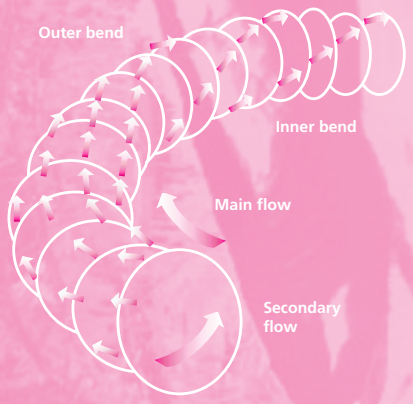
DHI Software

MIKE 21C

Engineering and Restoration of Morphodynamic Rivers

DHI
WATER & ENVIRONMENT

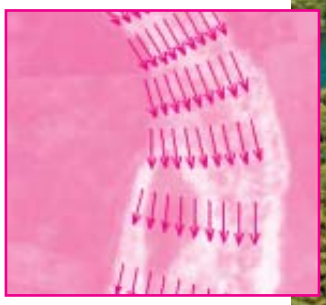
Woody debris.



What is MIKE 21C

MIKE 21C is an integrated river morphology modeling tool based on a curvilinear version of the 2D surface water model MIKE 21 and adjusted to river applications.

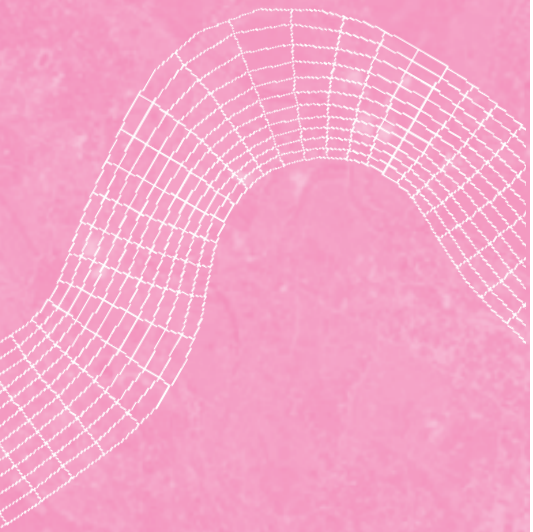
With **MIKE 21C** you can simulate changes in the river bed and planform, including bank erosion, scouring, shoaling associated with, for instance, construction work and changes in the hydraulic regime.



The model simulates

- Flow and sediment transport
- Stream bank erosion
- Bend scour, constriction scour, confluence scour and general scour
- Channel formation and closure including bifurcations
- Shoaling, point bar and alternating bar formations
- Gradation of sediment (armoring, coarsening of river bed, etc)
- Alluvial resistance

Construction of hardpoints in Brahmaputra River, Bangladesh.



MIKE 21C has been applied by DHI as a project tool in numerous river hydraulics and morphology studies for more than a decade. Experience from every new project has been encapsulated into the computational engine by specialist river morphologists and numerical experts.

MIKE 21C is today the most stable, accurate and reliable numerical model available for sediment transport and morphological studies. Model areas extend from a few hundred metres to more than hundred kilometers and simulation periods from just a few hours to several decades.

MIKE 21C comes with a GUI and online help, including a flexible and easy-to-use graphics-based grid generator. Tutorials and guidelines to get started with morphological modeling are provided.

Application examples

Application areas include:

- Protection schemes against bank erosion and bed scour
- Measures to reduce or manage shoaling
- Hydraulic structures including eg weirs, groynes, barrages and bendway weirs
- Alignments and dimensions of navigation channels for minimizing capital and maintenance dredging
- Sedimentation of water intakes, outlets, locks, harbors and reservoirs
- Bridge, tunnel and pipeline crossings
- Restoration plans for optimal habitat environment in channel floodplain systems
- Monitoring networks based on morphological forecasting

$$\chi_e = \frac{2}{\kappa^2}\left(1 - \frac{\sqrt{g}}{\kappa \cdot C}\right) \cdot \frac{H}{R_s}$$

Okavango delta, Botswana.

Benefits

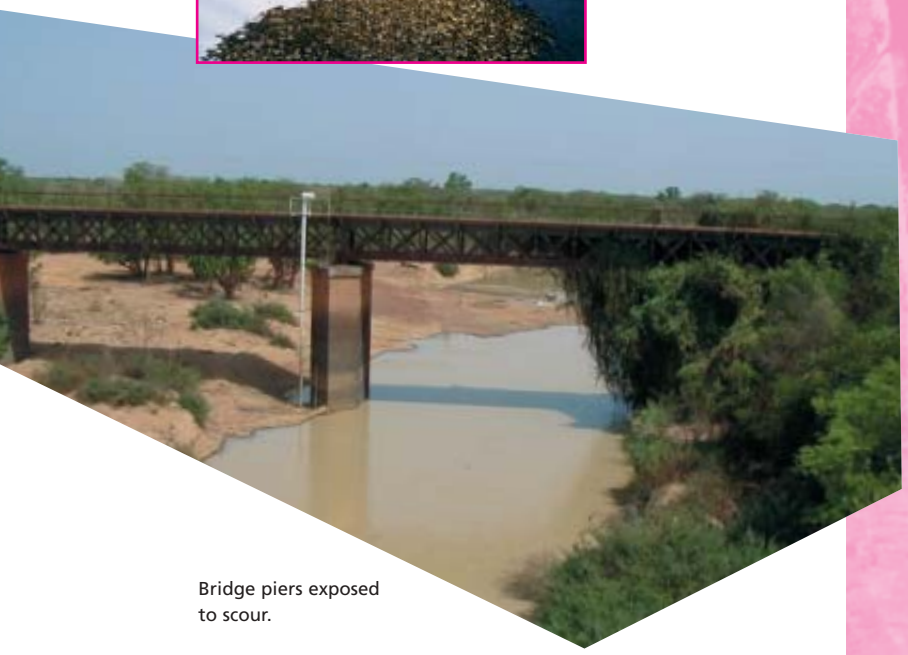
- Well-proven and recognized model validated through numerous real-case projects
- Graphical user interface with online help, easy-to-use
- Enhanced efficiency and quality in sediment studies
- Accurate and fast computations, stable solution methods
- Superior tools for data import, analysis and result presentations
- Guaranteed technical support with a team of specialists with substantial international experience
- Backup assistance ranging from formal courses to on-the-job training and project support
- Annual upgrades available
- DHI commitment to continue development

Features

- Hydrodynamic model solving the vertically integrated St. Venant equations on a curvilinear or rectilinear finite difference grid
- Fully dynamic or quasisteady flow model
- Hydraulic structures formulation
- Helical flow model of the 3D secondary currents, including time and phase lag
- Advection-dispersion model, fully dynamic or quasisteady
- Sediment transport equations for sand and gravel with separate descriptions of bed load and suspended load. Bed slope, helical flow, vertical velocity and concentration profiles, including space and time lag, are accounted for

- Cohesive sediment model for silt and clay
- Graded sediment model combining a range of sediment particle sizes
- Multilayer river bed description
- Alluvial resistance model
- Bed scour and deposition model with feed back (movable river bed)
- Bank erosion with planform feedback (movable computational grid)

Gravel bars in River Morava, Czech Republic.



Bridge piers exposed to scour.

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