

Jadel Limited

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3D Model Reviews - Documentation

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Introduction

During the details engineering of Oil and Gas Offshore Project it will be organize as minimum three official 3D Reviews called “**3D Project Review**”. These reviews are mandatories and generally contractual in between the Client and the Contractor. These reviews are:

- 30% of 3D Model Project Completion,
- 60% of 3D Model Project Completion,
- 90% of 3D Model Project Completion

These three reviews must be clearly define in the 3D Procedure of your Project and describe what will be review during each of them.

In order to be able to review the 3D Model you must use a specific software. The most efficient, powerful and useful software for this exercise is the software Navisworks from Autodesk; because:

- Native application to make graphic and/or text comments,
- Can easily extract the comments making a HTML report with pictures,
- Can easily share the comments with all of your engineers via your server or Intranet,

- Can easily do a Close Out,
- Automatically updated after each new version of the Navisworks you will have,
- Compatible with all industrial 3D software like PDMS, PDS, Smart Plan 3D,
- Can use with free licence for review by all of your engineers after the comments already made (free licence does not allow to make the comments),

Generally, on your project you have a 3D Coordinator to help the project to review the 3D Model. What are the competencies your 3D Coordinator should to have to review a 3D Model:

- Perfect expertise of the 3D Model and 3D Software,
- Good multi-disciplines knowledge including experience of field operation,
- Experience in Engineering and Construction,
- Fluent on the language of the contract,
- Able to manage, supervise, anticipate,
- Fast, do not spend hours for make comments (contractual or official 3D model reviews are not the place to find a solution but make comments),
- Very good overall project view.

Warning

As you probably know comments must be make during the 3D model reviews in order to avoid as maximum as possible to make comments during the Construction.

If you do no review nicely the 3D model you will have problems during the Construction, delay your sail away, financial impact for the Contractor and for the Company.

It is unacceptable to have a progressive number of comments between the 60% and 90% 3D model reviews. The number of comments must be digressive and if it is not, it is probably because you did not make a good review during the 60% or you was not at 60% and you may affect the Construction.

You can consider as a normal number of comments for all reviews as follow:

- 30% 3D Model Review → around 25% comments,
- 60% 3D Model Review → around 60% comments,
- 90% 3D Model Review → around 15% comments.

Do not forget that probably 95% of the Construction Shop Drawings will be extract from your 3D model. Your 3D Model finally must be As-Built and probably used by your Operation Team.

A good review help the Construction!

Who is Jadel Limited

Jadel Limited is a company created in 2007 in UK. The meaning of my company's name is **Jacques Francois Daubian Engineering Leader Limited**.

Specialist of Offshore Projects with 32 years of experience I participated to many projects always working in/or using the 3D Model. I am multi-disciplines engineer with a background of Mechanical Engineer and with strong knowledge in Piping, Layout and Mechanical Handling and also know very well all other disciplines as Construction, Commissioning, E&I, HVAC, Mechanical, Structure and Telecom.

Writer of two technical books published in UK in 2017:

- The New 3D Layout for Oil & Gas Offshore Projects – How to ensure success,
 - 3D Model Reviews Using Navisworks for Oil & Gas Offshore Projects – Best practice.
-
- **I developed the 3D PDS Master Databases of Elf Aquitaine Production** (before Total) for all of contractors,
 - **I helped Technip Geoproduction** (before Technip FMC) during their first 3D Offshore Project in Paris La Defense,
 - **I manage the full 3D including the Databases for the first FPSO GIRASSOL,**
 - **I developed the Piping Offshore Supports for Technip Paris in PDS,**
 - **Participate to the engineering of 17 Platforms, 2 LQ, 3 FPSO, 1 CPF, 1 FPU,**
 - **Participate to the construction of 2 Platforms, 1 LQ, 1 FPSO, 1 CPF, 1 FPU,**
 - Site survey for **TOTAL** in Singapore to review the Packages with comments made using video camera, 3D model and pictures,
 - **I developed the procedure for site survey using Navisworks on site with specific tools in order to review the discrepancies in between the Engineering and Construction for INPEX on the ICHTHYS CPF Project and made more than 5 000 comments.**

Always participated to the 3D Reviews for all of the projects but in particular:

- **PAZFLOR FPSO; TOTAL Project → 18 000 comments** during the 90% 3D PDMS Review with the Contractor **DSME** in South Korea,
- **BONKGOT; PTTEP/TOTAL Project → 6 000 comments** during the internal 3D PDMS Reviews with Contractor **HHI** in South Korea,
- **ICHTYS CPF Topside; INPEX/TOTAL Project → more than 27 000 comments** during the 90% 3D PDMS Reviews (**open and closed in 11 months with specific procedure I wrote**) with the Contractor **SHI** in South Korea.

Multi-disciplines, I am:

- **Lead Piping Engineer,**
- **Lead Mechanical Handling Engineer,**
- **Lead Layout Engineer,**
- **Specialist of 3D Software.**

Clients Reference

- 2018



- BP USA - Project MAD DOG Phase II – 3D Model Coordinator,

- 2017 to 2018



- Samsung Heavy Industry – Project MAD DOG Phase II – Layout Manager,

- 2013 to 2017



-  Ichthys Project INPEX Corporation Japan – Project ICH'THYS CPF – Lead Piping & Layout Engineer,

- 2011 to 2013



- Total Exploration and Production Myanmar – Project YADANA - Lead Mechanical and Piping Engineer (PVV),

- 2009 to 2011



- PTT Exploration and Production – Project BONGKOT – PDMS Coordinator,

- 2007 to 2009



- Worley Parsons Kazakhstan - Projects UNIT 800 & TCO SEP – Principal Piping Engineer,

- 2006 to 2007



- Bechtel UK, London – Project PIC Kuwait – Lead Piping Designer,

- 1987-2006



- Sofresid Engineering & Technip FMC Paris – Many Projects – as PDS Administrator, PDS Coordinators, Lead Piping Engineer,

What are the advantage to work with Jadel Limited – Professional Review

I will provide to you a professional review and will review all disciplines making comments, pictures, explanation for each comments, report in excel file and XML file used to import all the comments in your Navisworks file.

I will provide to you the procedure how you should work with these comments until the Close out.

I will provide to you my feedback for a general overview of your 3D model and I will be able to show to you the disciplines where you have the major problems and where your engineer(s) need to be more attentive.

I will not just make the comment saying you need to modify because the layout or design is wrong. I will explain using the graphic and description why is wrong, what you need to do and how you need to modify. **I will provide the resolution of the problems when it is possible.**

What are the advantage to work with Jadel Limited – Respect the Schedule

Schedule depends of the size of your project. You consider for “standard platform” around 45m x 45m with 3 decks: Lower, Main and Upper a complete review is around 4 to 8 weeks and for a PFSO review is around 10 to 20 weeks; working 6 days by week and 9 hours by day.

You will receive a weekly progress of the comments I will make with all necessary documents. You will be able to start the modification before the end of my review.

What are the advantage to work with Jadel Limited – Less expensive for your Project(s)

You send to me the Navisworks file from your project using Internet FTP I work from my place and will send back every week the progress. (Using Google Drive is a perfect solution).

I do not need a place in your office, accommodation, flights, etc.

You do not need to mobilize all of your engineers during the official review and the 4 weeks or more necessary they can do other part of their jobs,

What are the advantage to work with Jadel Limited – Test me

You do not believe I am able, alone, to review your project.

Test me,

Send me a module or part of your project I will make 50 comments maximum for example to show to you the problems you have.

You can do the same exercise with your engineers without showing to them my comments and compare to see the quality, pertinence and professionalism.

Procedure – 3D Project Review Using Navisworks

Navisworks is the most powerful software actually on the market to review and make comments on the 3D Model. Many Engineering or Contractors used already Navisworks including the Major Oil & Gas Companies. Navisworks is easy to learn, easy to use, easy to manage for make the comments, close the comments and keep the history.

The version of Navisworks will depend of the review you want and the version you are using. Actually two versions of Navisworks are available:

- Navisworks Simulate,
- Navisworks Manage.

With Navisworks Manage, I am able to run a clash check of your project. The version you want will be define by you in the Scope of Work.

Procedure – What will be review

Depending the Scope of Work requested the review: by disciplines will be about that you can see below:

- **E&I:**
 - Cable Ladder routing,
 - Cable Tray routing,
 - MCTs,
 - Supports of Cable Ladder and Trays,
 - Tubing Tray routing,
 - Support of Tubing Tray,
 - JB's location Accessibility/Maintenance,
 - Operation route,
 - Lighting,
 - Air Instrument Manifold location and Accessibility,
 - Power Socket location and Accessibility,
 - Technical Rooms and arrangement in the False Floor(s),
 - Structure for supports and equipment,
 - Etc.
- **HVAC:**
 - Tie-in point for equipment like Pumps, Air Handling Unit, Chillers, etc.
 - Ducting routing,
 - Ducting Supports,
 - Accessibility/Maintenance of component in line like Silencer, Damper, Fire Damper, etc.

- Operation route,
- Structure where the supports are attached,
- Etc.
- **Mechanical:**
 - Tie-ins points of all equipment following the Vendor Drawings,
 - Structure supporting all of the equipment,
 - Mechanical Handling if clashing with something,
 - Drain of Skid Equipment,
 - Operation route,
 - Etc.
- **Piping:**
 - Routing,
 - Accessibility/Maintenance of the piping and instrument valves,
 - Accessibility/Maintenance of instrument in line,
 - Piping penetration,
 - Operation route,
 - Location Accessibility/Maintenance of Utility Station,
 - Valve handling if clashing with something,
 - Supports,
 - Deck structure for the piping supports,
 - Etc.
- **Safety:**
 - Primary/Secondary Access Ways,
 - Location Accessibility/Maintenance of Safety Equipment in particular Hydrants, Hose Cabinets, Extinguishers, Safety Showers,
 - Inergen system if any,
 - Fire and Gas system location Accessibility/Maintenance,
 - Etc.
- **Structure:**
 - Monorail(s), Padeye(s) if clash with other disciplines,
 - Drain boxes location Accessibility/Maintenance,
 - Deck structure linked with any load,
 - Reinforcement on the deck if necessary (like trimmers or carling),
 - Bunding arrangement around equipment if necessary,
 - Etc.
- **Telecom:**
 - Location Accessibility/Maintenance of equipment,
 - Location of Camera Accessibility/Maintenance,
 - Location of Personal Localisation System (PLS),
 - Etc.

Procedure – How it will be review

I will review from my place and will not be to your office and using Internet FTP or Share Point to Upload/Download the documents.

Depending your project and your priority can be review by Decks, Modules or Areas.

Procedure – Necessary documents for an efficient 3D review

As a minimum, I will need the documents below:

- Piping and Layout philosophy,
- PIDs
- Standard support E&I, HVAC, Piping,
- Lighting calculation,
- Equipment layout,
- Mechanical handling report,
- Valve handling report is available,
- Equipment and package vendor drawing arrangement,
- Information concerning the structure deck, thickness of the decks, type of grating, load capacity,
- HFE specification(s) if any,
- Safety philosophy,
- Etc.

Procedure – Other specific 3D reviews

It is possible to have the review below using the same system. Some reviews can be add to the general 3D review but will request more time and other documents:

- **PIDs compare to the 3D model Line by Line.** Cannot be done at 40/45% you need to do this review around 80% progress of the 3D model and the time is identical as a 3D project review between 4 to 20 weeks,
- **Piping Stress Analysis result compare to the 3D model,** supports location and type with guide, stopper, etc. Can be done any time your Stress Analysis is ready and time depend of the number of the critical piping lines you have to review,
- **HFE review,** using your HFE specification,
- **Field Operation review,** maintainability, accessibility, mechanical handling,
- **Constructability review,** interface between modules, loose items, etc.
- **Vendor drawings review,** using your last vendor drawings available.

Procedure – When must be review

The best pre-review must be done before your official 60% Model Review and receive all comments 3 weeks before you start this official review. Otherwise depending of your request I can make a pre-review before all of your official reviews if you think it is necessary.

By experience a good review before the 60% avoid many problems and give a guideline for what you are waiting in your 3D Model.

Procedure – Cannot be done during the 3D reviews


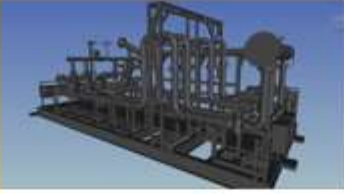

Some part of the Engineering disciplines cannot be review during the 3D Model Review and generally concerning:

- **E&I:**
 - Cable Schedule, these information are not in the 3D model,
- **Process:**
 - Process is never review during the 3D Model other than comment to check with process if modification is possible. Can be review with check Line by Line,
- **Structure:**
 - Primary structure, must be review with detail drawings and calculation notes,
 - Secondary structure, must be review with detail drawings and calculation notes,
- **Weight Control**
 - Weight Control is never review during the 3D Model other than request a weight to check the deck load capacity or the COG of equipment/valves for mechanical/valve handling.

For the reviews you need your engineers and it will be a specific 3D reviews.

During the 3D Model Review, I can make comment to check or confirm something concerning these points but cannot request a modification without agreement of your specialist engineers.

Type of Reviews

General 3D Model Review	Vendor General Arrangement Drawings vs 3D Model	PIDs yellow markup using the 3D Model
		
<p><u>Pre-requisition:</u></p> <ul style="list-style-type: none"> • Basis of design, • Client's Specification(s). 	<p><u>Pre-requisition:</u></p> <ul style="list-style-type: none"> • Vendor GA Drawings Issued For Construction (IFC). 	<p><u>Pre-requisition:</u></p> <ul style="list-style-type: none"> • PIDs Issued For Construction (IFC). • ..
<p><u>During Review:</u></p> <ul style="list-style-type: none"> • All Disciplines, • Saved Viewpoints, • XML File, • Excel File. • .. • .. 	<p><u>During Review:</u></p> <ul style="list-style-type: none"> • All Disciplines, • Tags, • Overall Dimensions, • Tie-ins, • XML File, • Excel File. 	<p><u>During Review:</u></p> <ul style="list-style-type: none"> • Line sequences, • Tags • Components, • Slope and No Pocket, • XML File, • Excel File.
<p><u>Duration:</u></p> <ul style="list-style-type: none"> • 4 to 10 weeks. 	<p><u>Duration:</u></p> <ul style="list-style-type: none"> • 2 to 6 weeks. 	<p><u>Duration:</u></p> <ul style="list-style-type: none"> • 3 to 10 weeks.
<p><u>Transmission:</u></p> <ul style="list-style-type: none"> • Weekly Basis, • XML File, • Excel File, • Share Point. 	<p><u>Transmission:</u></p> <ul style="list-style-type: none"> • Weekly Basis, • XML File, • Excel File, • Share Point. 	<p><u>Transmission:</u></p> <ul style="list-style-type: none"> • Weekly Basis, • XML File, • Excel File, • Share Point.
<p><u>Software & Cost:</u></p> <ul style="list-style-type: none"> • Navisworks V. (a), • Excel V. (a), • Cost with quotation 	<p><u>Software & Cost:</u></p> <ul style="list-style-type: none"> • Navisworks V. (a), • Excel V. (a), • Cost with quotation 	<p><u>Software & Cost:</u></p> <ul style="list-style-type: none"> • Navisworks V. (a), • Excel V. (a), • Cost with quotation.

Contact

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I like to say that I am an “Artisan” multi-disciplines and expert of the 3D Model Reviews doing well his job.

Do not hesitate to contact me if you need more information

Thank you for your time

Jacques Francois Daubian