MWH is a pioneer in establishing a multi-discipline BIM philosophy on infrastructure projects and we’ve developed a proven team approach.

MWH began implementing BIM concepts by embedding intelligence into our process and instrumentation diagrams (P&IDs) over a decade ago, and we’ve since integrated BIM into our approach towards infrastructure solutions. Today, MWH continues to lead the industry in advanced BIM systems through our holistic view of engineering software.

We’ve surpassed CAD usage through a comprehensive understanding of BIM, including a definition of its process, systems integration, and project execution. Our BIM approach provides for complex infrastructure design and this approach is instrumental to keeping the project design coordinated, saving our clients’ time and money.

**BIM Technology Benefits**

Our BIM approach provides:

- Improved design and construction quality for our clients by providing a platform for conflict identification/clash detection and multi-model integration
- Increased productivity by enabling us to efficiently manage design changes on complex projects
- An ability to better communicate with clients and contractors by using visualization to explain intricate design concepts
- Increased predictability of our projects by allowing us to generate more reliable quantity take-offs for cost estimating early in the design project

**Early BIM Project Applications and Reality Capture**

MWH applies a BIM logic which spans the project’s life-cycle from inception to operations. Utilizing Autodesk’s Infraworks software, MWH built a proprietary approach toward BIM implementation.

**MWH Provides BIM Solutions on a Variety of Projects**

**Panama Canal Third Set of Locks, Panama Canal, Panama** – Recently, MWH received Autodesk’s BIM Experience Award for our BIM work on the Panama Canal Third Set of Locks Project—one of the first and largest civil works projects, budgeted at $3.25 billion dollars, to deploy BIM. This award recognizes MWH for using BIM to improve the quality of design, efficiently managing design development and design changes, and facilitate communication with clients and builders through visualization. Using a suite of BIM software in combination with other 3-D models, MWH prepared:

- Precise excavation and lock structure models within 3D environment
- Structural simulations including critical seismic areas
- Gate installation clash detection with lock structures
- Federated models enabled discipline coordination, material quantities, design and construction reviews

**Fremont Water Pollution Control Center (WPCC), Fremont, Ohio** – The City of Fremont hired MWH to design the $57M Water Pollution Control Center (WPCC) expansion to meet nutrient removal and wet weather capacity requirements. The final design improves secondary treatment capacity to 24 mgd and makes collection system improvements to divert storm type flows. MWH Constructors (MWHC) is providing Construction Management at Risk services. MWH and MWHC are coordinating with the City to sequence construction activities to avoid interruptions to plant operations. The MWH team relied on a BIM production workflow for a distributed design environment and to collaborate construction activities. In addition, our BIM process enabled:

- Default 3D design across all disciplines
- Improved coordination between disciplines and client’s design understanding.
- Material quantities and construction services sequencing and inventory assistance.
- Clash detection involving internal discipline coordination meetings using Navisworks manage and saved reports.

**Tres Rios Wastewater Reclamation Facility (WRF), Tucson, Arizona** – MWH provided preconstruction and construction services to expand preliminary and primary treatment facilities from 37.5 to 50 mgd. The MWH team utilized BIM applications on all aspects of the project, which allowed greater ease in conflict resolution, and reduced the risk of costly rework in the field.
MWH CAD Processes and BIM Workflow

As part of the MWH CAD BIM work flow, a (LOD) Level of Development (as defined by AIA/ACIIG and modified by MWH to be project specific) is created for each phase of the project BIM modeling effort and is aligned to the expectations of the scope of work.

**LOD 100**: Completed BODR, 75% to 85% PID’s, hydraulic profile established, BIM models developed by process mechanical using elements from other similar projects or libraries. Buildings/structures modeled as 3D elements indicative of area, height, volume, spatial location and orientation. Drawings/sheet files developed to single plan and one section general arrangement views only with a site development plan.

**LOD 200**: PID’s, floor plans, structural concepts complete, BIM originating models progressed to a 60% development stage, preliminary engineering completed, sheet files started for 2D drawings with minimal annotation. Civil references originating models and begin site development for preliminary paving, drainage, grading, and yard piping and minimal annotation.

**LOD 300**: Originating BIM models progressed to 100% development stage, all major engineering completed. All other disciplines released and federated to same level of completeness. Drawings and specifications issued to allow for complete BID. This information can be expressed through the Drawings and through extraction of BIM information from the intelligent PID’s and models.

**LOD 350**: This LOD was added to define the amount of information in all discipline models to ensure potential conflicts are resolved. Model elements are graphically represented to the true definition of the design, but not to the detail of LOD 400.

**LOD 400**: Models are progressed to include detailed equipment, elements, and to a level of accuracy that allow for field or shop fabrication of desired constructions.

**LOD 500**: Post construction models incorporate actual project equipment and elements creating a true reflection of As-Built conditions.

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