

## Panama's epic, wider path between the seas

by ROB McMANAMY, Editor-in-Chief | July 19, 2016

Think the world is in decline? Depressed over intractable, global conflicts, big and small, old and new? Afraid civilization is heading backwards? Well, then watch the joyous, international festivities above, followed by the awe-inspiring, [time-lapse video](#) below (captured by [EarthCam](#)), and I guarantee that you will feel better about both our species, and our collective future, at least for a bit.

This summer, the Panama Canal —which opened in August 1914 as arguably the greatest (and costliest) construction achievement of the last century — has just been doubled in size. And the mammoth, \$5.4-billion, 10-year effort to add a third set of wider and deeper locks to the 48-mile-long, “path between the seas” has truly been a testament to the last century’s extraordinary advances in engineering technology, medicine and, yes, even multinational cooperation.



Forget for a moment the cost overruns (\$2.3 billion), delivery delay (missed the centennial by 23 months), concrete woes (lock walls sprung leaks during tests earlier this year), and seismic concerns, among other clouds over the project’s gleeful inauguration. For now, let us celebrate the epic achievement.

After years of planning for how to handle today’s longer, wider, taller and heavier cargo ships, the Panama Canal Authority (ACP) in mid-2009 awarded a low-bid, design-build contract to Grupo Unidos Por el Canal (GUPC). The well-connected, multinational consortium included Panama’s Constructora Urbana S.A. (CUSA); and three European water and power infrastructure firms: Salini Impregilo (Italy); Jan De Nul Group (Luxembourg); and Sacyr (Spain). One red flag? GUPC’s winning bid (\$3.1 billion) was a full billion dollars under the next lowest bid. For much more on the related controversies, go [here](#).

BIM Conquers all

In the face of such high hurdles, both natural and manmade, Broomfield CO-based MWH Global (now part of Stantec) led the design joint venture, CICP Consultores Internacionales, LLC. Its partners included Tetra Tech, Pasadena CA; and Iv-Infra of the Netherlands.

“The most daunting challenge was meeting the high design performance requirements,” said Mike Newbery, MWH Global’s project lead. After all, “this is the Panama Canal. We couldn’t afford to make a mistake; the clock was ticking.” Newbery made his remarks to Autodesk, which hosts an engaging, interactive web page, highlighting the project. There, the tech giant explains BIM’s key role:

To manage this extraordinary level of complexity, the Panama Canal expansion became one of the first large-scale civil works projects to use building information modeling (BIM). MWH Global used intelligent 3D models to enable a diverse team of engineers, in five design offices around the world, to collaborate efficiently across disciplines. The MWH team mapped sites and resolved design conflicts prior to construction (clash detection) to save thousands of rework hours, and millions of dollars.

For its part, MWH Global highlights the key design features of the finished product:

**Lock walls:** The cost-effective lock wall designs incorporate foundation drains that reduce the hydrostatic and hydrodynamic loads, enabling more efficient structures that achieve the performance goals for strength and durability;

**Seismic design:** Using state-of-the-art seismic analysis techniques, MWH is developing lock wall configurations that meet stringent seismic criteria at minimum cost;

**Water consumption:** Water saving basins – the largest in the world – are designed to reuse 60 percent of the fresh water consumed for lockages, with an optimized filling and emptying system that meets aggressive performance criteria for system efficiency and throughput;

**Integrated operations and controls:** Through optimum design of operational features and control systems, lock operations will be seamless and efficient. Design of the lock operating gates for rapid opening and closing, coupled with an efficient filling and emptying system based on innovative hydraulic design, and state-of-practice control technologies, system safety, efficiency and throughput are maximized.