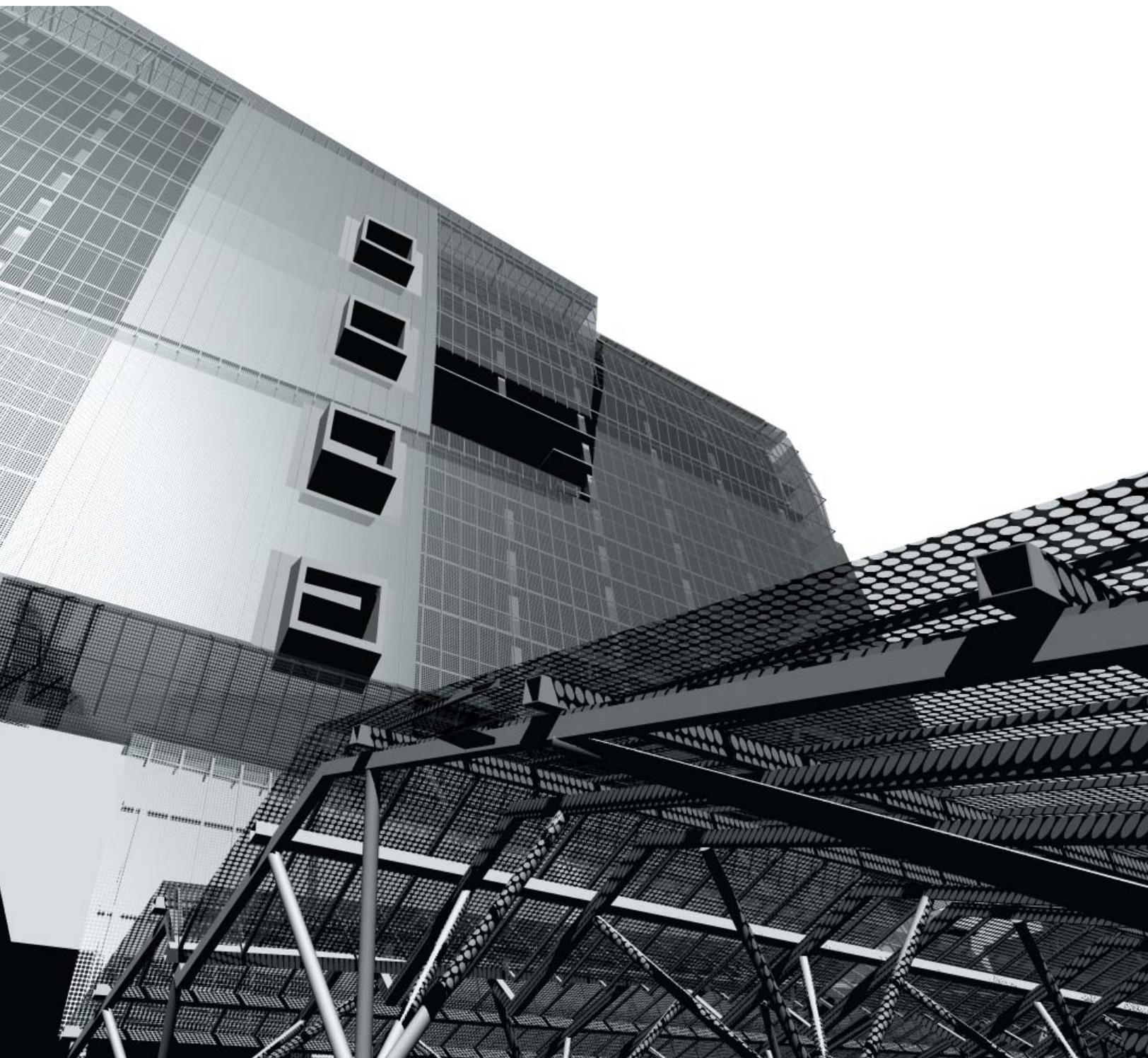


MORPHOSIS SAN FRANCISCO FEDERAL BUILDING

SAN FRANCISCO, CA

BIM Awards Competition
AIA Technology in Architectural Practice
11 April 2005



The new San Francisco Federal Building, commissioning under the aegis of the Design Excellence Program of the General Services Administration, is currently under construction. When completed in 2006, this 600,000 s.f. flagship office building will house five different agencies of the federal government. Among other innovative technologies, the building deploys an integrated custom window wall to regulate internal comfort standards through natural ventilation, thermal mass storage, and both passive and active sunshading.

As part of the project delivery method, Morphosis, the lead design architect for the project, elected to develop a Building Information Model as an in-house tool. Early uses of the 3-D model included generating quantity takeoffs for cost estimating, coordinating with the engineering team for control of geometry and layout, and managing the production of construction documents.

Though there exists no contractual requirement for the general contractor or their subcontractors to use a B.I.M., the model was accepted by several key subcontractors as a tool for the coordination of the exterior cladding system for the project. Comprised of 153,900 s.f. of custom perforated stainless steel panels attached to a tube steel frame bolted to the concrete frame of the building, the sunscreen is composed as multiple planar elements of varying geometry that wrap the south elevation of the building, continue over the roof, and transition to the ground as a series of plaza-level sunshades. The 3-D model was used over a period of 14 months as a baseline driver for the preparation of shop drawings and coordination between trades.

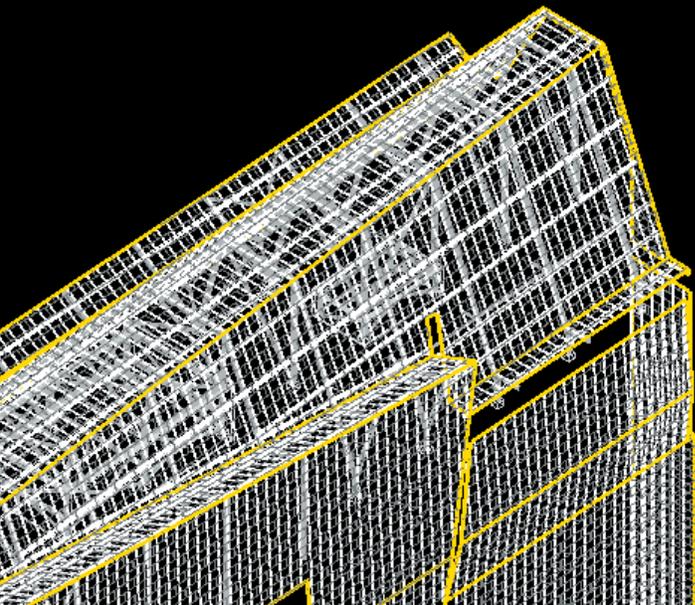
The following key team members contributed directly to the evolution of the coordinated shop drawings as an integrated digital model:

T. & M. Manufacturing, Tremonton, UT: fabrication and installation of miscellaneous metals, sunscreen supports

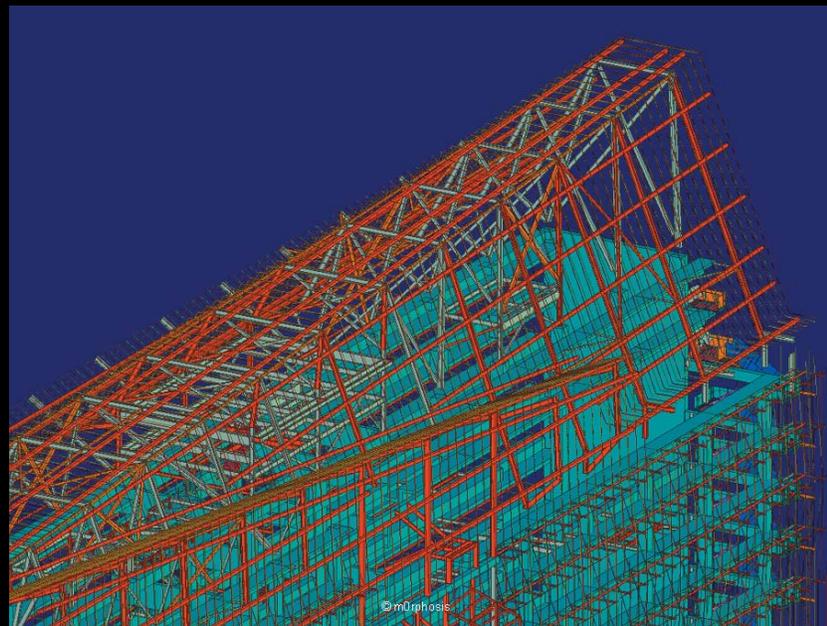
B.D.S. Steel Detailers- detailers for miscellaneous metals and sunscreen supports

Permasteelisa Cladding Technologies, Corona, CA: window wall and sunscreen panels

Design Team Skin and Framing model



B.D.S. detail model

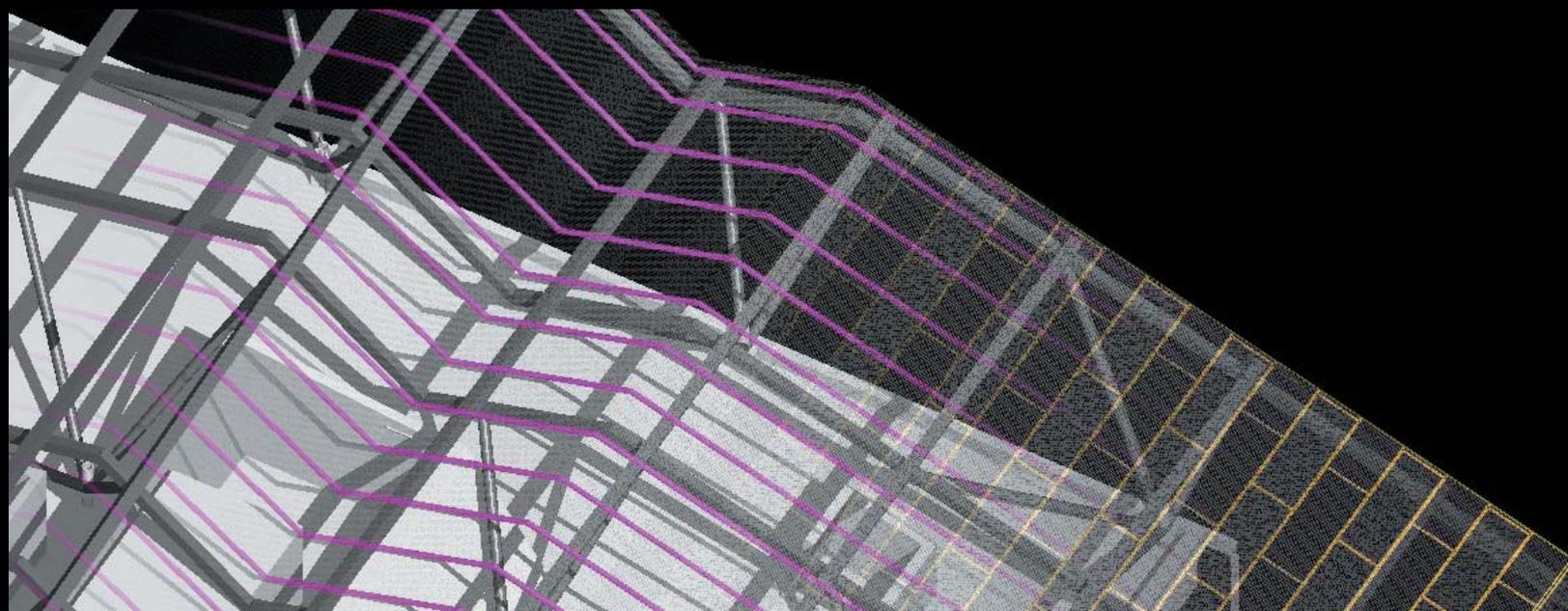




The use of BIM affords great benefits to large scale projects, both quantitative and qualitative. For example, the ease of translation between software platforms has greatly reduced time in preparation and checking of shop drawings. Estimators are able to operate cost modeling with a higher degree of accuracy. And many laborious negotiations over fine-grained performance details can be greatly condensed, with all parties providing simultaneous review of the digital model. Key to the success of this is the willingness of both design and detailing team members to expose their models to scrutiny. At this stage, accurate quantification of benefits remains highly elusive as new relationships are forged between designers and fabricators. We encourage the construction industry to begin detailed analysis of the cost benefits that may accrue to the process: estimating, detailing, and scheduling. Open dialogue between all parties can move the discussion to a more sophisticated level and allow a predictive framework to emerge.

Morphosis employs Bentley Microstation as its cad platform, and Bentley Triforma and Bentley Structural for BIM. B.D.S. creates parametric steel detail models in Tekla Xsteel, and Permasteelisa utilizes Autodesk Autocad for detailing, unfolding and drawing the perforated metal. The SDNF file format was used to exchange round-trip between Morphosis and B.D.S., and DWG format was used to exchange round-trip between Morphosis, B.D.S. and Permasteelisa. This seamless digital round-trip meant that there were very few areas where the layout geometry was in question, and at the end of shop drawing review, there were no areas of the detail models which diverged from the intended design geometry more than a few millimeters.

Layers of trades: Structural Primary Frame, Secondary Steel, Sunscreen Panel Framing, Sunscreen Panels



Shop model review



PROJECT NAME

San Francisco Federal Building

FACILITY TYPE

Office building

LOCATION

San Francisco, CA

CLIENT

General Services Administration

COMPLETION DATE

Spring, 2006

SIZE

605,000 s.f.

LEAD DESIGN

Morphosis

LEAD CONSTRUCTION

DickCorp-Morganti Joint Venture

DESIGN COLLABORATORS

Morphosis, Arup

CONSTRUCTION COLLABORATORS

Permasteelisa, T. & M. Manufacturing

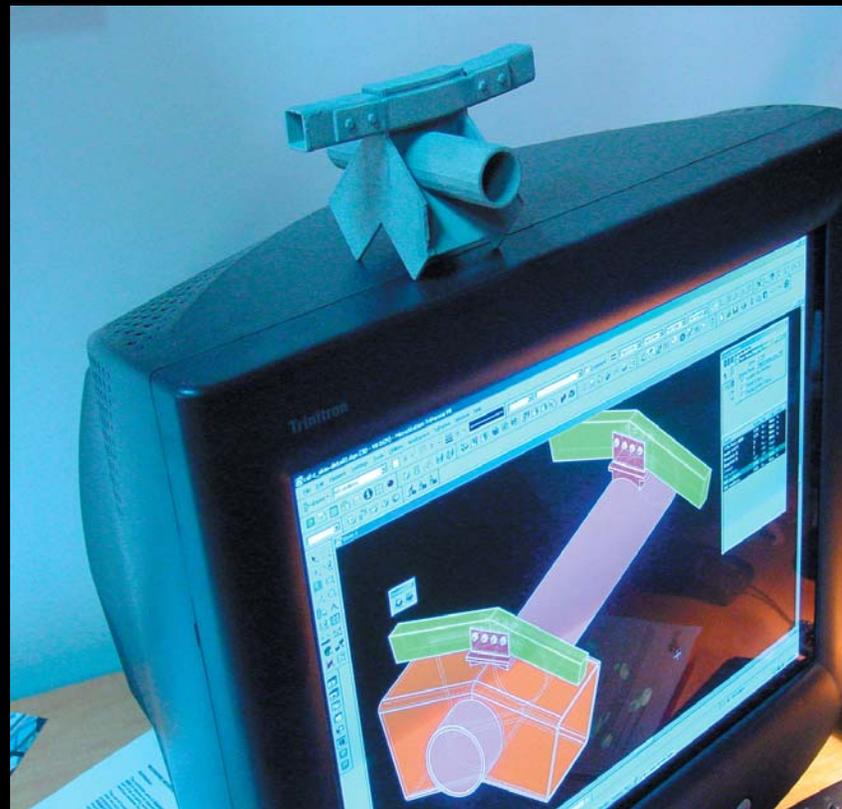
CONTACT INFORMATION

Marty Doscher

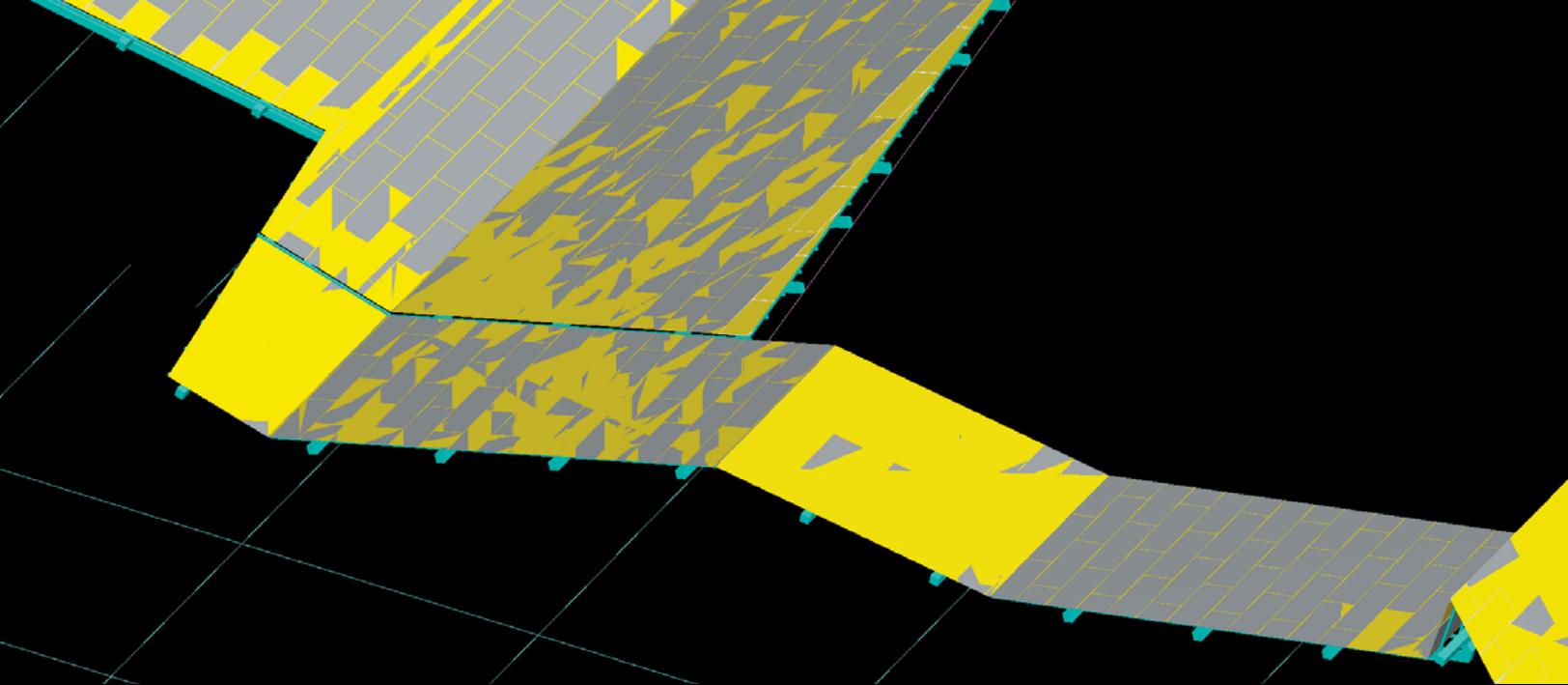
Morphosis

2041 Colorado Avenue

Santa Monica, CA 90404



Shop model 3D Print



rendering artifacts of coincident Morphosis' design and Permasteelisa/B.D.S. detail surfaces