

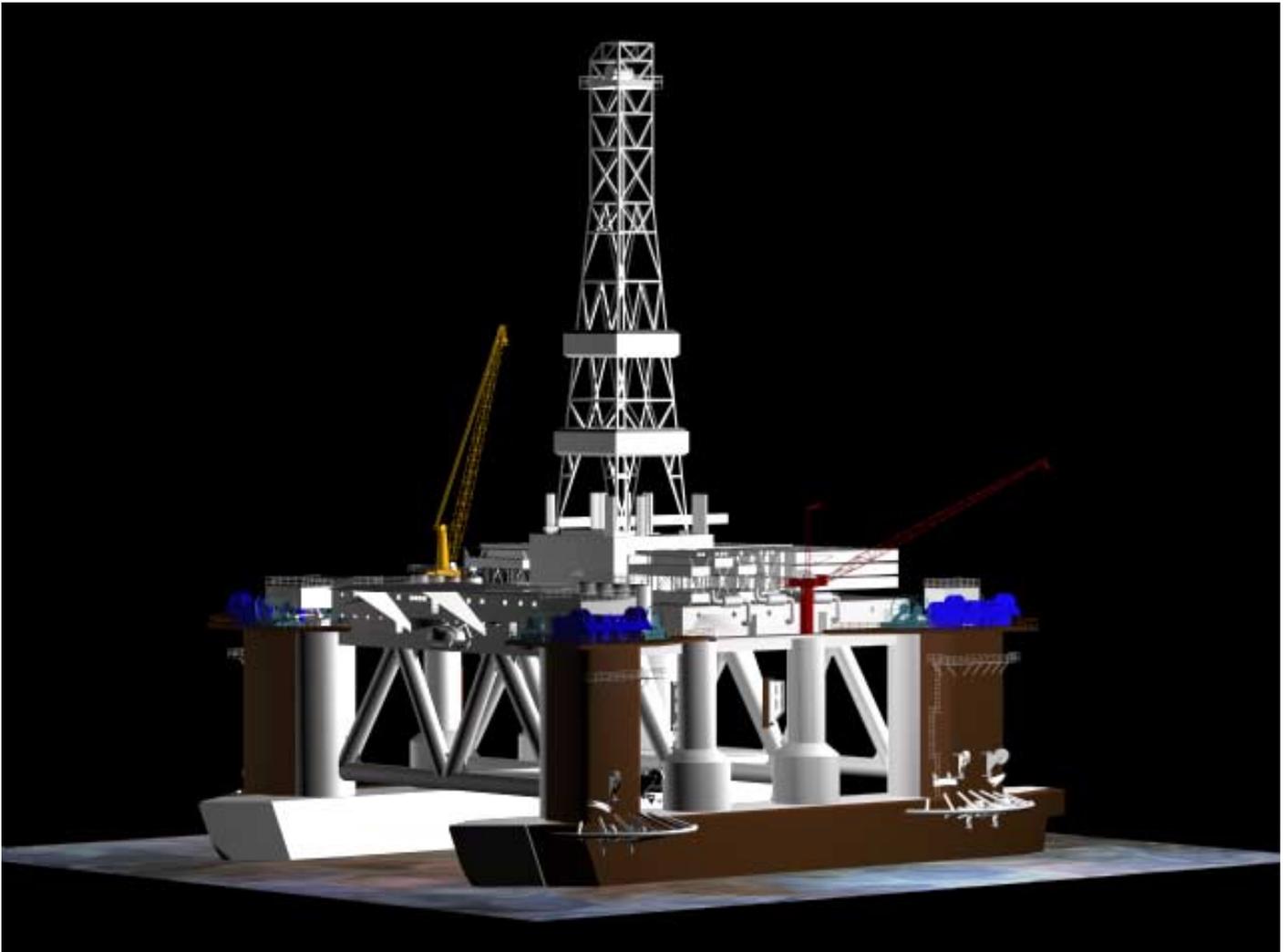
# 3D Animation of Oil Rig Repairs

*OFFSHORE OIL RIG UNDERGOING MAJOR UPGRADE  
ENHANCEMENT PROGRAM IN SINGAPORE GETS AN  
ANIMATED PREVIEW OF THE CONSTRUCTION PROCESS.*

Singapore Shipyard

• Replace all chain

• Adding a riser



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## Project General Description

A New Era class semisubmersible mobile offshore drilling unit to undergo a enhancement upgrade in a local

which includes:

- Increasing the afloat VDL capabilities
- Adding outboard pontoon sponsons to achieve adequate buoyancy.
- Adding column sponsons to achieve adequate stability.

and mooring system and addition of wire traction winches and take-up spools.

- Increasing the riser and pipe rack deck areas.

handling gantry crane.

- Increasing the mud-pit capacity with new installation of shale shaker and mud pumps.
- Adding riser tensioner at drill floor.



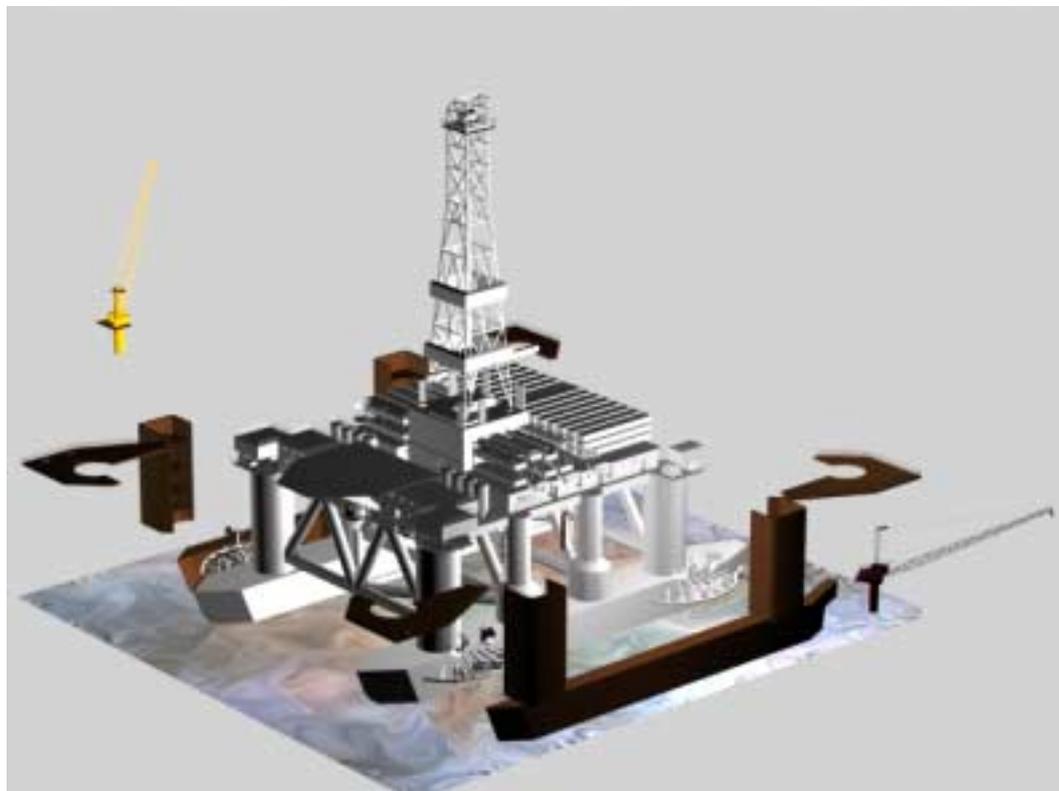
The Semi-Submersible Oil Rig's Owner and Superintendent like to know what its

drawings which basically includes orthographic drawings and technical

machineries and steel sheets as they are being cropped and installed.

Project Manager of the Shipyard.

Safety is also a major consideration in line with various hot work permits and safe-to-enter enclosed spaces.



main contractor is up to. As always, scheduled project updates are built into its contract agreements during the sales and project pursuit processes. EXACO's Marine Engineers took that to greater heights and included a 3-dimensional fully rendered and animated entire view of the semi-submersible oil rig enhancement process before she even arrives in Singapore water.

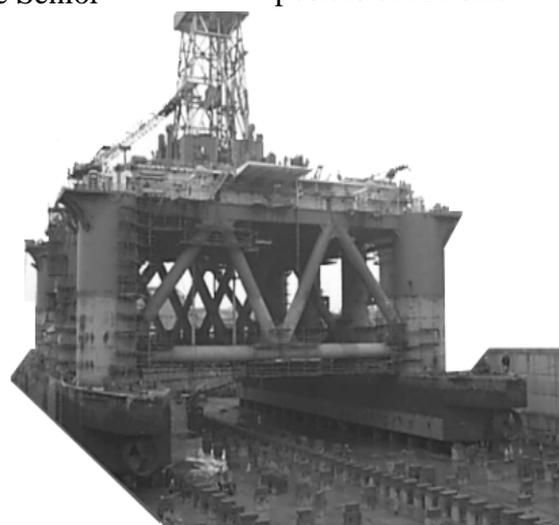
specifications in 2 thick volumes from Owner's appointed Naval Architect, this Owner wanted to know how the construction and repairs would proceed. "Major customers particularly for large projects like to see that you have all things well planned out. They want you to prove to them that you've thought through the complexities of such projects, that you know how your teams are organized, where the interfaces are between various components,

And they want you to convince their team (typically Superintendent, Rig's Captain, Drill team and Engineers) that you are going to deliver in timely, accurate manner and that you will meet the requirements that have been laid out in the specification." Says the Senior

A suitably co-ordinated and well explained demonstration to outline the voluminous project specification and each item on the schedule is tasked to EXACO to show how different components of the project will be integrated.

To satisfy this requirement for this 8-month enhancement in one of the major shipyard here, the most efficient and effective way to achieve this would be to simulate the enhancement project process visually with 2 sections. First section includes posters of A1-size

Though the design and construction



**To demonstrate the installation of major structures, | designers generated more than 30 animations and walk-through project development schedule to actual engineering mode**

full coloured render drawings positioned at various departments of the shipyard so that each knows the complete work scope and to facilitate each other during the construction.

Second section would be to simulate the enhancement process visually with 3D models and onto \*.avi graphic files that can be suitably displayed on any multimedia PC.

To this end, EXACO, as a subcontractor to the shipyard (which was commissioned to develop the various

structures along with repairs for the semi-submersible oil rig), developed new software programs, 3D models, Animation and Quality Control database specifically for this project.

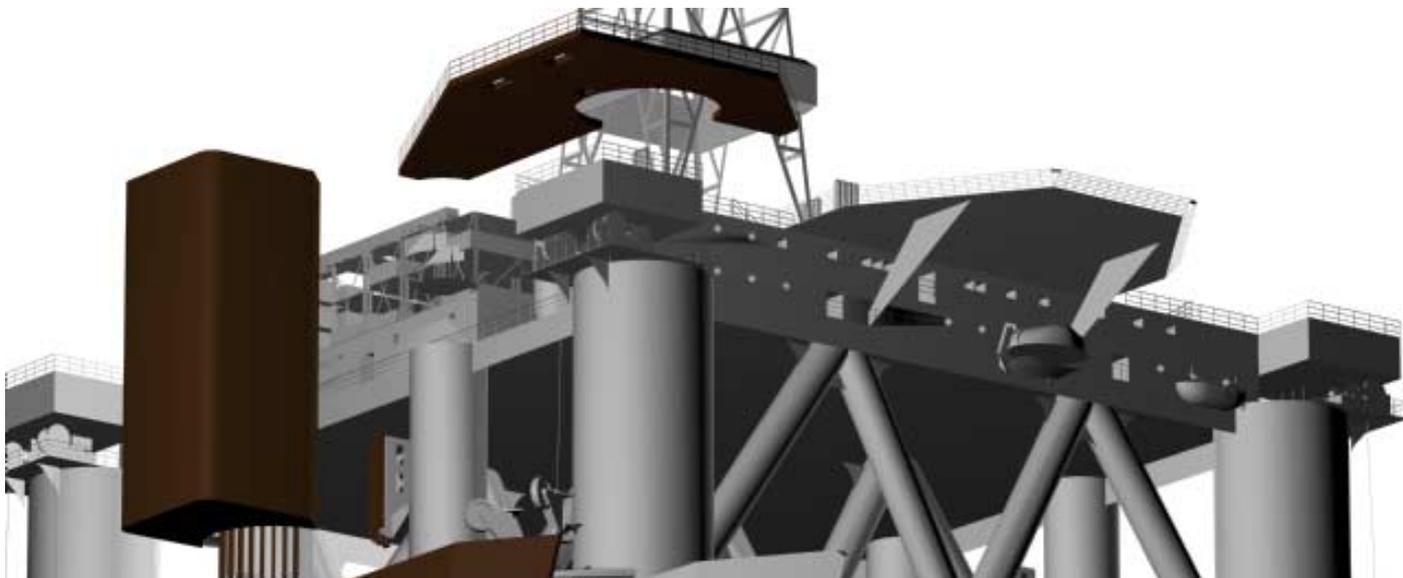
The successful effort enabled the EXACO team to generate more than 30 sequences depicting such scenarios as dock preparation, sponson blocks fabrication, column blisters pre-fabrication, equipment delivery and installation, structural development, and the placement of piping, pipe rack, gantry

crane, new shale shakers, mud pump equipment and electrical equipment.

EXACO highlighted: "We used a 7 days window, so everytime a frame advanced, it would advance 7 days including Saturday and Sunday, this let you see what the Oil Rig with the construction looks like on those days. You see the sponson going in, all the structural steel going up, major steel platforms and crane pedestals being installed, and so forth."

The link of 3D

model and animation to the scheduling program is the most critical component to the success of these simulations. We are taking the 3D files and adjusting the data with the shipyard resources to show views of the oil rig during various times over the life of the construction and installation project. Linking the model to the gantt chart schedule gives it credibility. The marketing people loves it, it let's them say, "Here is the actual sequence of your project during her stay at our yard, and here are the various durations of



**A model of the semisubmersible drill rig from the underside to reveal the truss columns and webs repairs.**



each of the construction activities.” This kind of information, backed by the actual schedule, with assigned resources, gives meaning to the visualization.

Let’s not forget the Classification Societies which similarly is able to advice concerned parties critical areas upon review of the animation and fly-through of the finished structure.

These 3D models are ‘intelligent,’ able to provide relevant engineering information behind them which includes weld seams, centre-of-gravity and space volume. We were able to use these 3D models along with the software to show how all that information, all the pieces, would actually fit together to get to the end finished project.

Beyond its value as presentation medium, the simulation capability has also proven to be value internally as a point-of-sale tool for the marketing and engineering department, externally for owners to incorporate onto

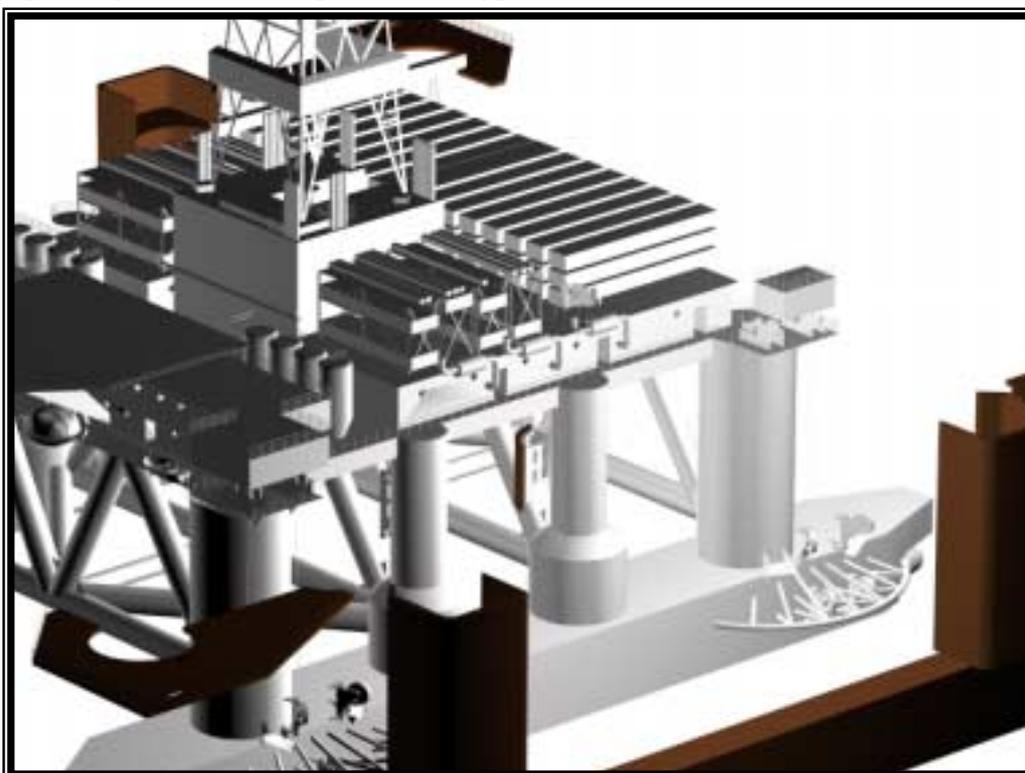
their technical specification.

EXACO notes that the creation of the 3D simulation itself was not much of a departure from standard drawings and drafting procedure, this really is a normal course of evolution of the design process. We take all the individual files and bring them together to look for interferences and dependents, things that don’t line up properly or structures that need to follow specific process (eg: blasting, priming,

and time phasing how each of these structure and machinery (whether structural, mechanical, or electrical) would go together in sequence.

Being able to do this validates (or invalidates) the project schedule in line with actual progress. Visualization the animation sequence puts the enhancement project schedule into a clearer perspective for the clients. “This is certainly a new way for the shipyard to present this type

particularly this project involved 300 plus activities. To some steel fitting chargehands, engineering supervisors and formen, the gantt chart is just a bunch of lines,” admits a Repair Manager. The 3D posters and simulation made it simple to understand. All you had to do was sit there and watch a movie, you could see how it was going to look. Any one of your project team could stop it any point in the project progress and say, “ Hey, we could check this



painting and touch-ups). The real experienced Project Manager is able to take these individual 3D computer files

of information. There are few among them who really understood how the gantt chart schedule was put together,

area/tanks etc on Sept 25. Safety officer please note and standby ... etc. It is very effective in that way.”

But actual job site and project progress does'nt always meet. No one expects the see exactly what was demonstrated months ago since project schedules are dynamic, they change as the conditions change, and conditions

**Each phase of the enhancement process, from pre-fabrication to fit-ups and structural installation, is represented in the construction simulation for the project team and their sub-contractors.**

always change.

Because of this, the simulation will be dynamic as well. EXACO has demonstrated visually the ongoing status of the project, particularly when there's a conflict where one piece of equipment testing was overlooked.

Achieving this is fairly straightforward since the software has the ability to generate “what-if” scenarios.

Problems and Challenges faced.

One of the biggest challenge was structuring the 3D files to effectively string onto the animation and project schedule. When EXACO first started this project, too much detailing was included which really do not contribute effectively in overall speed of the animation and validation of the schedule tasks. EXACO now has since picked up pointers for smoother interface and model

the

3D models a little bit differently.

Future:

Future projects there definitely will be as PCs/mini computers are getting faster and multimedia is now a buzzword.

Project media submitted by EXACO is via CDROM and can be viewed with any PC with Windows operating system.

Shipowners, Rig Owners are now familiar with this

technology and we anticipate this form of virtual reality presentation for Marine Vessel new building or repairs may be very soon be an industry-standard tool.

Benefits/Productivity Gained

This project has been the most effective way of achieving consensus among the shipyard's Shipwright / Engineering / Hull

Construction / QC / Piping and Mould Loft departments.

The animation improved understanding of customer's Superintendent to yard's capability and enables all to thoroughly examine the project from the beginning.

While quantifying the Productivity and Cost Saving in this project was not tabulated (nor computed), this idea of 3D animation and A1-size posters from the beginning of this project has already shown tremendous promise with all assigned personnels (from Overall Project

Manager to Supervisor) acknowledged that this was by far the first time they could “see” a large Marine project being handled. They now better know their task in answering the where, when, what, who and how, from visual animation and 3D graphics.

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Project No 570/98**

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