차세대 한국형 조선 CAD 시스템

TTM(Timetec Marine)

㈜ 타임텍

김승석 상무

차세대?

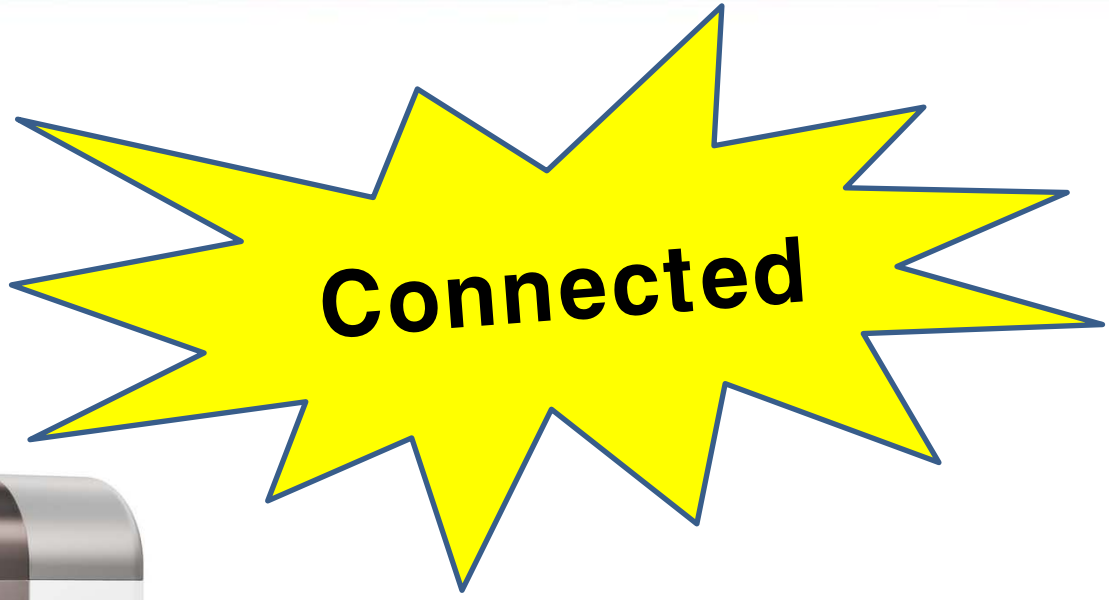
- Lean Construction
- JIT
- Connected

제조 혁신?

- Industry 4.0
- Smart Factory

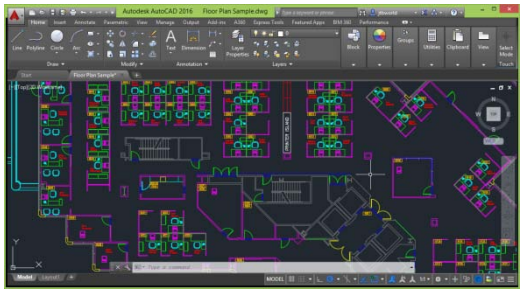
TIA (Totally Integrated Automation)

3D 프린팅?

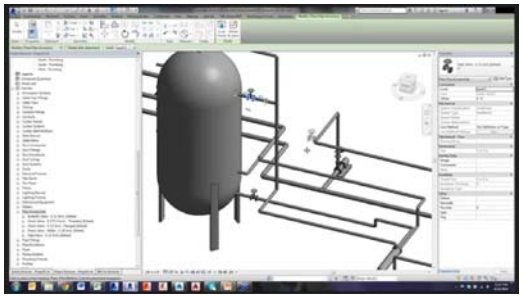


현실?

2D CAD

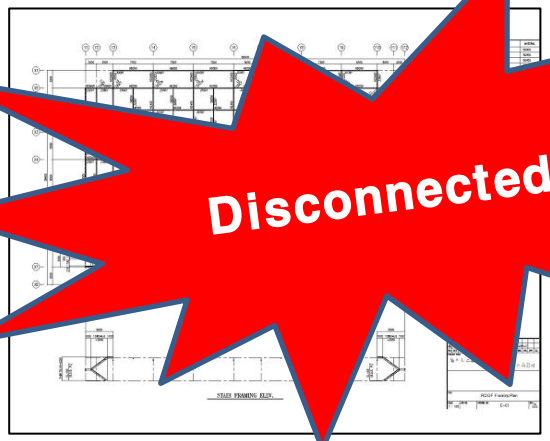


3D CAD



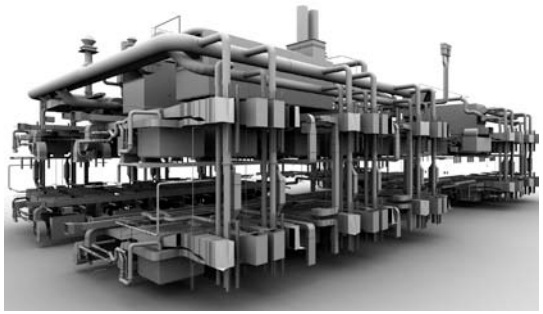
출력

도면



배포

제품화



조선소 현실

Disconnected

기본설계 | 상세설계 | 생산설계 | 생산부

2D 기본도 + 견적서

사도

2D 상세도

사도

생산정보

3D 생산 Model

선박제작

사도

도면제작

NC Data

도면

바람직한 조선소

Connected

기본설계 | 상세설계 | 생산설계 | 생산부

개념설계 | 상세설계 | 생산정보 | 작업상황

3D 기본 모델 → 3D 상세 모델 → 3D 생산 모델 → 3D View 모델

추출

- 견적서
- 승인도
  - 발주물량
- 중일정 계획

선박제작

Connected CAD System

기본설계 | 상세설계 | 생산설계 | 생산부

T* CAD

3D 생산 모델 → 3D View 모델

A* CAD

3D 상세 모델 → 3D 생산 모델 → 3D View 모델

Timetec TTM CAD

3D 기본 모델 → 3D 상세 모델 → 3D 생산 모델 → 3D View 모델

TTM CAD → Connected

기본설계 | 상세설계 | 생산설계 | 생산부

3D 기본 모델 → 3D 상세 모델 → 3D 생산 모델 → 3D View 모델

ISD

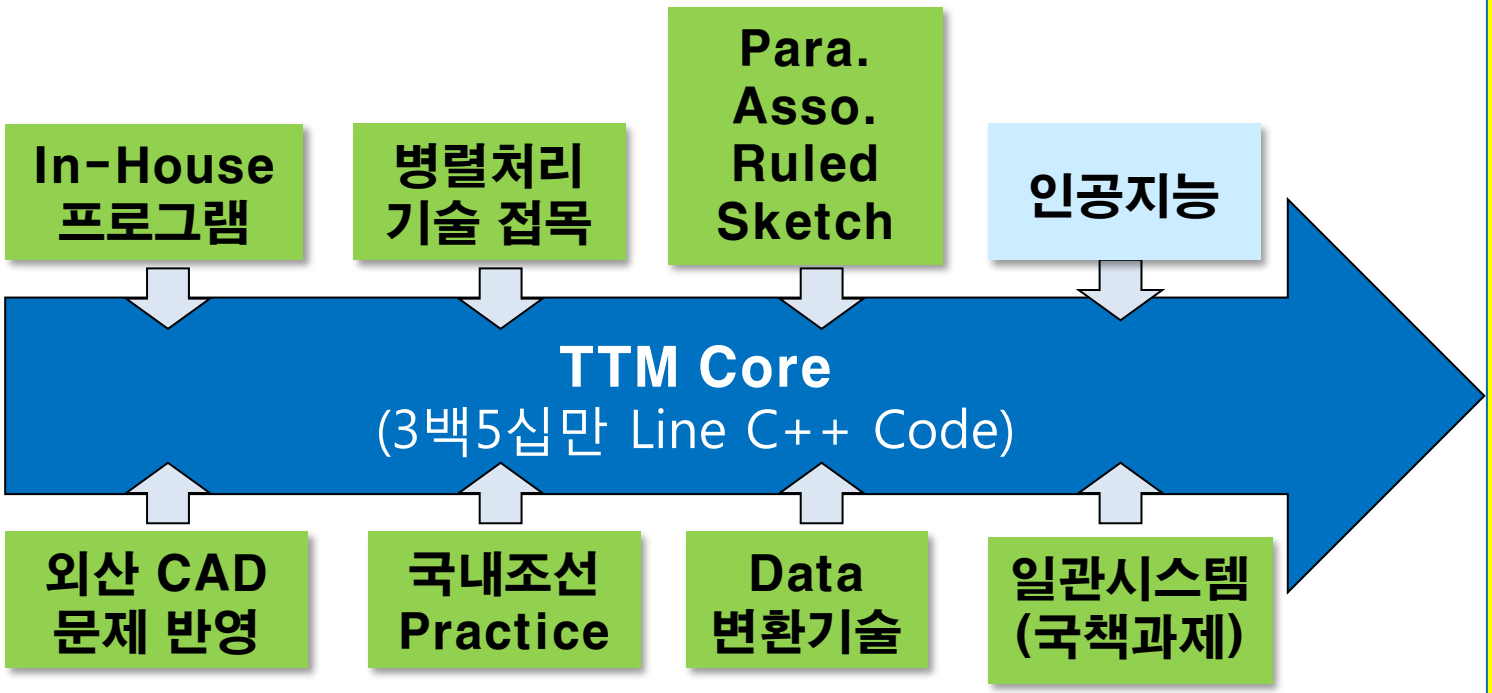
HPD

IOD

PIPE/STRUC/CABLE /VENT

VIEW

TTM 방향

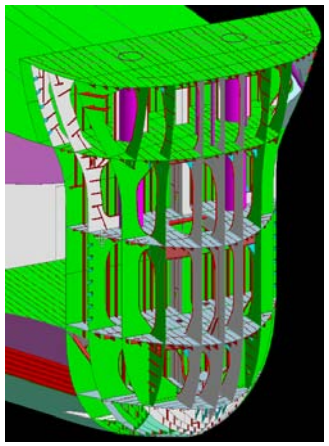


Connected 3D CAD System

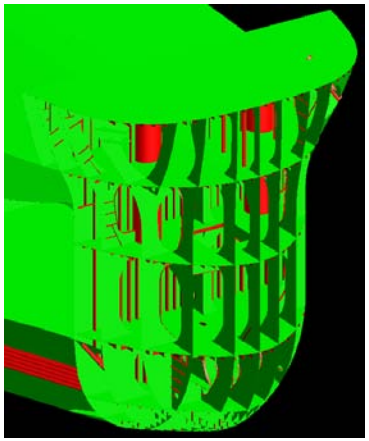
CAD Data 변환

TTM 변환기

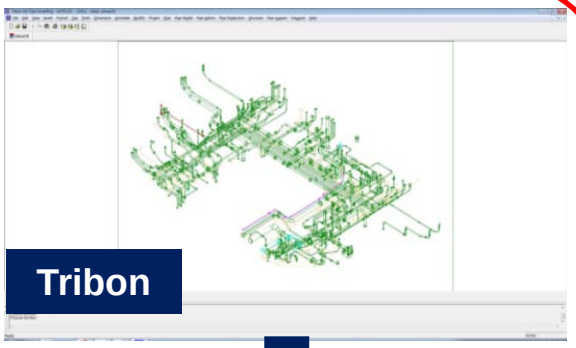
SM3D/S3D ⇄ AM/PDMS

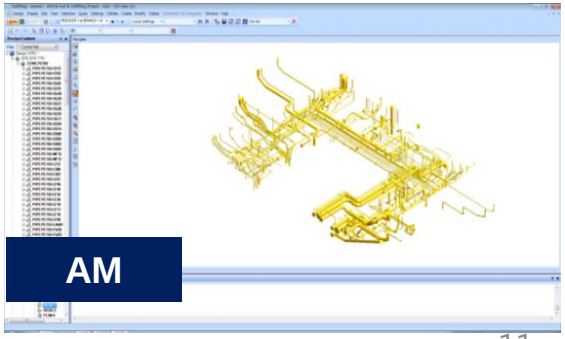


TTM



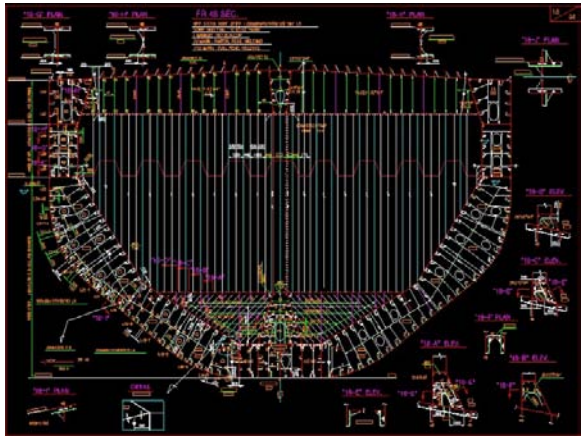
AM/TRIBON





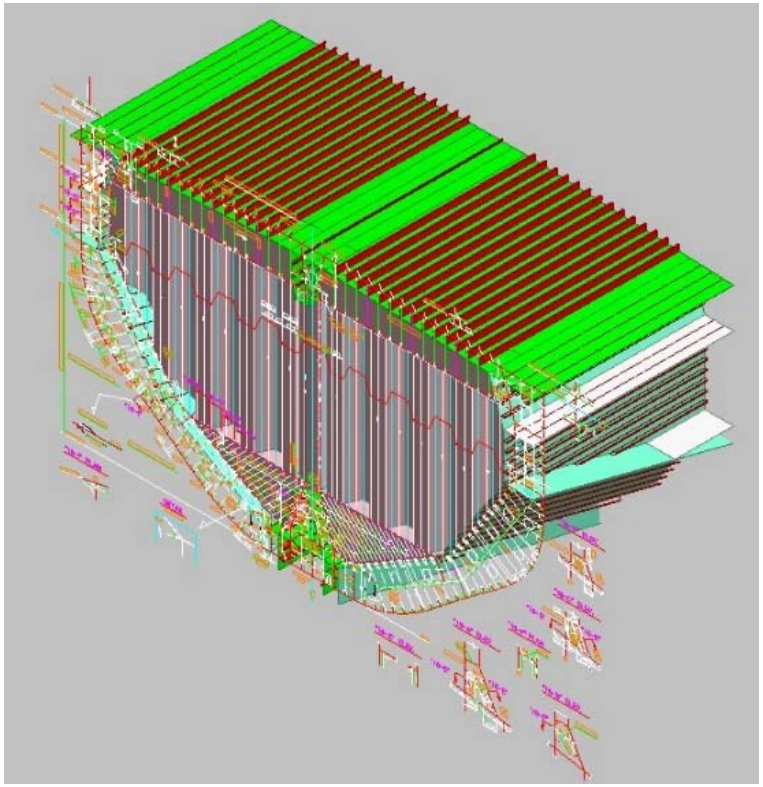
Sketch 기반 모델링

AutoCAD 도면



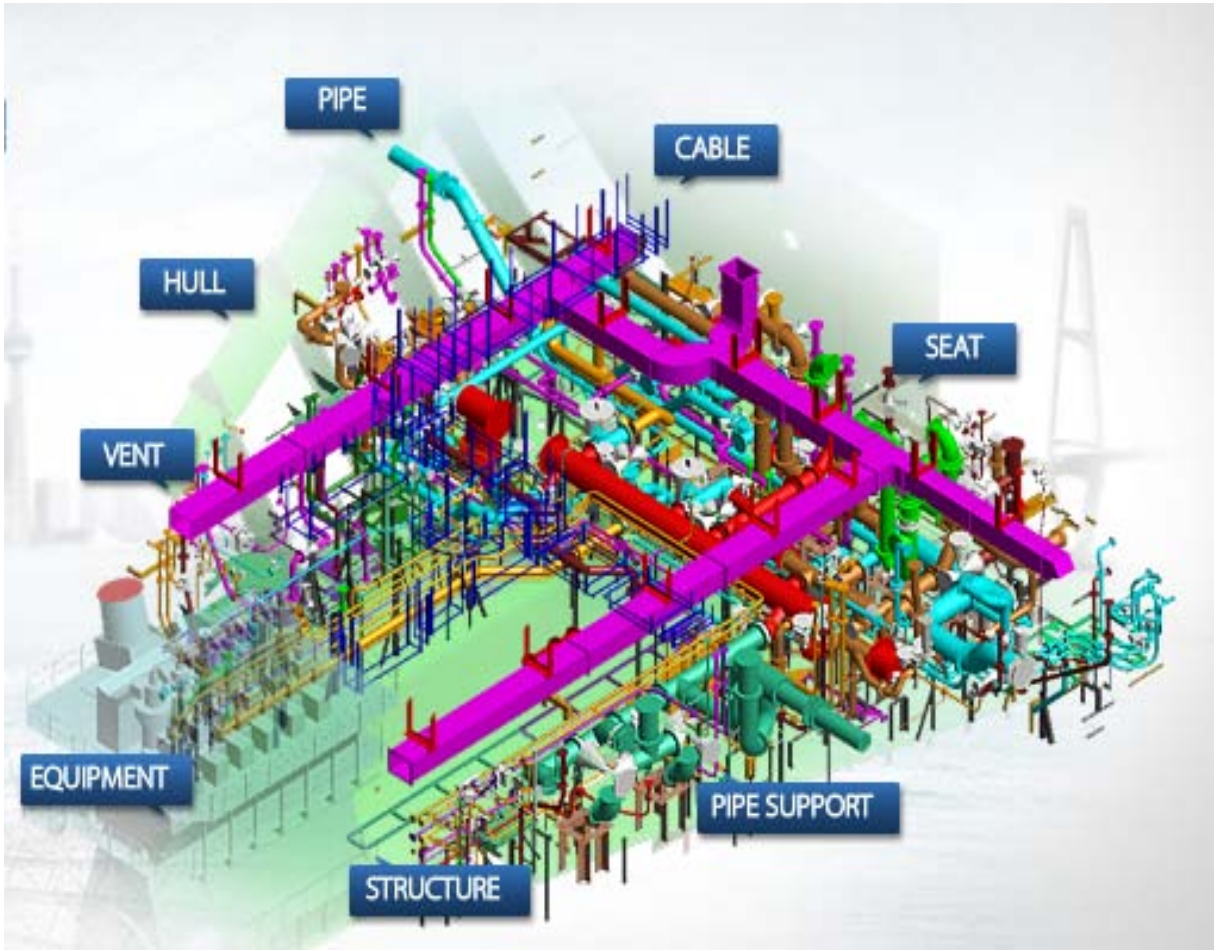
Import

3D Model 환경



2D Section 도면활용 3D Modeling

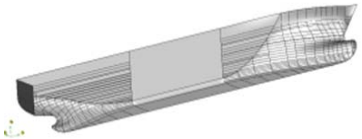
TTM 철학



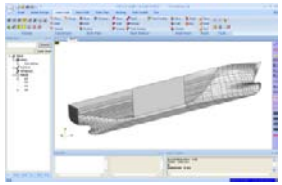
- **AEC CAD**
  - ✓ 조선/플랜트
  - ✓ 원자력/건설
- **국산 CAD**
  - ✓ 자체 Kernel
  - ✓ Parametric
  - ✓ Associative
  - ✓ Sketch driven
  - ✓ Ruled driven
- **Easy CAD**
  - ✓ 일관 시스템
  - ✓ 빠른 속도
  - ✓ 즉시 사용
  - ✓ 편집 설계

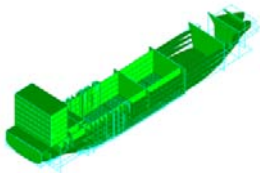
TTM ISD/HPD

외부 Surface



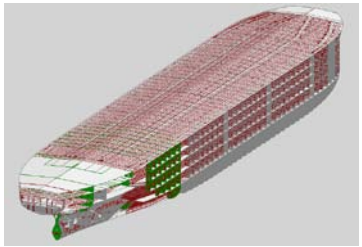
ISD



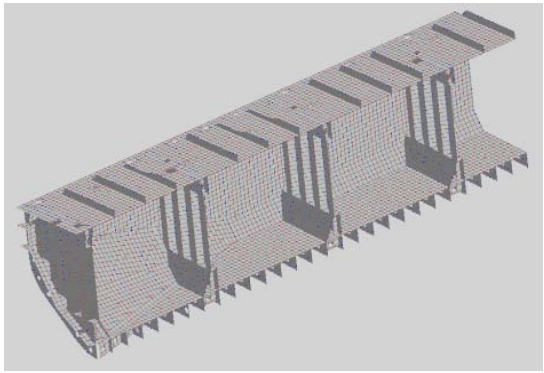


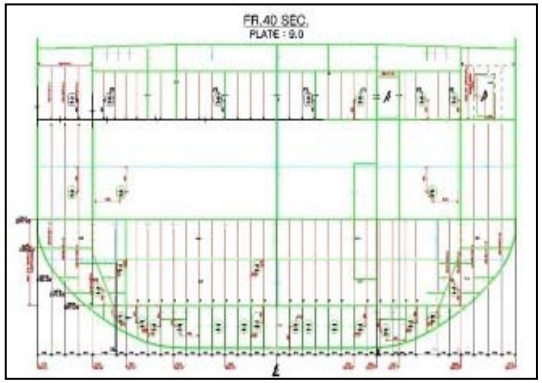
Surface + Compartment

ISD Model



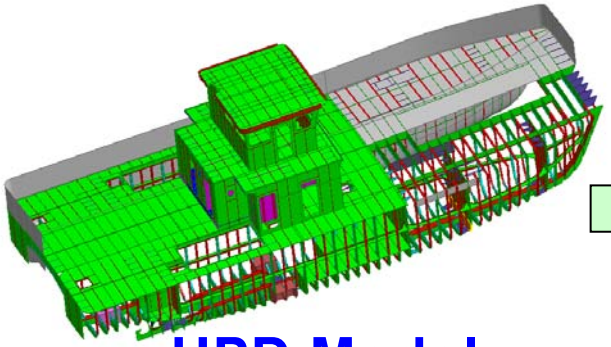
FEM



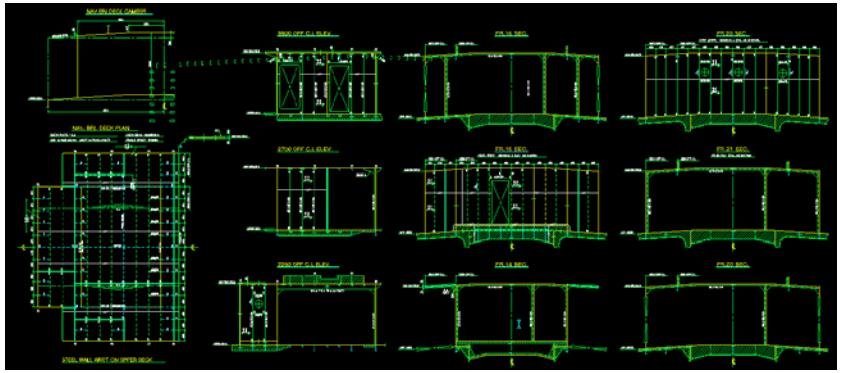


Connected

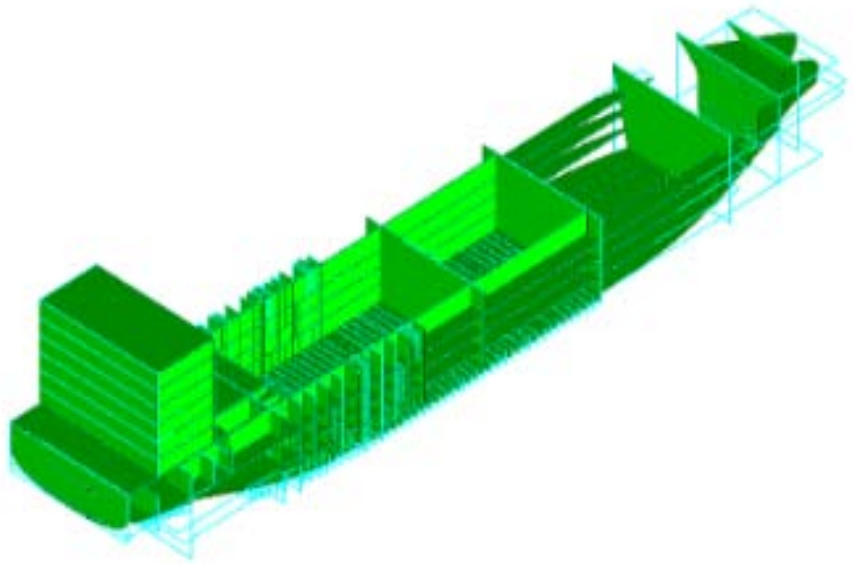
HPD



HPD Model



TTM IOD



Compartment 분할 작업

TANK 용량 검증
-Compartment 검증/수정

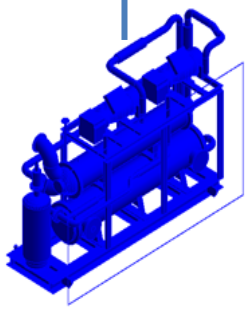
2D 기반 MA 작업
- 2D ←→3D 양방향 수정)

Auto Routing
- P&ID 연계 Auto Routing
- Ruled Support

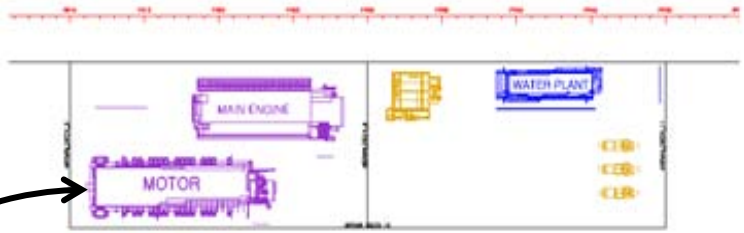
정확하고 빠른 견적 산출

2D 기반 MA 작업

Symbol 형상

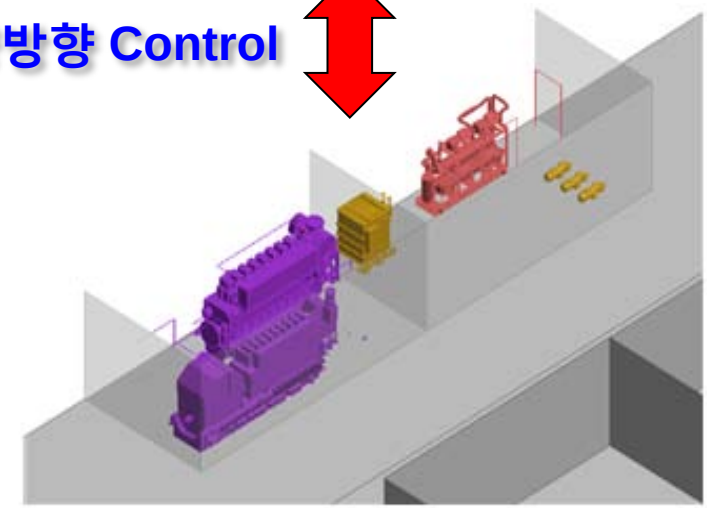


3D Equipment



2D PLAN 작업

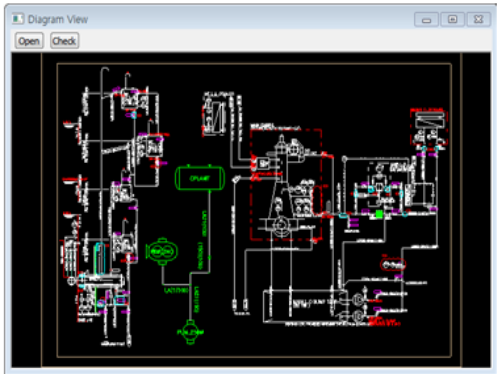
양방향 Control



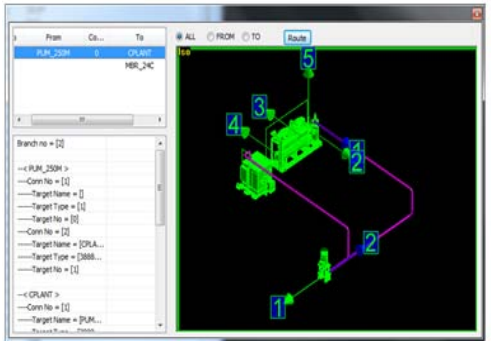
3D Model

16

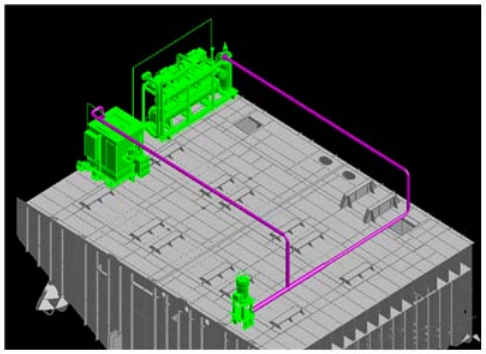
Auto Routing



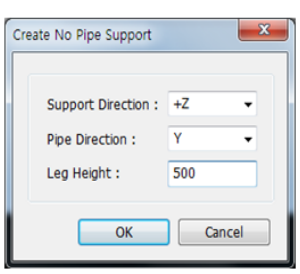
P&ID

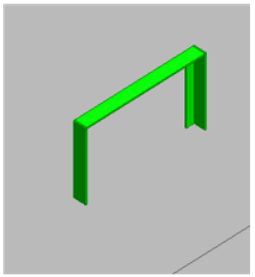


Preview Dialog

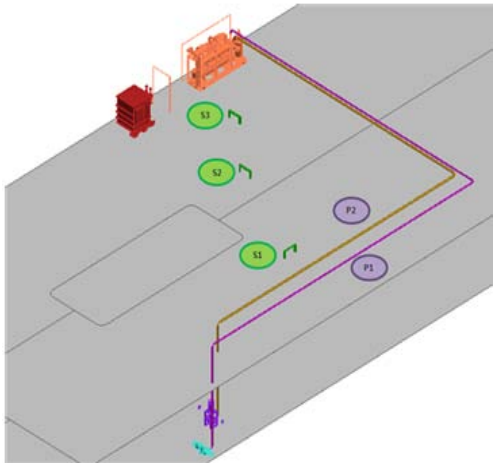


Auto Route

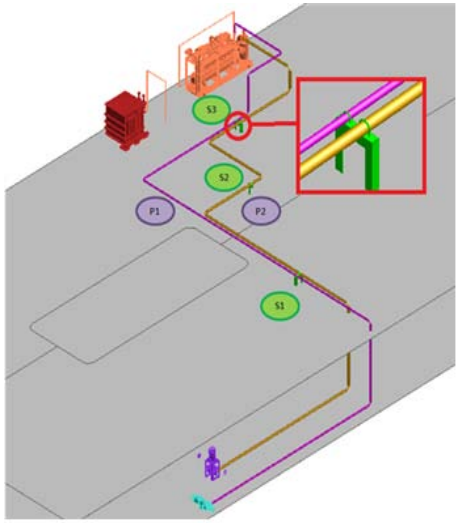




Routing Path
(Ruled Support)

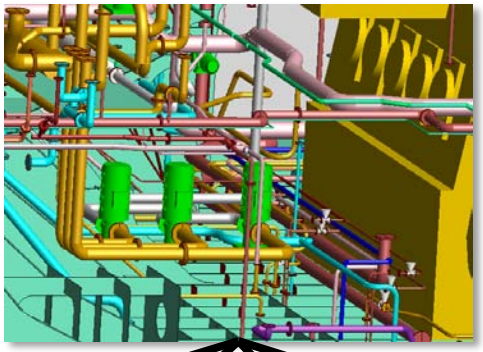


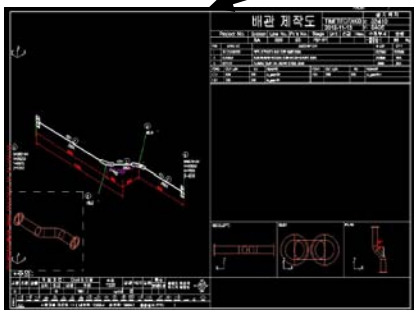
Support 생성



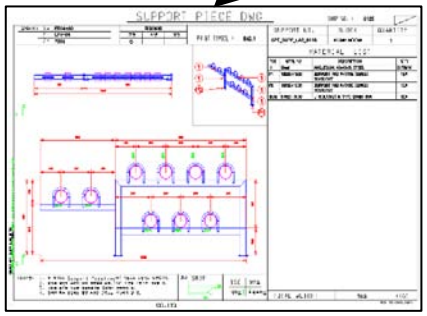
Pipe Re-Route

TTM PIPE

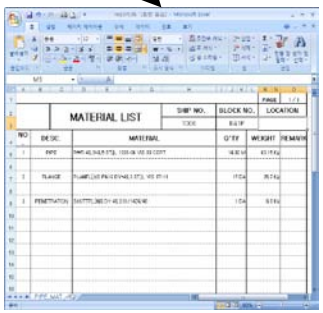




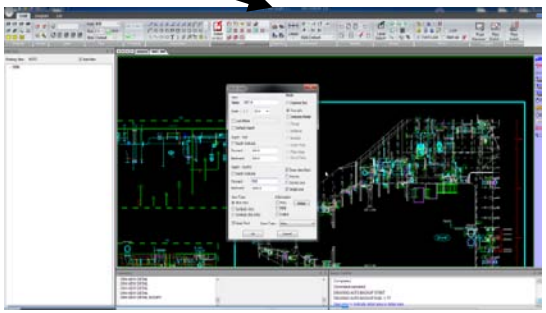
PIPE 제작도



Support 제작도



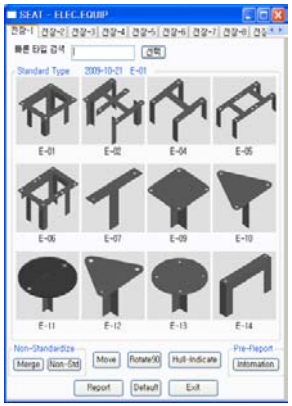
BOM



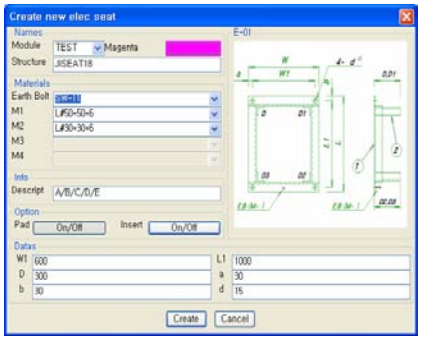
배관 설치도

TTM STRUCTURE

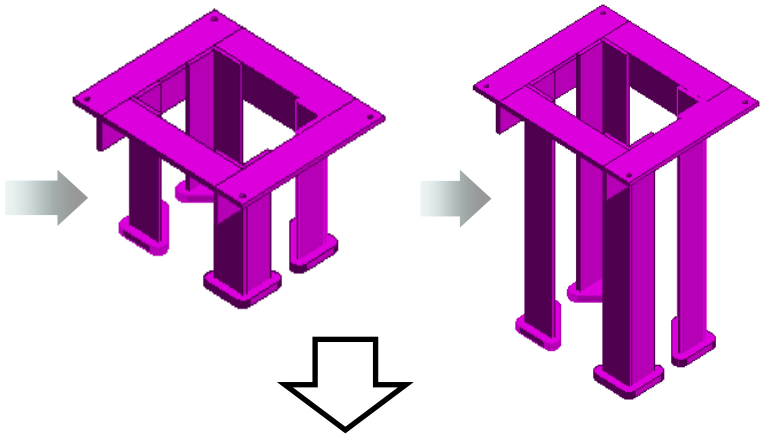
Type선택

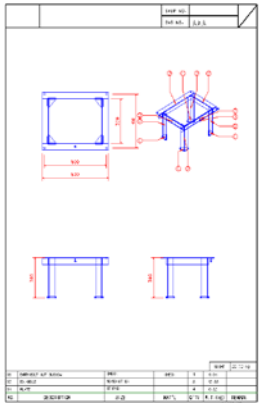


Parameter 입력

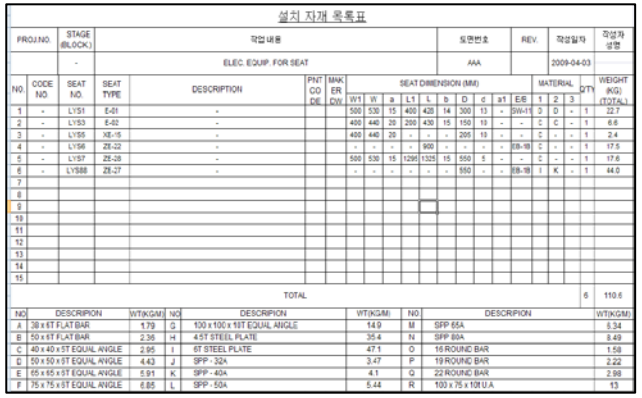


Parametric



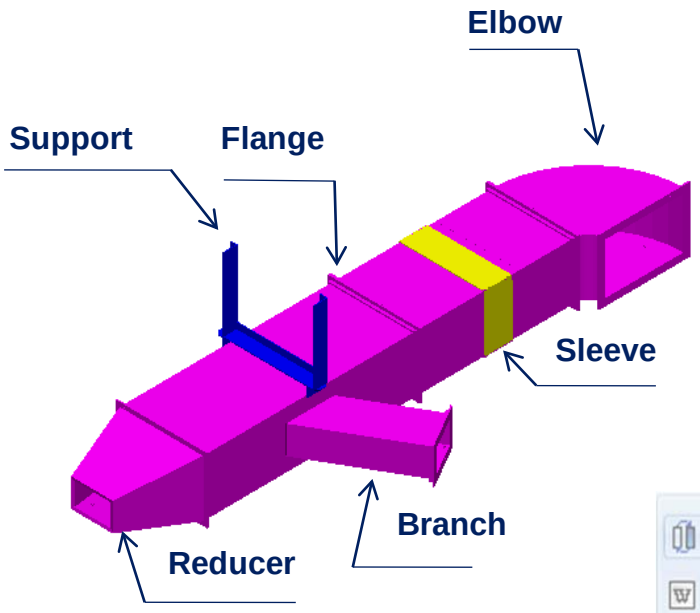


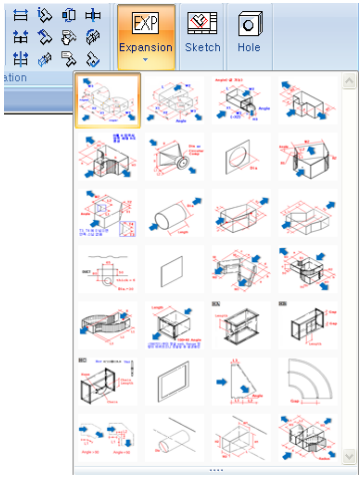
제작도

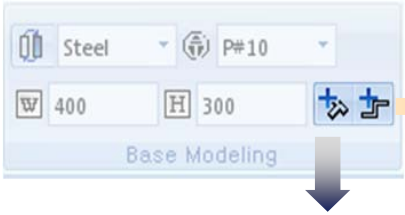


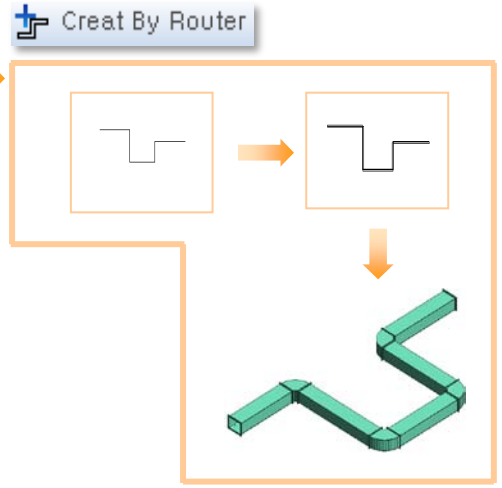
BOM

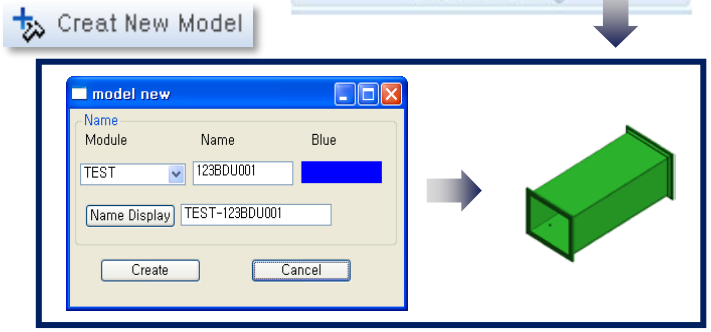
TTM VENT


Elbow
Support
Flange
Sleeve
Branch
Reducer

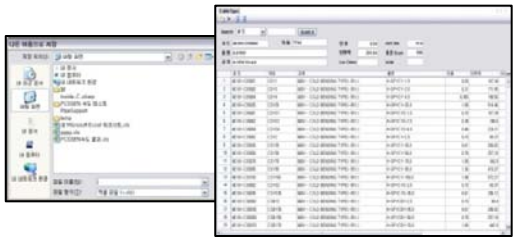

EXP
Expansion
Sketch
Hole


Steel
P#10
400
300
Base Modeling


Creat By Router

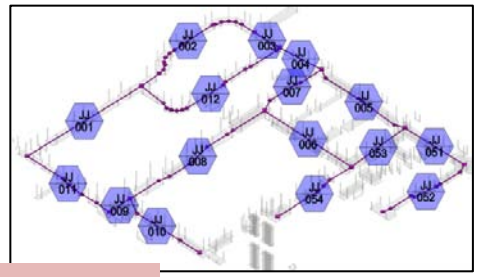

Creat New Model
model new
Name
Module
Name
Blue
TEST
123BDU001
Name Display
TEST-123BDU001
Create
Cancel

TTM CABLE



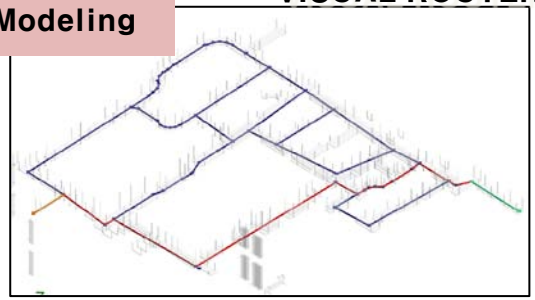
CABLE MANAGER

CABLE DIAGRAM

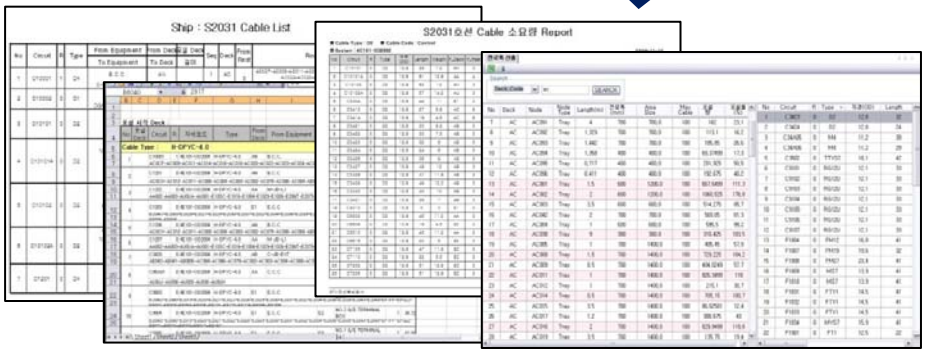


Cable way/Tray Modeling
Equipment Modeling

VISUAL ROUTER



Cable Master DB



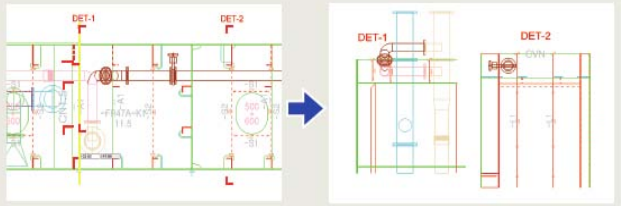
Single Routing
Multiple Routing

Cable List
포설 Deck Report
Cable 소요량 Report
전로 폭 산출 Report

TTM DRAFT

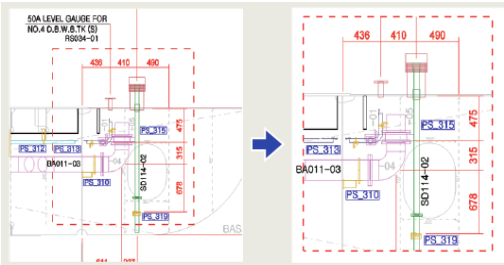
주요 특징

- AUTOCAD와 유사한 직관적인 Geometry 생성 수정
- 3D Model의 2D 도면화를 위한 기능 최적화
  - Wire Frame View 생성 : Sliced View, Symbolic View
  - 고품질 Hidden Line Removal
  - 우수한 Detail View 및 Area Copy 기능
  - Associative Dimension & Label
  - Pipe/Cable 등 설치도 작성 기능
- MDI : 여러 도면 동시 편집
- 화면 분할 및 Floating Window 지원
- DXF/DWG file import & Export
- Undo/Redo & Crash Save
- Excel, Word, Bitmap 등의 Copy & Paste
- PDF file 생성기능

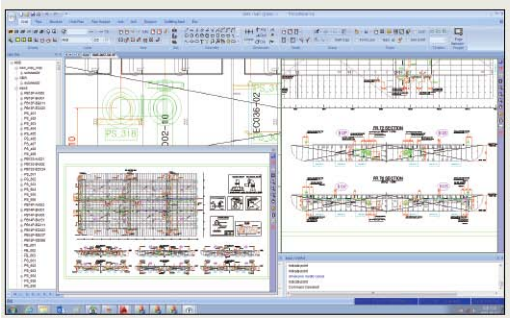
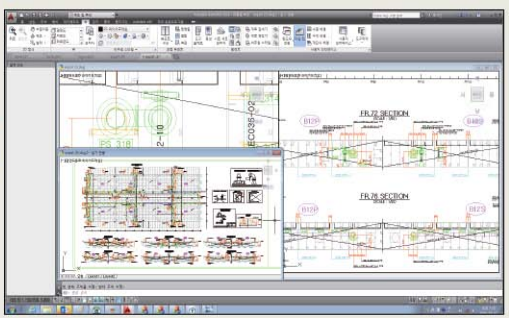


Detail View 영역 수정


Clipping을 이용한 도면생성

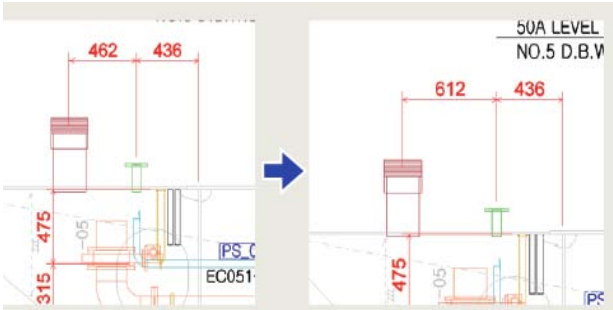


Copy Area의 예

TTM Draft(화면 분할/Floating window)

TTM에서 생성된 DWG File을 AUTOCAD에서 Open



Model의 변경에 따른 Dimension 자동 수정

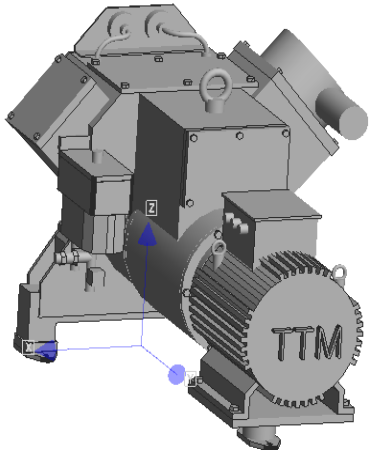
TTM VOLUME

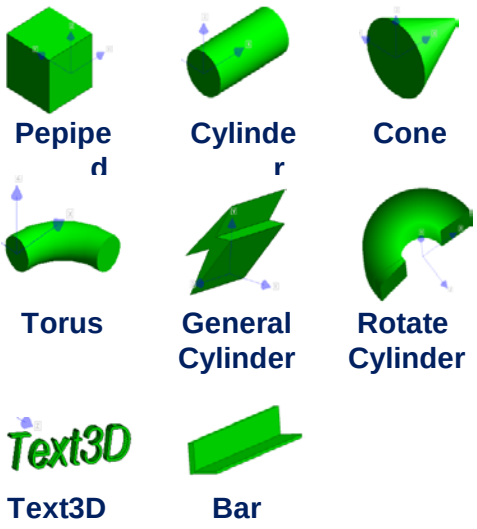
Volume 생성

- 주요 형상의 Primitive로 제공
- Hole 생성 등 Structure 기능 상속으로 보다 쉽게 정교한 Volume 생성 가능
- Template : 하나의 Volume Template 로 다른 Size의 Volume으로 사용

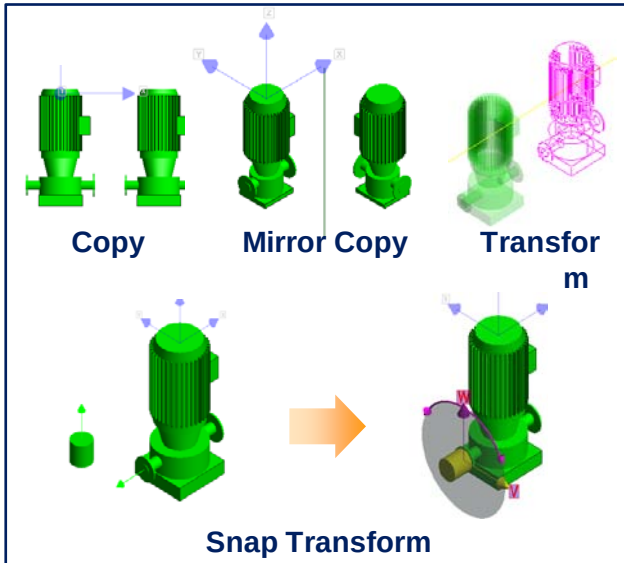
Modify

- Copy, Transform등의 수정작업
- Snap기능을 이용한 Transform
- Parametric 수정
- Undo/Redo 기능 제공

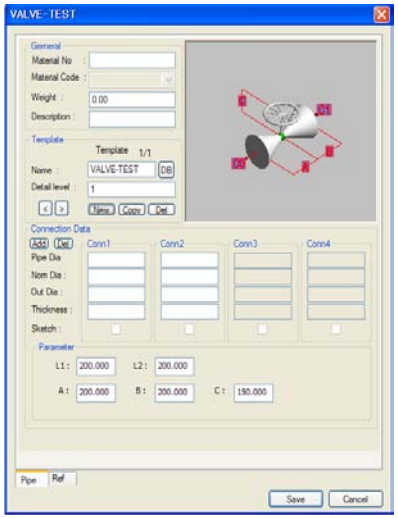




Primitive

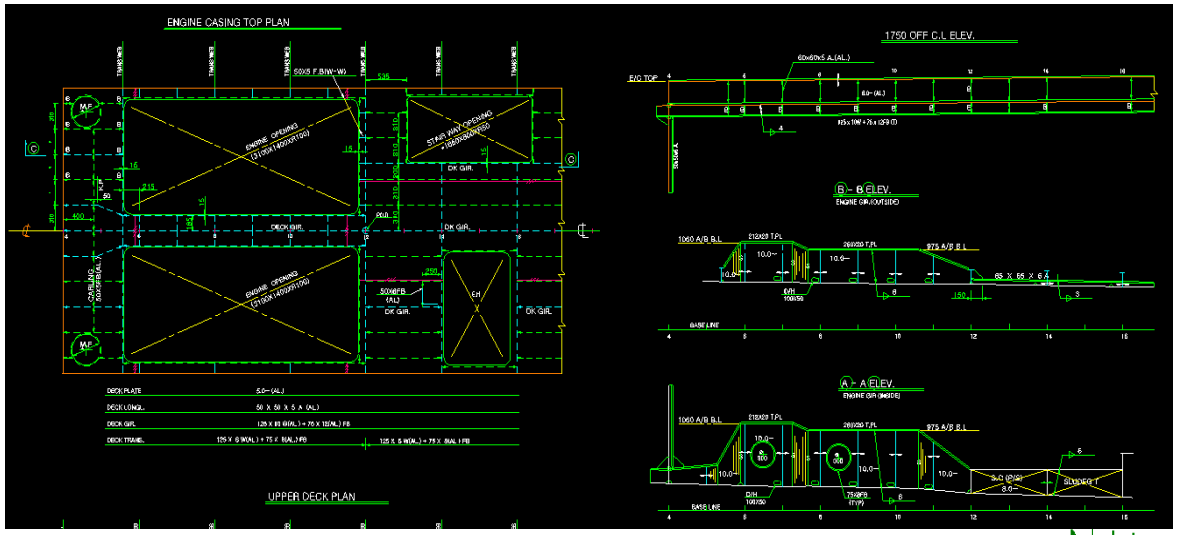


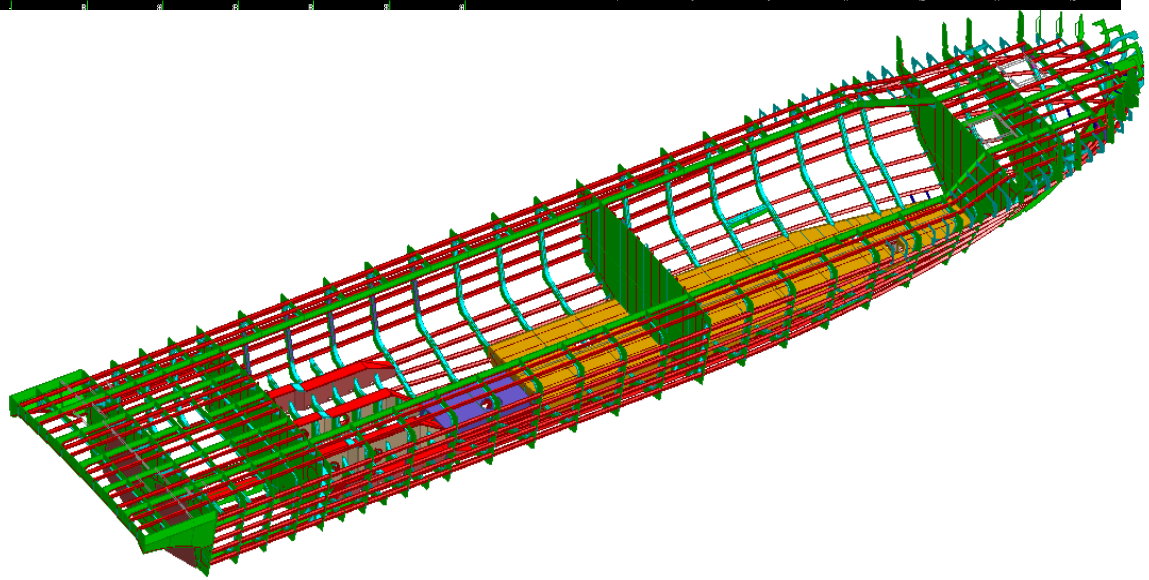
Modify

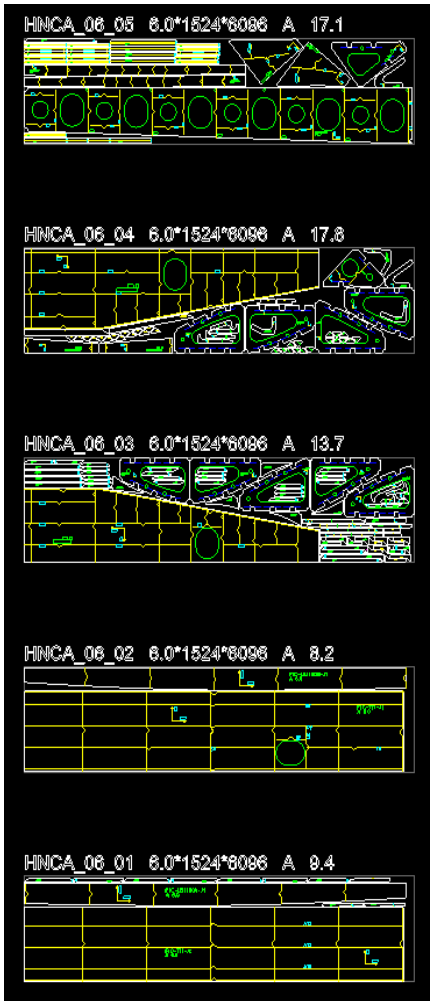


TTM Component

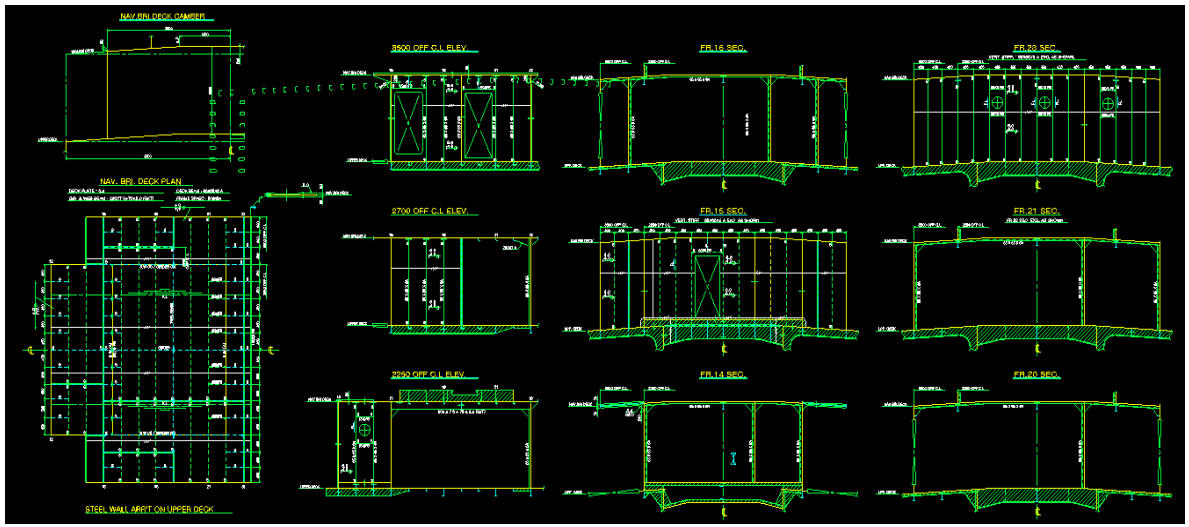
TTM 적용 사례 – 어업 지도선

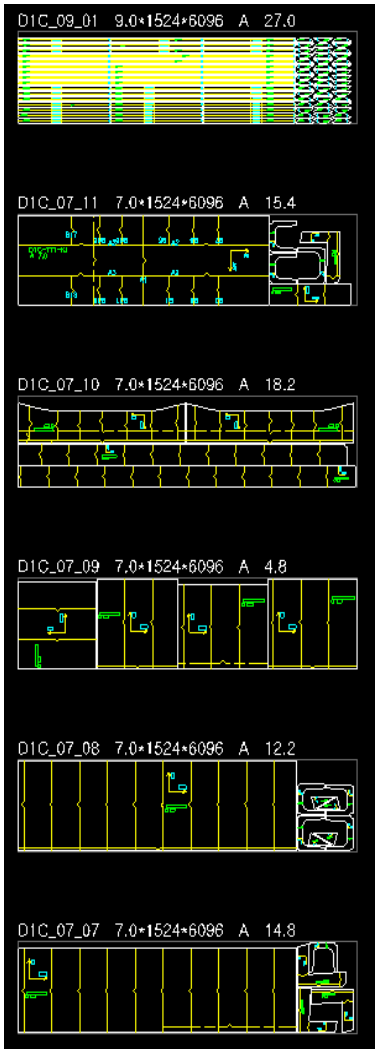


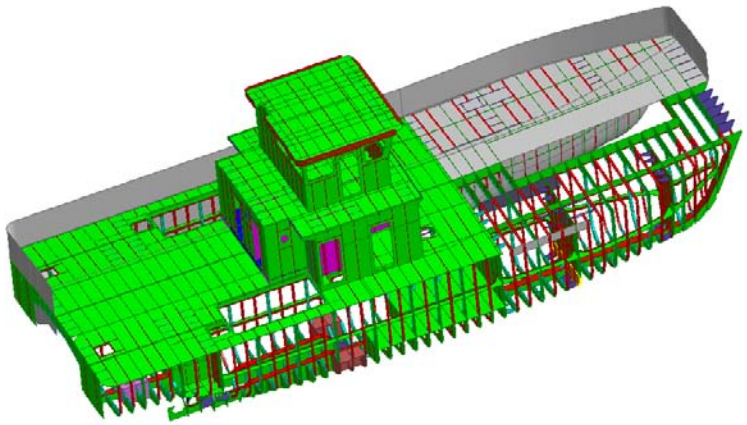


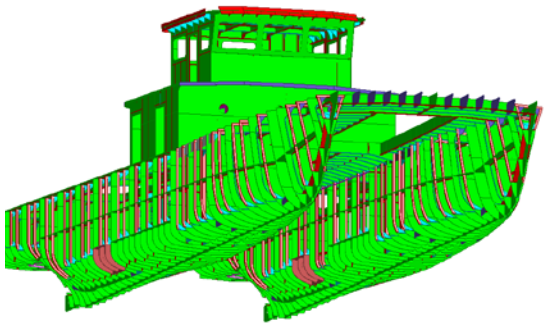


TTM 적용 사례 – 해상 방제선







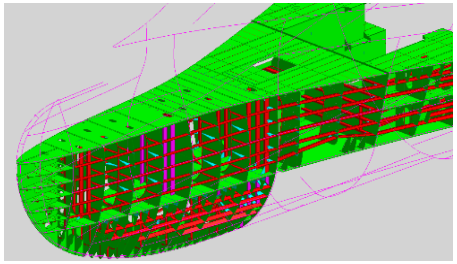


TTM 개발 의의

- **기술 독립**
  - 조선 세계 1위에 맞는 CAD 국산화
  - AEC 분야 적용 확대

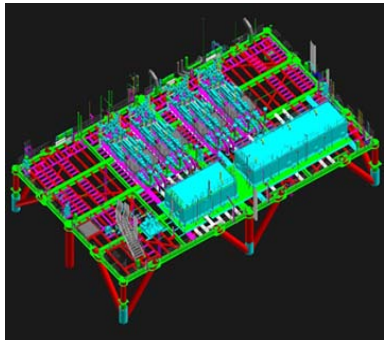
- **조선/플랜트 경쟁력 강화**
  - 생산 비용 절감(30% 설계 생산성 향상)
  - 중소 조선소 경쟁력 강화

- **외화 절약**
  - 조선소 연간 500억원 외화 유출 방지
  - TTM으로 교체, 자금 국내 유보
  - 외산 CAD 독과점 개선 및 조건 개선



조선

해양/플랜트/발전/건설



회사 소개

❖ 회사 개요
- ✓ ㈜ 타임텍 (Timetec)
- ✓ 2003년 설립 벤처 회사
- ✓ 부산시 해운대구 우동 CSP빌딩 16층

- ✓ 10년간 조선/플랜트용 3D CAD TTM 개발
- ✓ 2025년 세계 1위 CAD 개발사 목표
- ✓ 한국, 일본, 중국 시장점유율 50% 목표

Thank You!