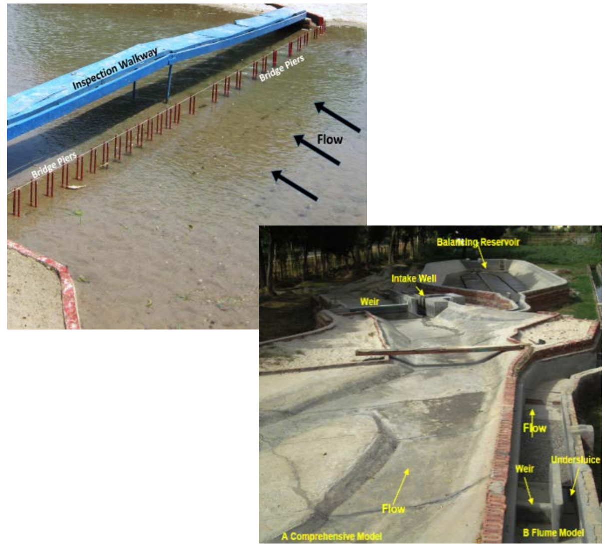
Scour and Erosion

All scour is the result of the transportation of bed material by the watercourse.

Channel instability is a natural phenomenon and is the result of the erosion and deposition of bed material. Braided rivers are most prone to scour and channel instability. The effect of channel instability on a bridge or waterside structure may be to undermine foundations and direct flows towards or behind the structure.

Local scour is a consequence of the presence of a structure in a watercourse. The turbulence caused as water flows by a pier will generally cause an uplifting effect at the nose, resulting in erosion of the bed.

Bridge scour is the removal of sediment such as sand and rocks from around bridge abutments or piers. Many bridges failed around the world because of ***extreme scour around pier and abutment***. The failure of bridges due to scour results in economical loss and in losses of human life. Around 53% of the recorded ***bridge failures*** in the world were due to **scouring**.



Physical Model Testing

In recent years, sediment scour near bridge piers and abutment is a serious problem given the highly sensitive issue of flooding due to climate change which cause nationwide concern because it has resulted in more bridge failures than other causes. Fail to present an accurate maximum depth of scour may either lead to an uneconomical design of substructures, or result in scour damage or even bridge failure.

As part of this process physical modelling can provide detailed assessment of current and future river work arrangements in a cost effective and timely manner.

Physical modelling of Rivers is principally required to assess the following:-

•Potential flood risk

•Afflux effects on hydraulic structures

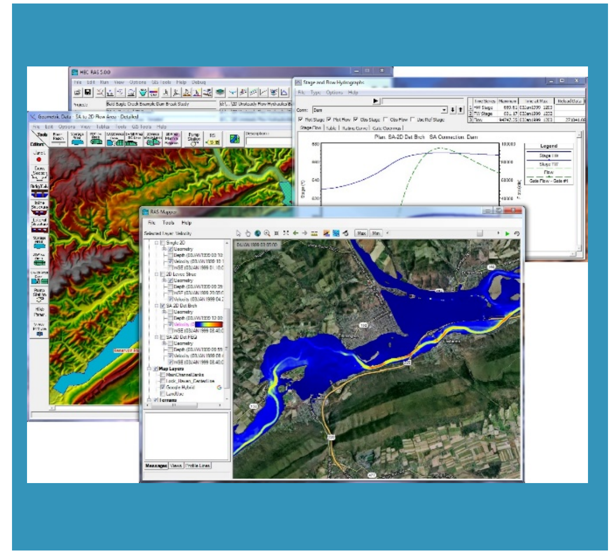
•Calibrate and verify mathematical models

•Provide assessment of hydraulic adequacy of structures

•Provide detailed calibration of pertinent hydraulic structures

•Scour*/deposition characteristics

•The effect of trash/debris within a system



Mathematical Modelling

Mathematical models capable of reproducing both hydrodynamic and morphodynamic features is an important tools for understanding the evolution of rivers because of good spatial and temporal resolution. The most evident feature of a model is its dimensionality.

1-D model simulates flow perpendicular to the river cross-section and averages the outputs cross-sectionally, the use of multidimensional models is recommended when modelling complex riverine environments.

2-D models have been shown to predict the general flow pattern in rivers well and computa-tionally lighter when compared with 3-D models.

- 1-D; 2-D; and combined 1/2-D unsteady flow
- Full Network Simulation of Open Channels, Floodplains, and Alluvial Fans
- Subcritical, Supercritical, and Mixed Flow Regime
- Hydraulic Calculations for Cross-Sections, Bridges, Culverts, and other Structures
- Dam Break Analysis; Levee Breaching and Overtopping;
- Estimation of Maximum Possible Scour Around Bridge Piers, Guide bunds and other structures

*Scour assessment can be made with the provision of a representative mobile bed media.