

2007 PLM Best Practice Conference

조선산업의 BOM 구조와 종류 소개

2007 4 12

_____ (_____)

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I.

II. BOM

III. BOM

IV. BOM

V. BOM





- Product: Material() (CAD, BOM)

- , , ,

- Process: Material Flow (BOP, WBS)

- , 가 , ,

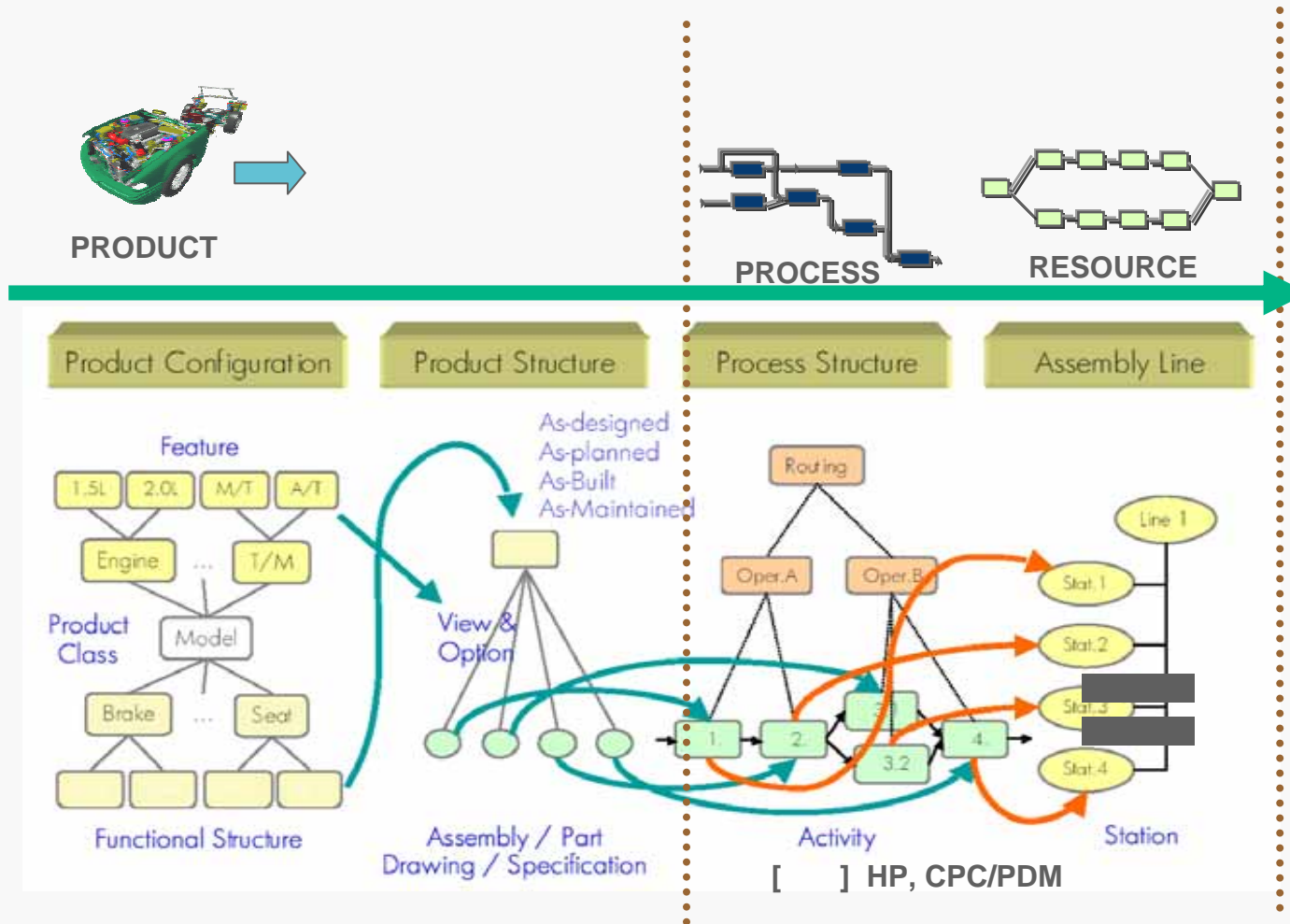
- BOM: , , ,

- Resource: Machine (BOR, OBS)

- , ,

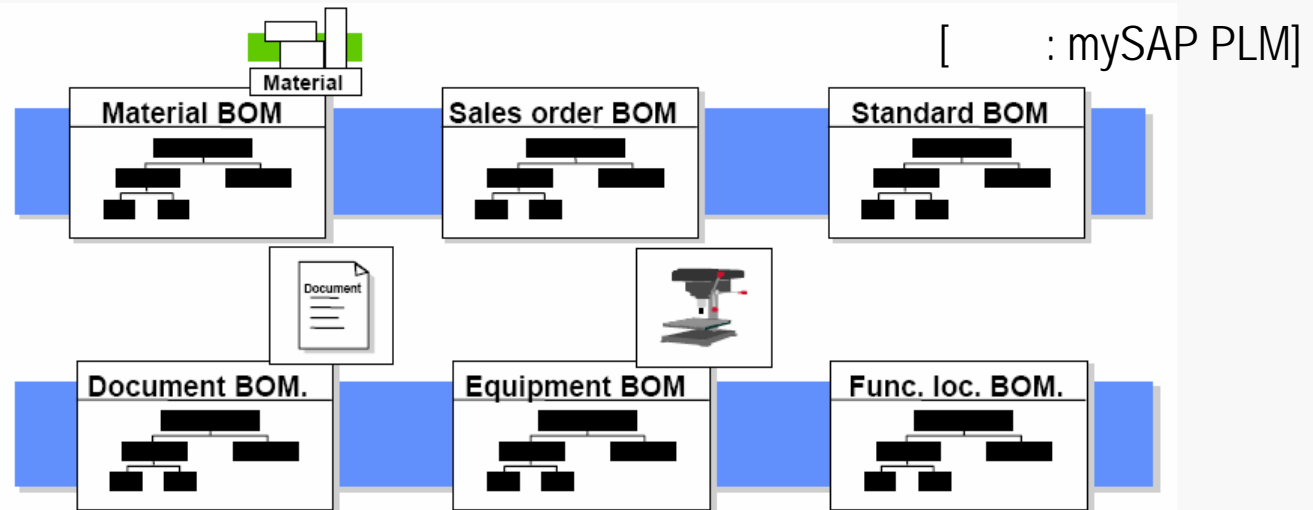


Product, Process, Resource, BOM and Routing

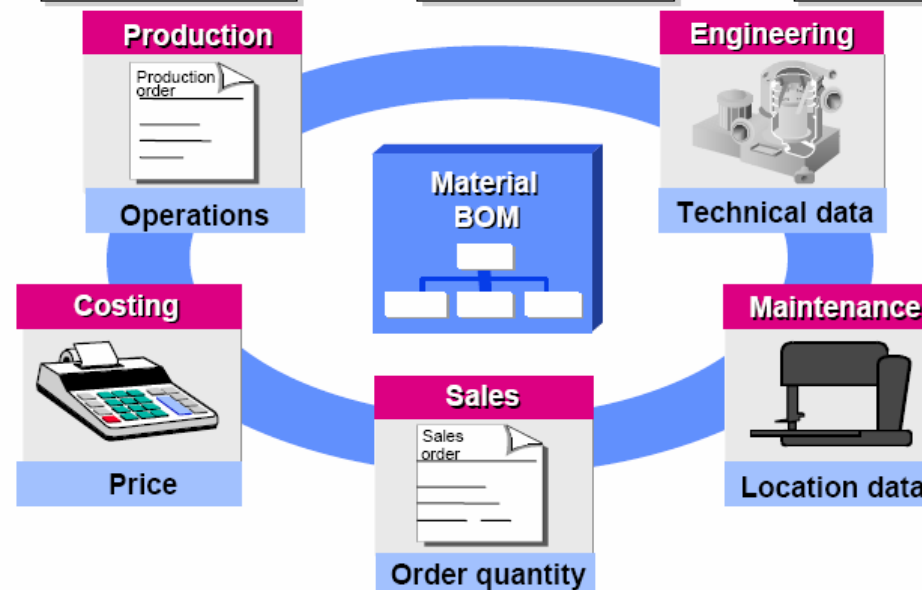


BOM

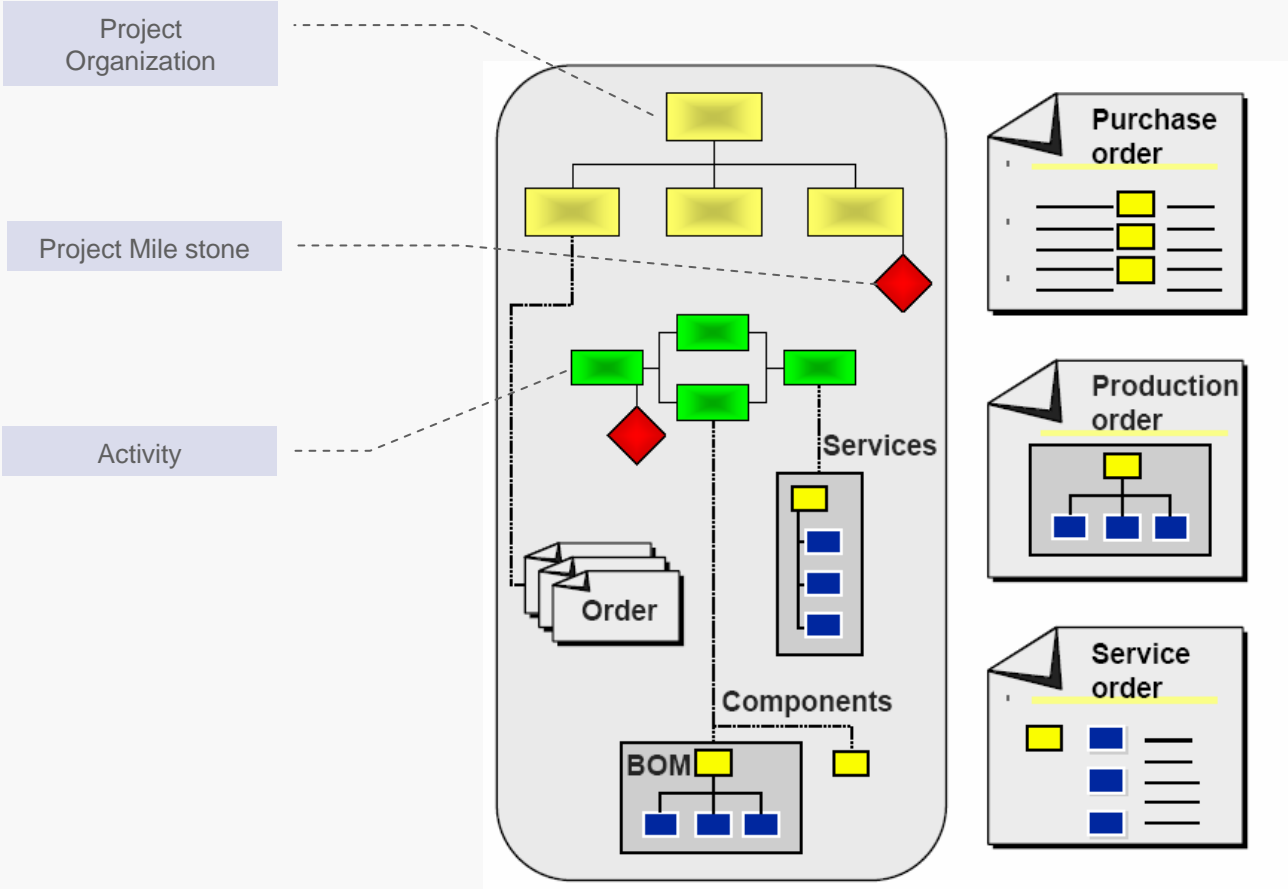
BOM Categories



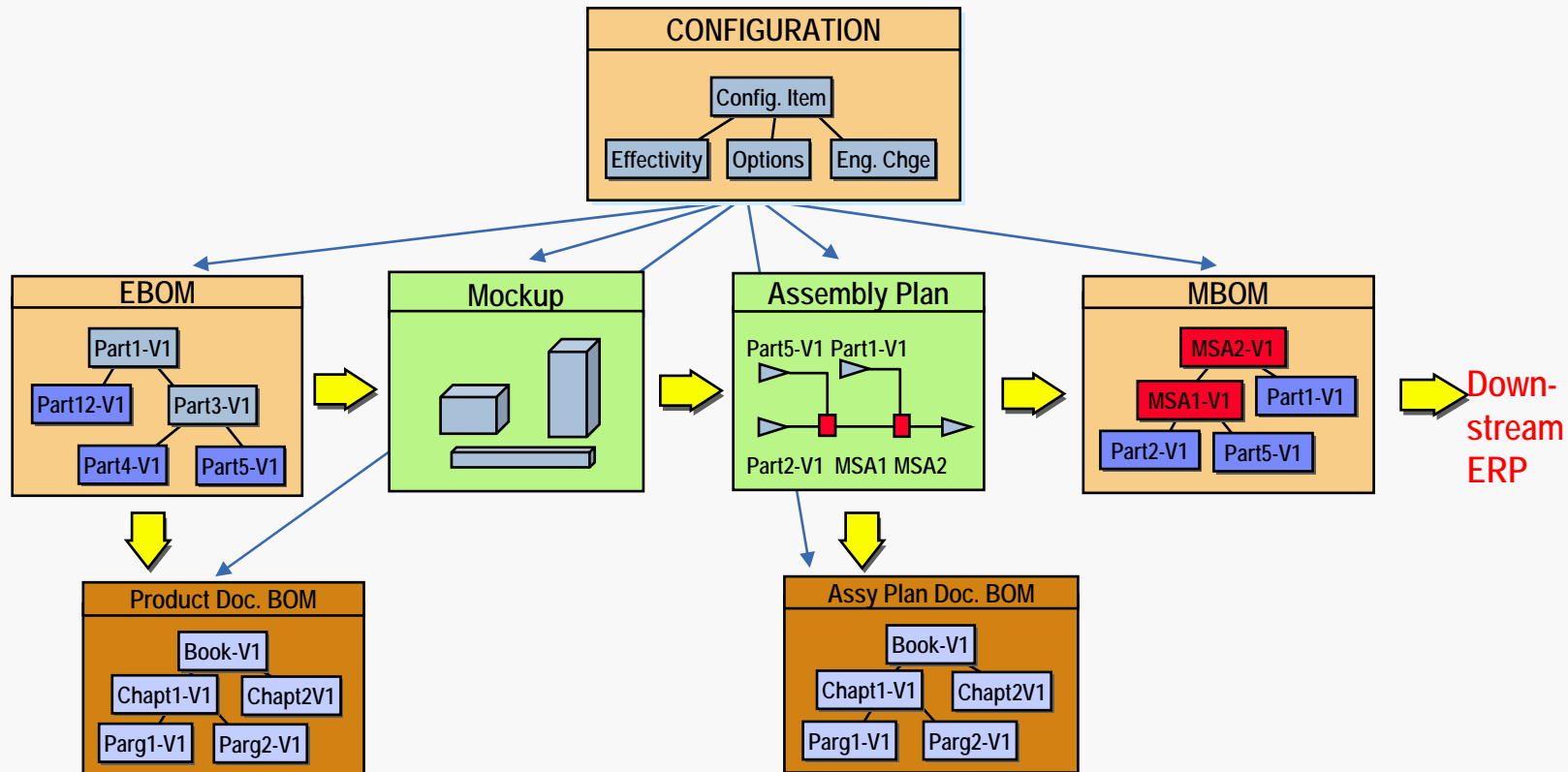
BOM Usage



[: MySAP]



Data Interface between PDM and ERP



- Engineering To Order: , Plant, Construction

- = (→)

- Make To Stock : , ,

- =

-

- Assemble To Order: DELL Computer

- = +

- , 가

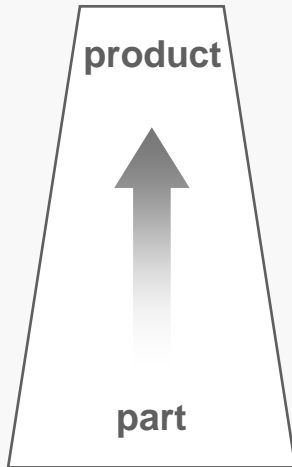
- Make To Order: , 가

-

- 가 , ,

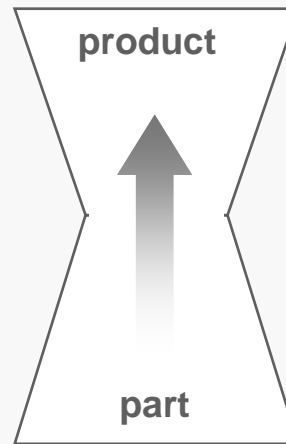


- Modular BOM



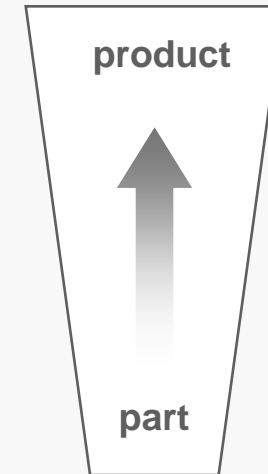
Limited Number of Items
Made from Many
Intermediate Items or
Components

Ex) Ship Building



Many Items Made from a
Smaller Number of
Intermediate Items or Sets
of Components

Ex) Motor Engineering



Many Items Made from
Limited Number of
Components

Ex) Steel, Chemicals



I.

II. BOM

III. BOM

IV. BOM

V.

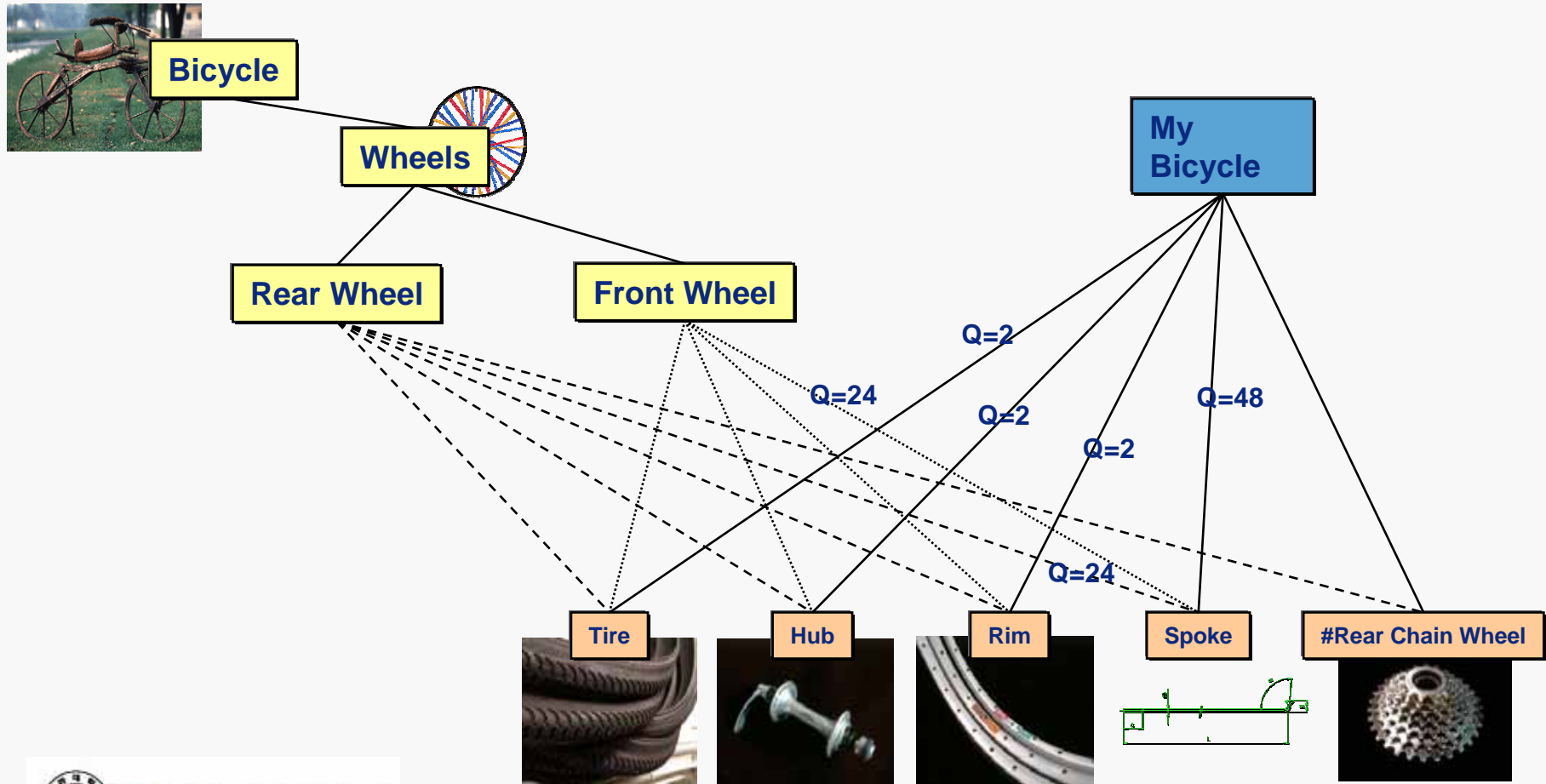


- APICS (American Production and Inventory Control Society)
 - Item: Any unique manufactured or purchased part, material, intermediate, subassembly, or product
 - BOM: A listing of all the subassemblies, intermediates, parts and raw materials that go into a parent assembly showing the quantity of each required to make an assembly
- BOM (Bill of Material)
 - (Item) (Item)
 - BOM Item (relationship)
 - Product Structure, Bill of Material, Part List
 - BOM





BOM example





What's Your Motivation of BOM?

- 1. Traditional BOM
 - (Make To Stock)
- 2. MPS
 - (Demand Management)
- 3. Product Structure, Option/variant
 -
 - Item master
 - Traditional BOM → Modular BOM
 - ATO, MTO
- 4. MRP
 - Super BOM + Variant BOM → Material Plan
- 5. Lead time



I.

II. BOM

III. BOM

IV. BOM

V. BOM



BOM	
/ BOM	Engineering BOM
	Manufacturing BOM
	Planning BOM <ul style="list-style-type: none"> Modular BOM Percentage BOM (Ratio BOM) Super Common BOM (Super BOM in APICS Dictionary) Inverted BOM Family BOM Add/Delete BOM Generic BOM
	Others



	MTS	ATO	MTO	ETO
BOM	BOM	Planning BOM	Project BOM	Project BOM



	Information BOM	Planning BOM	Manufacturing BOM
E-BOM	Indented BOM Where Used BOM Price/Cost BOM	---	---
M-BOM	Matrix BOM Summarized BOM Common Parts BOM	Super BOM Modular BOM Aggregate BOM	As-Built Configured BOM Customer Order Configured BOM Frozen BOM





- 1) Engineering BOM

- , BOM BOM.
- (Functional Sub-Systems) 가 .

- 2) Manufacturing BOM

- BOM , BOM .
- / (Assemble Groups) 가 .

- 3) Planning BOM

- BOM.
- (MPS) (Material planning) ,
- BOM BOM .

- 4) Others

- BOM .
-) 가 .



- Modular BOM
 - BOM (management), BOM .
 - 가 (Option) ,
 - [BALC1992], [1996], [BERT2000] : Module .
- Percentage BOM (Ratio BOM)
 - cf) Super BOM
- Super Common BOM (Super BOM in APICS Dictionary)
- Inverted BOM
- Family BOM
- Add/Delete BOM

cf) Generic BOM, Generative BOM Processing System



1) As Designed

- (develop) BOM.
- , Engineering BOM .

2) As Planned

- 가 BOM.
- (Prototype) .

3) As Built

- (Produce) BOM.
- , Manufacturing BOM .

4) As Maintained

- (Service) BOM.
- (Service Part) BOM .
- (Warrantee Service)

- EBOM (Engineering BOM)

- - (Function) → EBOM
 - CAD S/W: (Assembly Product) 가
 - A ,
 -
- (Product Configuration)

- Manufacturing BOM

- BOM
- MRP BOM
- MBOM VS EBOM
 - E-BOM
 - Item

- PBOM (Planning BOM)

- (Production Planning)
- (Master Production Scheduling)
-
-
- Planning BOM

- Planning BOM

- (1) Modular BOM
- (2) Percentage BOM
- (3) Super Common BOM (Super BOM in APICS Dictionary)
- (4) Inverted BOM
- (5) Family BOM
- (6) Add/Delete BOM



- ATO (Assemble-To-Order)

- Option 가 .
- (Manufacturing Strategy) - ATO
- 가
- Variant, Feature/Option, Product Configuration .



-)
 - Engine: 1800cc, 2000cc
 - Audio: , Graphic Equalizer, CD
 - ABS, Air bag: , +
 - TCS (Tracking Control System)
 - Seat: 가 ,
 - Color: 10 가
 - : 가 가
- Option BOM
 - Variant BOM
 - Option BOM
 - Configuration Management



- Option

- BOM BOM ...?
 -) A 3 , B 10 , C 5 , D 5 , E 10 >> 3 * 10
 * 5 * 5 * 10 = 7500 BOM
 → , , 3 + 10 + 5 + 5 + 10 = 33 BOM

- Modular BOM

(Common Parts)

- Modular BOM , BOM
 - Master Production Scheduling Option ,
 - (Final Product) 7500가
 , 33 Common Parts

- (MTS, ATO, MTO)

- Make-To-Stock
 - Assemble-To-Order, Make-To-Order



Modular BOM (Feature, Option and Variant)

- Frame: F53, F57, F60, F65
- : MR, MT, WR, WT
- : C, T
- $4 \times 4 \times 2 = 32$ 가
-





-

, BOM .



- (1) Color TV

- 14 , 15 , 17 Color TV
- 20%, 30%, 50%
- Percentage BOM .

- (2) Modular BOM VS Percentage BOM

- Option BOM
- 1800cc 60%, 2000cc 40%, 30%, CD Player가 50% 30%, Graphic Equalizer가



- MPS(Master Production Scheduling)

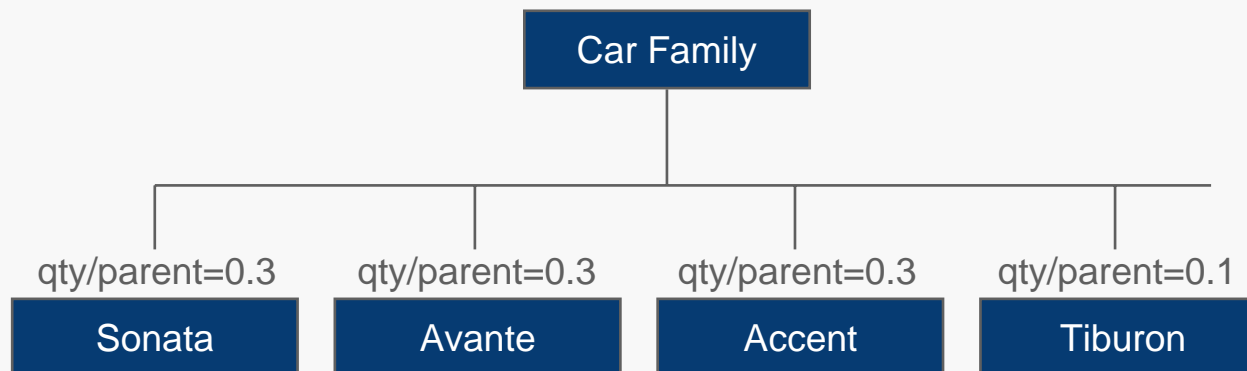
- : Percentage BOM



1) Process Industry

2) Module

cf) Super BOM

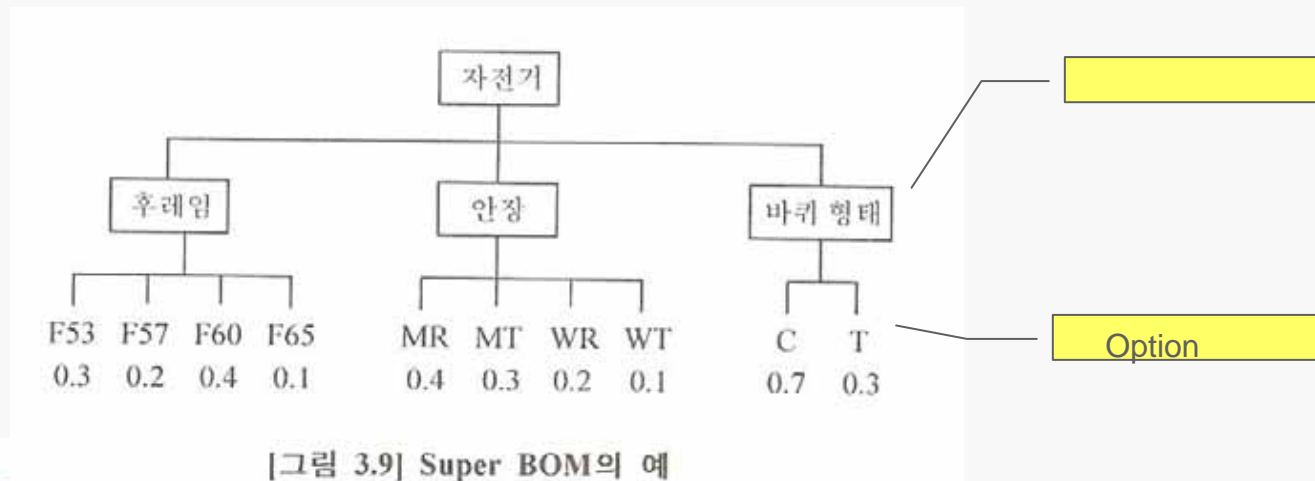


* source : [Mather 87]



- (Demand Management)

- → Planning
- Group : Percentage BOM
- : Super BOM
- Make To Stock Super BOM .
-



[그림 3.9] Super BOM의 예

BK21 -



- - F53-MR-C
 - $0.3 \times 0.4 \times 0.7 = 0.084 \rightarrow 8.4\%$
- Super BOM
 - Modular BOM
 -
 -

<표 3.1> Super BOM에 의한 예측

선택사양		안장	후레임			
			F53(0.3)	F57(0.2)	F60(0.4)	F65(0.1)
바퀴	C(0.7)	MR(0.4)	0.084	0.056	0.112	0.028
		MT(0.3)	0.063	0.042	0.084	0.021
		WR(0.2)	0.042	0.028	0.056	0.014
		WT(0.1)	0.021	0.014	0.028	0.007
	T(0.3)	MR(0.4)	0.036	0.024	0.048	0.012
		MT(0.3)	0.027	0.018	0.036	0.009
		WR(0.2)	0.018	0.012	0.024	0.006
		WT(0.1)	0.009	0.006	0.012	0.003



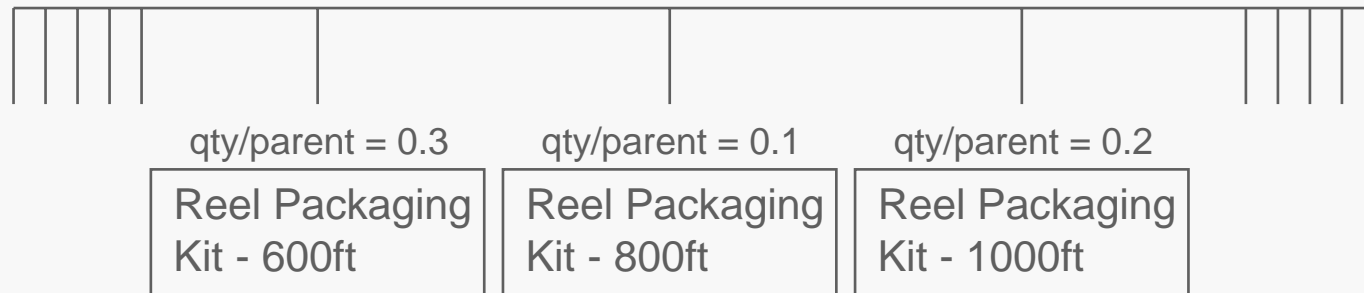
- Inverted BOM BOM

- BOM: / Tree ,
TOP-DOWN
- Package
- Percentage BOM .

- - : BOM (Parent Child Relationship)가 , Parent Item
Child Item
 - : () 가
.
 - 가 ,
 - BOM Inverted BOM



Magnetic tape jumbo roll



* source : [Mather 87]



- Family BOM

-
- ()

- Common BOM

- A Kind of Planning BOM
- A Kind of Phantom BOM
- It groups Common Components for a product or family of products into One BOM,
- Grouping .
- BOM
- 가



- Multilevel BOM

- BOM Display
- BOM Parent Child ,
- Child Child () BOM BOM
- Single level BOM
- Multi level BOM
- Single Where Used BOM
- Multi Where Used BOM

- Indented BOM

- BOM Multilevel BOM
- Parent Child 가 BOM



- BOM

-

-

-

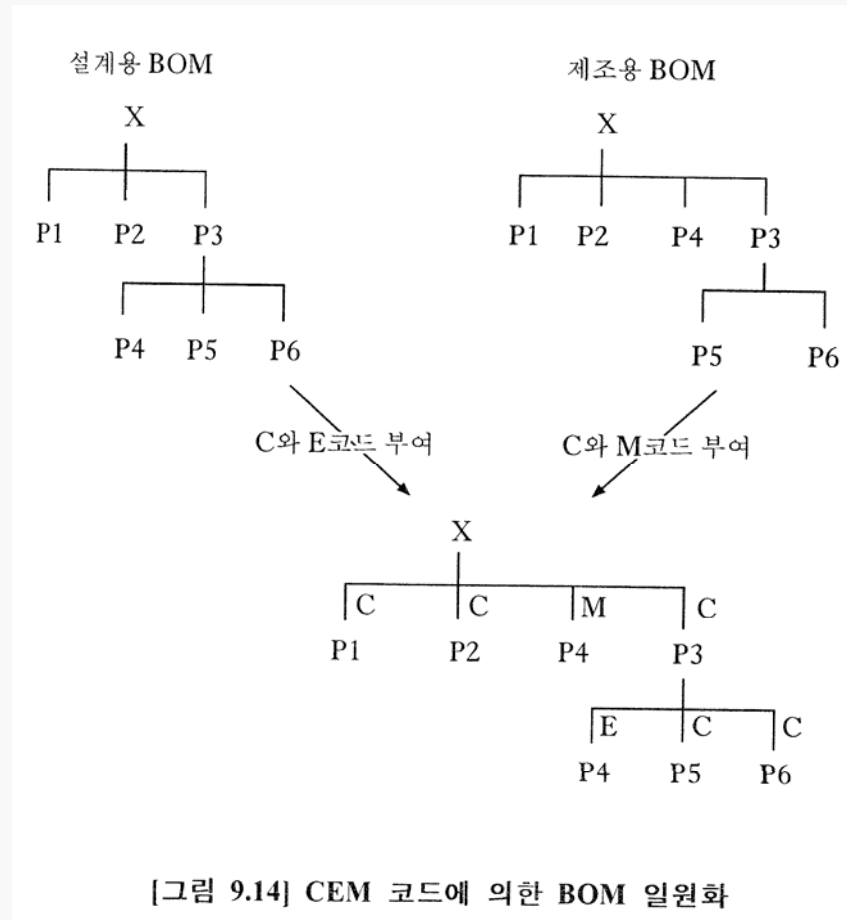
BOM

- C:

parent/Child

- E: E-BOM

- M: M-BOM



Discuss On Generic BOM

- 1st Step: Traditional BOM
- 2nd Step: Modular BOM
 - BOM
- 3rd Step: Family BOM ← Modular BOM
- 4th Step: Generic BOM
- 5th Step: Variant BOM, Option BOM ← Generic BOM
 - Variant Option 가



INHA UNIVERSITY
Option BOM

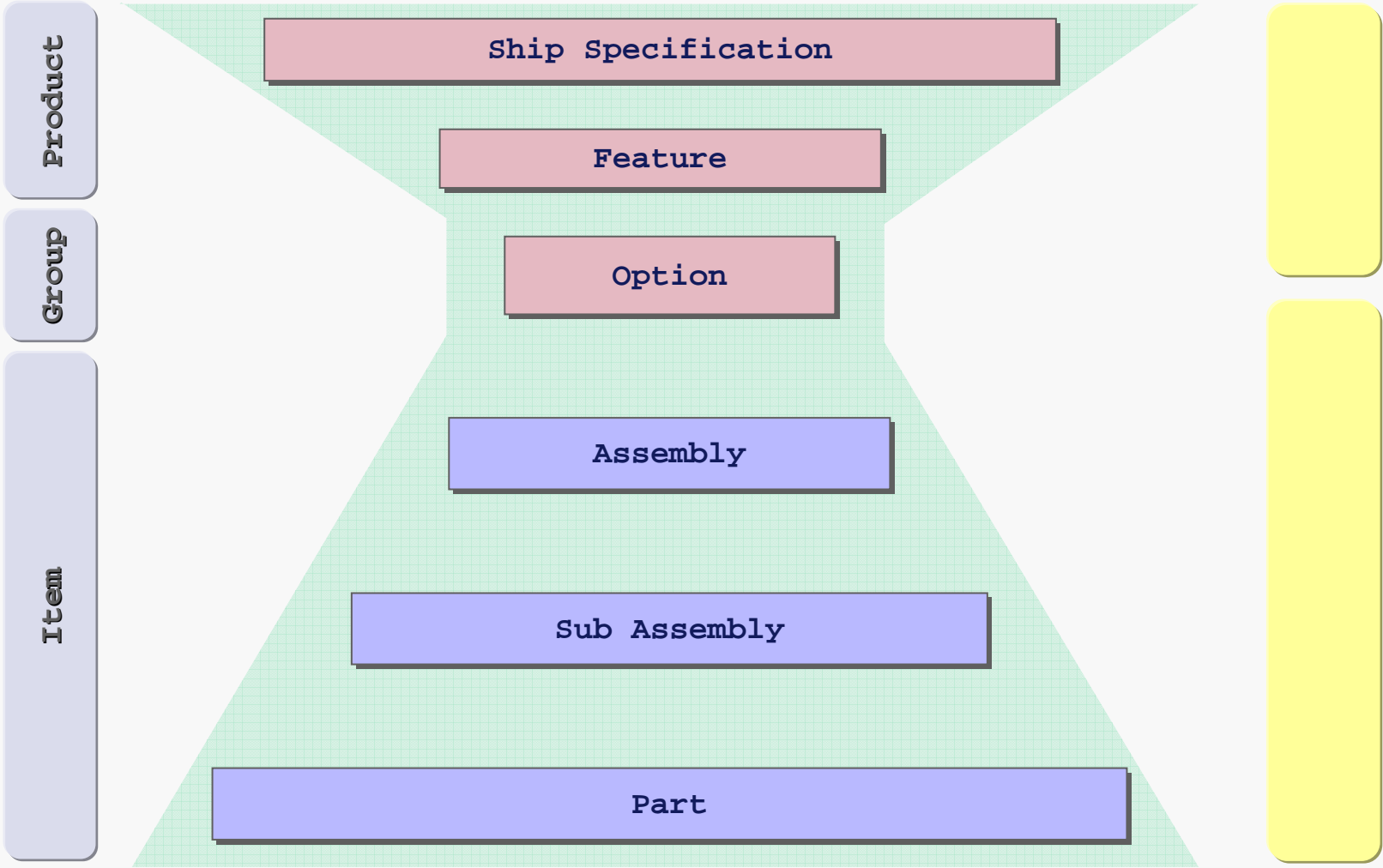
(mandatory, substitute, ...)

● Modularization

- Non Modular → 제품 사양 별 독립된 BOM 존재 → 설계 변경 불가 → 생산 계획 불가
 - Modular: Variant/Option, Product configuration
 - 모듈 구성: 제품에 들어가는 부품의 사용 형태 분석
- Modular BOM 은 Planning BOM의로서만 의미를 가짐
 - Product Structure 정보가 없음, 따라서 Product Structure를 표현할 수 있는 BOM 정의가 추가되어야 함.
 - 사양이 많이 증가할 경우에는 구현이 어려움
- 조선, Plant와 같이 복잡한 사양을 갖는 ETO에 적용하기 위해서는 변화가 필요함.



Product Configuration Management



I.

II. BOM

III. BOM

IV. BOM

V. BOM



E-BOM, M-BOM

설계제품

품번: WM-01 리비전: .0

상태: New 단계: []

품명: MUFFLER ASSY-CTR

생성자: 관리자 생성일: 2002/11/05 14:28

차종: C-CAR

제품군: MUFFLER

부품명: MUFFLER ASSY-CTR

고객 품번: []

고객 품명: []

중량(KG): 0

등록정보 / 변경정보 / 사양정보

Parts Tree

- WM-01-0-MUFFLER ASSY-CTR
 - Part-000039-A-0-FLANGE
 - Part-000040-A-0-BAND
 - Part-000041-A-0-BRKT-HANGER
 - Part-000042-A-0-PROTECTOR
 - WM-06-A-0-RESONATOR ASSY-CTR
 - Part-000036-A-0-SHELL
 - Part-000037-A-0-FILTER
 - Part-000038-A-0-FILTER
 - WM-07-A-0-G/W SUB
 - Part-000033-A-0-STUFFING
 - Part-000034-A-0-STUFFING
 - Part-000035-A-0-MAT
 - WM-32201-A-END PLATE
 - WM-32501-A-SET PLATE
 - WM-50101-A-BOLT

Form 1

참조 EBOM 선택: A-CAR WM000-00200 B

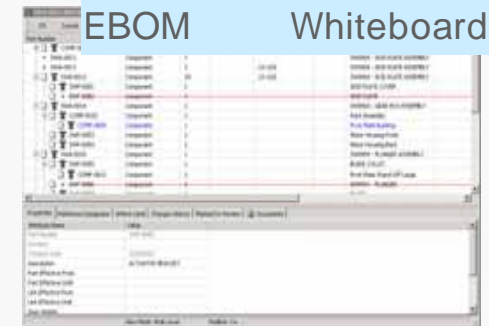
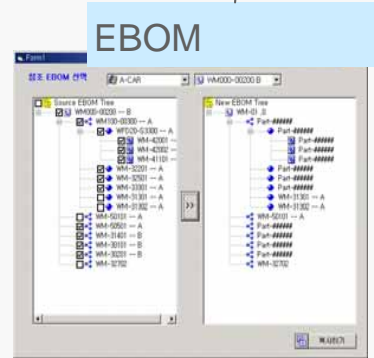
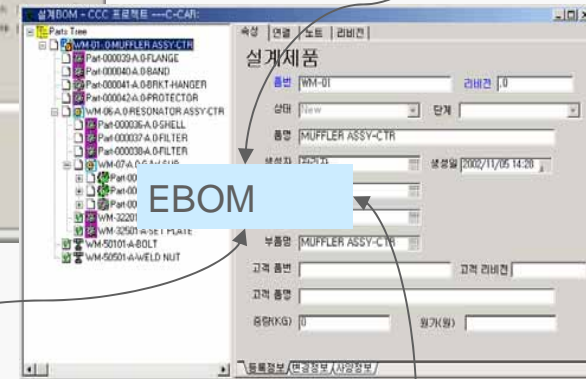
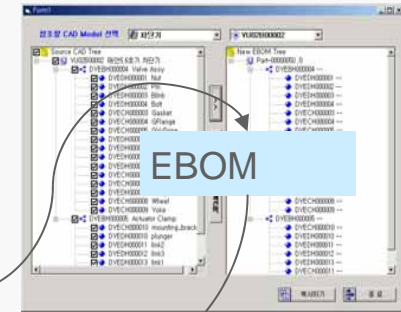
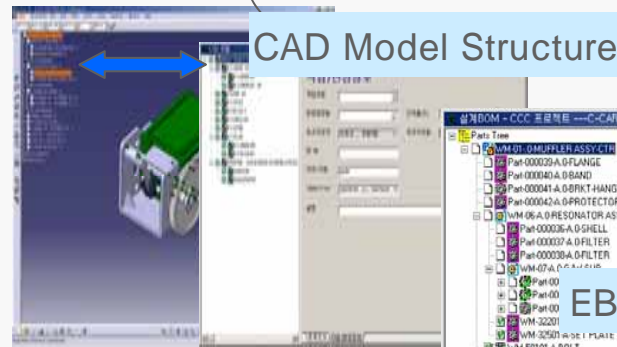
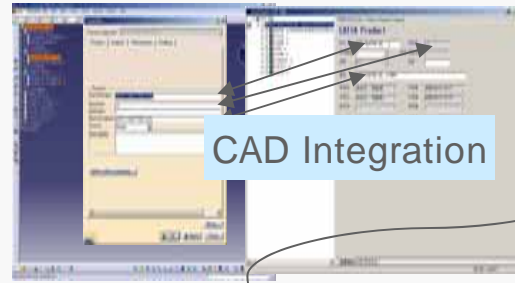
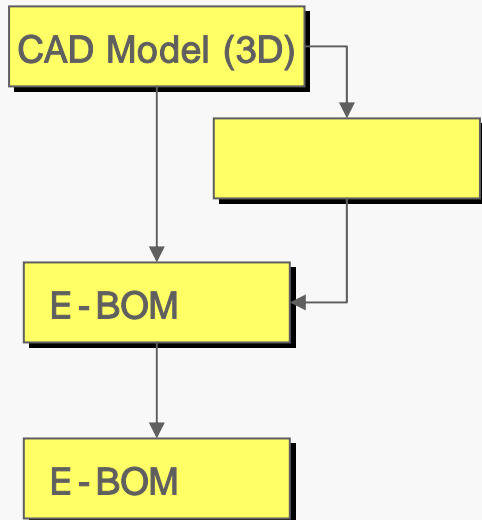
Source EBOM Tree

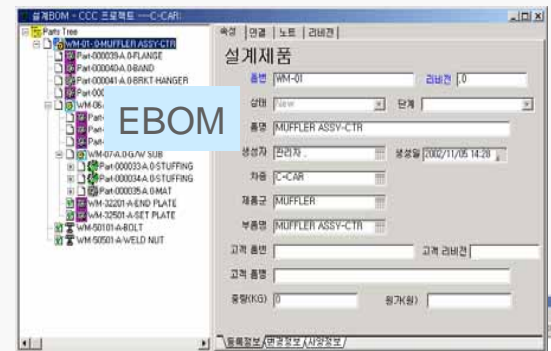
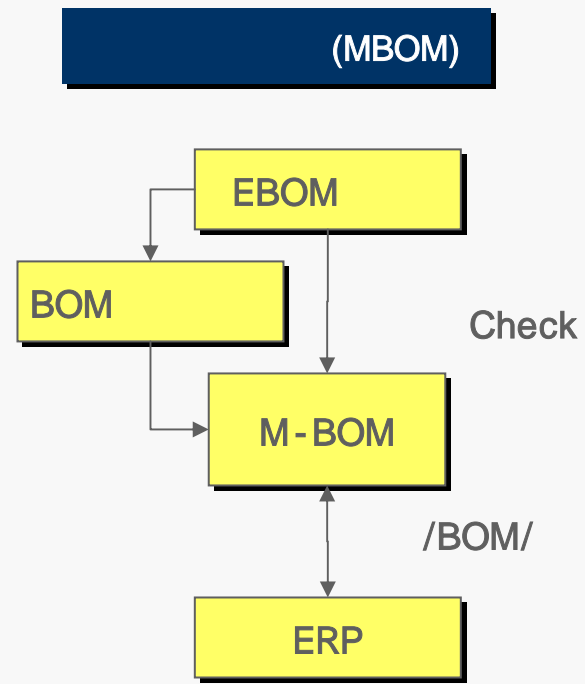
- WM000-00200 -- B
 - WM100-00300 -- A
 - WFD20-S1300 -- A
 - WM-42001
 - WM-42002
 - WM-41101
 - WM-32201 -- A
 - WM-32501 -- A
 - WM-33301 -- A
 - WM-31301 -- A
 - WM-31302 -- A
 - WM-50101 -- A
 - WM-50501 -- A
 - WM-31401 -- B
 - WM-30101 -- B
 - WM-30201 -- B
 - WM-32702

New EBOM Tree

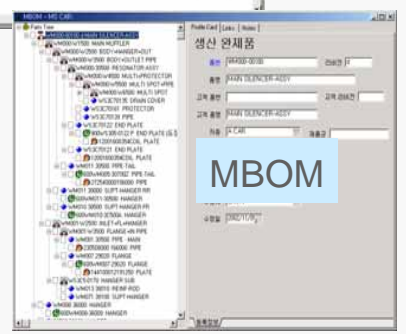
- WM-01.0
 - Part-#####
 - Part-#####
 - Part-#####
 - Part-#####
 - Part-#####
 - Part-#####
 - Part-#####
 - WM-31301 -- A
 - WM-31302 -- A
 - WM-50101 -- A
 - Part-#####
 - Part-#####
 - Part-#####
 - Part-#####
 - WM-32702

(EBOM)



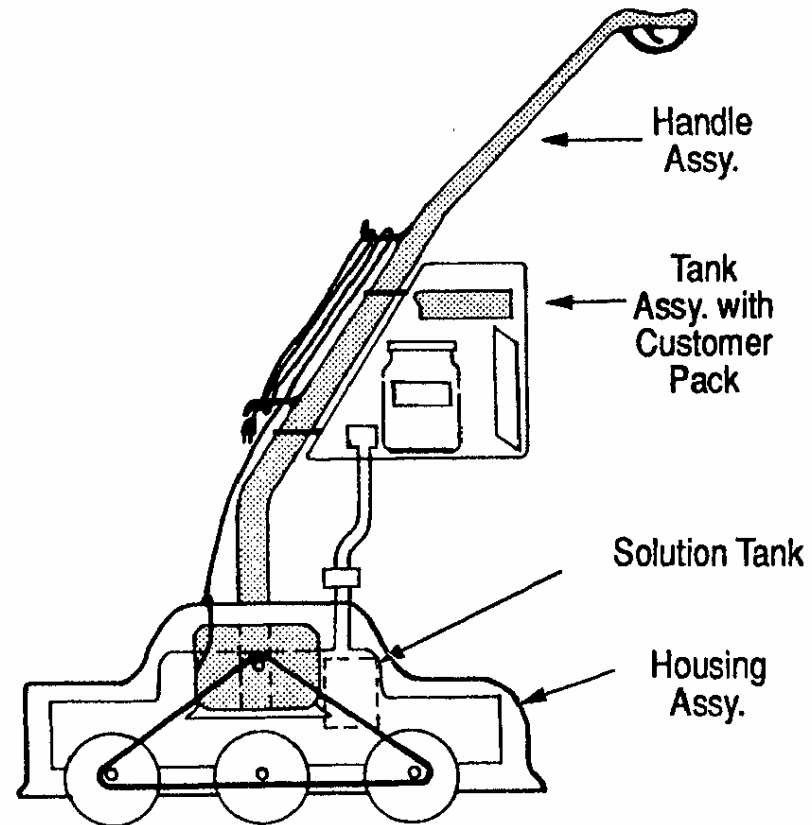


EBOM의 EndPart				MBOM의 EndPart			
번호	부품명	수량	상태	번호	부품명	수량	상태
1	WM00 8030	1	0	1	WM00 8030	1	0
2	WM 3181	1	2	2	WM 3181	1	1
3	WM 3020	1	4	3	WM 3020	1	1
4	WM 3130	1	5	4	WM 3130	1	1
5	WM 31302	1	5	5	WM 31302	1	1
6	WM 3140	1	7	6	WM 3140	1	1
7	WM 3201	1	8	7	WM 3201	1	1
8	WM 3250	1	9	8	WM 3250	1	1
9	WM 32702	1	10	9	WM 32702	1	1
10	WM 3280	1	11	10	WM 3280	1	1
11	WM 3280	1	12	11	WM 3280	1	1
12	WM 4200	1	13	12	WM 4200	1	1
13	WM 4200	1	14	13	WM 4200	1	1
14	WM 5010	1	15	14	WM 5010	1	1
15	WM 5990	1	16	15	WM 5990	1	1
16	WM 5990	1	17	16	WM 5990	1	1
17			18				
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98			99				
99			100				



Carpet Cleaner

Carpet Cleaner Part No. 0123



Indented BOM (Part #6221)

Figure 2-6
Bottled Concentrate Levels

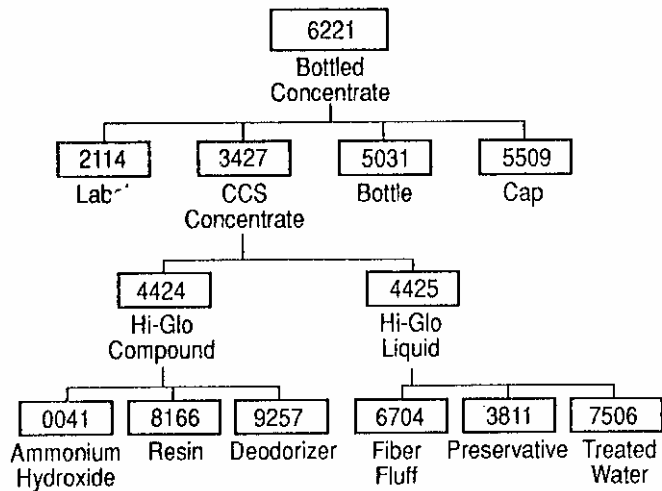


Figure 2-7
Indented Bill of Material

Parent: 6221
Description: Bottled Concentrate

LEVEL	COMPONENT	DESCRIPTION	UNITS REQUIRED	UNIT OF MEASURE
1	2114	Label	1.00	Ea.
1	3427	CCS Concentrate	1.00	Litre
• 2	4424	Hi-Glo Compound	50.00	Grams
•• 3	0041	Ammonium Hydroxide	15.00	Grams
•• 3	8166	Resin	30.00	Grams
•• 3	9257	Deodorizer	5.00	Grams
• 2	4425	Hi-Glo Liquid	1.00	Litre
•• 3	3811	Preservative	0.02	Litre
•• 3	6704	Fiber Fluff	0.02	Litre
•• 3	7506	Treated Water	0.80	Litre
1	5031	Bottle	1.00	Ea.
1	5509	Cap	1.00	Ea.



Figure 2-8
Single Level: Where-Used

Item: 4209
Description: Painted Tank Top

LEVEL	PARENT	DESCRIPTION	QUANTITY PER	UNIT OF MEASURE
1	1910	3-Gal. Tank Subassembly	1	Ea.
1	4721	4-Gal. Tank Subassembly	1	Ea.
1	7350	5-Gal. Tank Subassembly	1	Ea.



Where used – Multi Level (Part # 4209)

Figure 2-9
Multi-level: Where-Used

Item: 4209

Description: Painted Tank Top

LEVEL	PARENT	DESCRIPTION	QUANTITY PER	UNIT OF MEASURE
2	1910	3-Gal. Tank Subassembly	1	Ea.
• 1	2927	3-Gal. Tank Assembly	1	Ea.
• • 0	0123	Carpet Cleaner	1	Ea.
2	4721	4-Gal. Tank Subassembly	1	Ea.
• 1	1527	4-Gal. Tank Assembly	1	Ea.
• • 0	0124	Carpet Cleaner	1	Ea.
2	7350	5-Gal. Tank Subassembly	1	Ea.
• 1	2104	5-Gal. Tank Assembly	1	Ea.
• • 0	0125	Carpet Cleaner	1	Ea.



Product Configuration : Feature & Option, Variant

Figure 6-7
Carpet Cleaner Option Availability

	DOM. EXPORT		HORSEPOWER				CAPACITY					BRUSHES	
			1.0	1.5	2.0	3.0	3P	4P	5P	5S	6S	3	5
0123 Standard	S	X	S	X	X	X	S	X	X	X	X	S	X
0124 Heavy Duty	O	O	X	O	O	X	X	O	O	X	X	S	X
0125 Commercial	O	O	X	X	O	O	X	X	X	O	O	O	O

S = Standard
X = Not Available
O = Option

P = Painted Tank
S = Stainless





- 설계/제조 BOM
 - TB 설계BOM
 - 84701-1C000 C/PAD MAIN ASSY
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C010 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C020 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C030 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - TB 제조BOM
 - 84701-1C000AB C/PAD MAIN
 - 51240 RUBBER BAND
 - 84710-1C000AB C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84701-1C000DB C/PAD MAIN 중등일반 LHD N-PAD
 - 51240 RUBBER BAND
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84701-1C000LT C/PAD MAIN 중등일반
 - 51240 RUBBER BAND
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84701-1C010DB C/PAD MAIN 중등일반
 - 51240 RUBBER BAND
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84701-1C020DB C/PAD MAIN 중국 GCC LHD N-PAD
 - 51240 RUBBER BAND
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84701-1C030DB C/PAD MAIN 중국 GCC
 - 51240 RUBBER BAND
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW

BOM

BOM

Profile Card Links Notes Revision

설계 BOM - 기본정보

품번	TB 설계BOM
리비전	
상태	New
부품명(영문)	.
시작일	2004/04/19
종료일	2004/04/20
타입	4-4 DOOR
위치	E, COMMON,
형상	0-COMMON
차종	1C, TB, 클릭
ITEM명	CP, COCKPIT MODULE,
EO No	
인상태	

- 설계/제조 BOM
 - TB 설계BOM
 - 84701-1C000 C/PAD MAIN
 - 84701-1C010 C/PAD MAIN
 - 84701-1C020 C/PAD MAIN
 - 84701-1C030 C/PAD MAIN
 - TB 제조BOM
 - 84701-1C000AB C/PAD MAIN 중등일반
 - 84701-1C000DB C/PAD MAIN 중등일반 LHD N-PAD
 - 84701-1C000LT C/PAD MAIN 중등일반
 - 84701-1C010DB C/PAD MAIN 중등일반
 - 84701-1C020DB C/PAD MAIN 중국 GCC LHD N-PAD
 - 84701-1C030DB C/PAD MAIN 중국 GCC





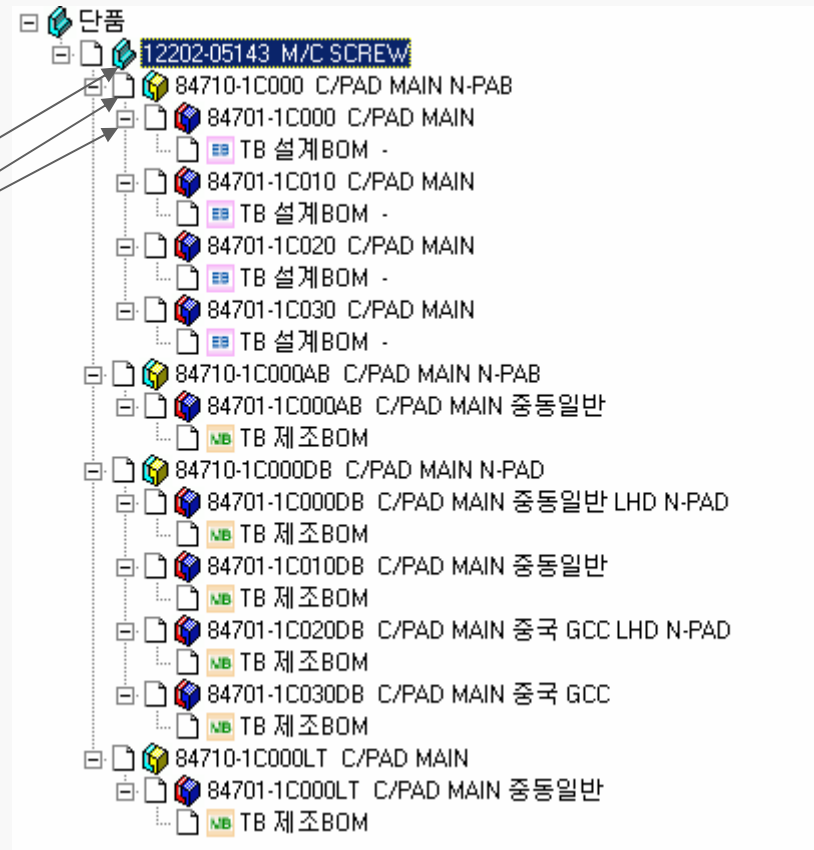
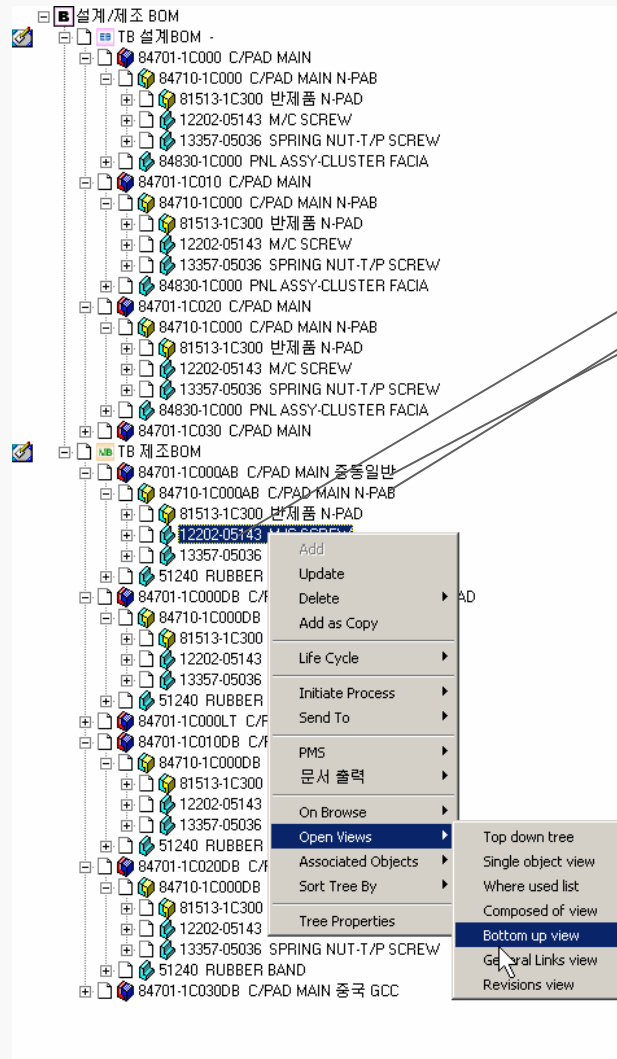
설계/제조 BOM

- TB 설계BOM -
 - 84701-1C000 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C010 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
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 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C020 C/PAD MAIN
 - 84710-1C000 C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 84830-1C000 PNL ASSY-CLUSTER FACIA
 - 84701-1C030 C/PAD MAIN
 - 84701-1C000AB C/PAD MAIN 중동일반
 - 84710-1C000AB C/PAD MAIN N-PAB
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 51240 RUBBER BAND
 - 84701-1C000DB C/PAD MAIN 중동일반 LHD N-PAD
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 51240 RUBBER BAND
 - 84701-1C000LT C/PAD MAIN 중동일반
 - 84701-1C010DB C/PAD MAIN 중동일반
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 51240 RUBBER BAND
 - 84701-1C020DB C/PAD MAIN 중국 GCC LHD N-PAD
 - 84710-1C000DB C/PAD MAIN N-PAD
 - 81513-1C300 반제품 N-PAD
 - 12202-05143 M/C SCREW
 - 13357-05036 SPRING NUT-T/P SCREW
 - 51240 RUBBER BAND
 - 84701-1C030DB C/PAD MAIN 중국 GCC

Profile Card	Links	Notes	Revision		
품번	리비전	부품명(영문)	수량	설계변경번호	Desc
1 84710-1C000		C/PAD MAIN N-PAB	2		
2 84710-1C000LT		C/PAD MAIN	2		
3 84710-1C000DB		C/PAD MAIN N-PAD	2		
4 84710-1C000AB		C/PAD MAIN N-PAB	2		



Bottom up View



I.

II. BOM

III. BOM

IV. BOM

V. BOM

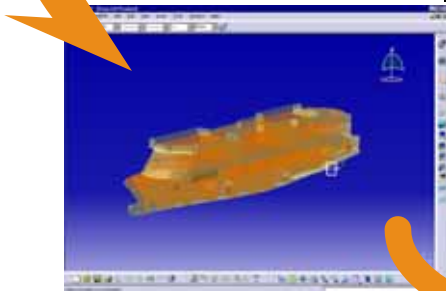
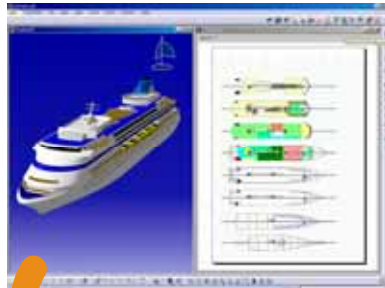


Structural Design Progression

[FROM Dassault Systemes]

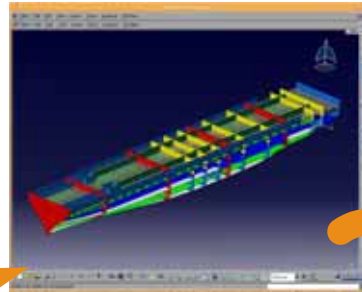
0) Pre-Contractual

- Hull form
- General Arrangement
- Naval Architect Analysis
- Cost Estimate



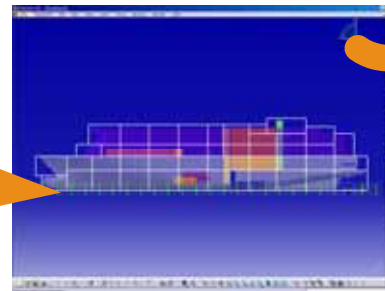
1) Concept Design

- Preliminary Structural Layout
- Compartment and Zoning
- Pre. weight estimates



2.a) Functional Design

- Primary Steelwork
- Through whole ship
- FEM Analysis

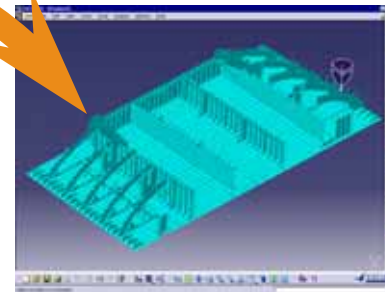


2.b) Work Preparation

- Build Strategy
- Assembly hierarchy
- Welding procedures
- Interim Product

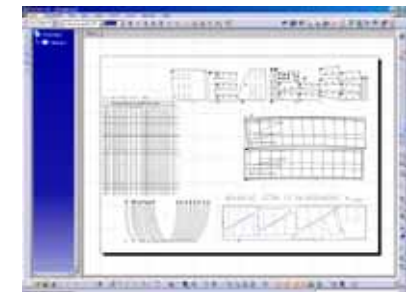
3) Detail Steel Design

- Finalize design per block
- Minor stiffeners, shell plates, end-cuts, slots
- Weld & paint



4) Deliverables extraction

- Manufacturing Data
- Assembly drawings
- Bill of Materials
- Fixture
- Tooling / Lofting

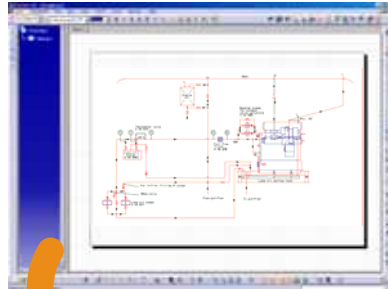


Outfitting Design Progression

[FROM Dassault Systemes]

0) Pre-Contractual

- Flow Diagrams
- General Arrangement
- Propulsion Systems
- Cost Estimate

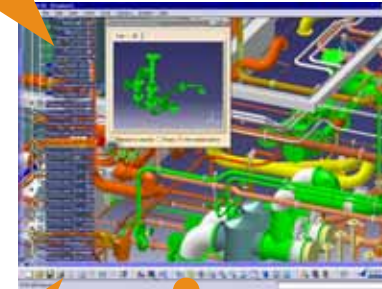


2.a) Functional Design

- P&I/HVAC Diagrams
- Systems Runs
- Equipment Layout

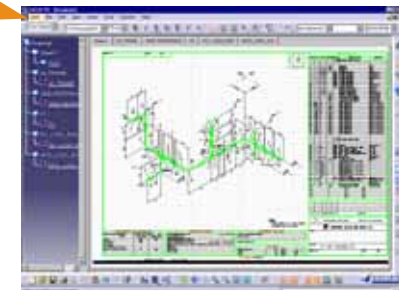
3) Detail Design

- Piping Spec-modeling
- HVAC and Raceway placement
- Structural Foundation
- Pipe Hangers and Penetration design



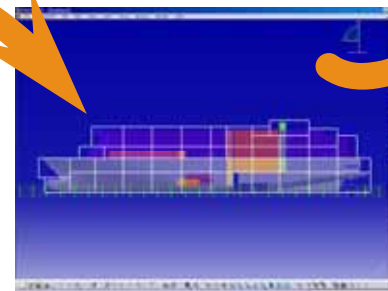
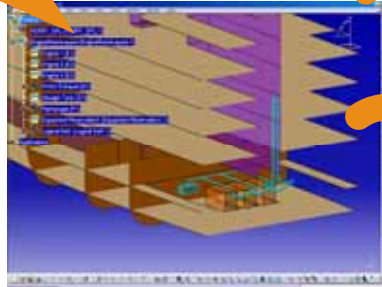
4) Deliverables extraction

- Piping ISOMETRIC
- Piece Drawings
- Assembly drawings
- Bill of Materials
- Loop Diagrams



1) Concept Design

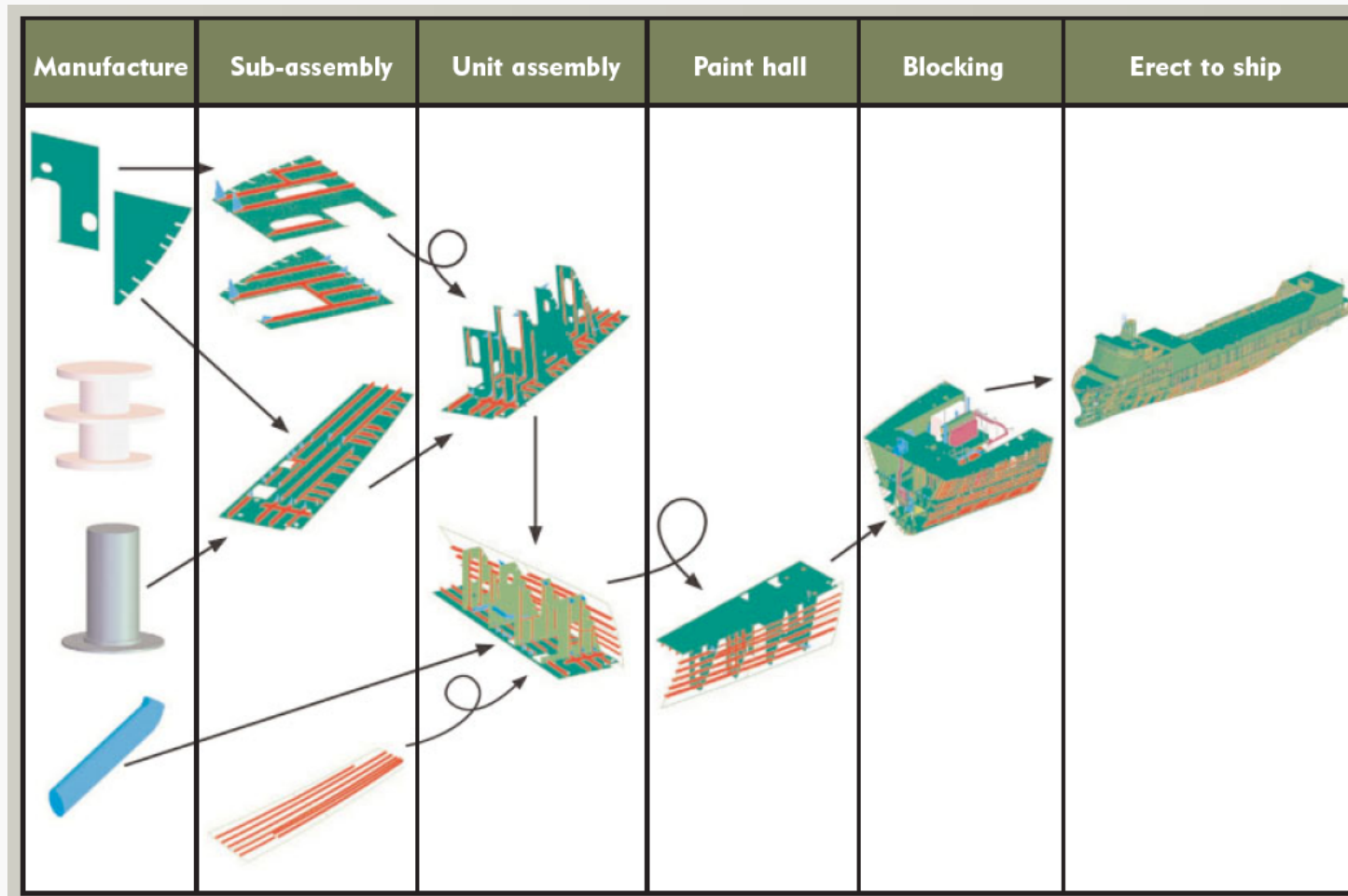
- Space Claim
- Flow Diagram
- Run Ways allocation
- Cost Estimate



2.b) Work Preparation

- Build Strategy
- Assembly hierarchy
- Spool Definition

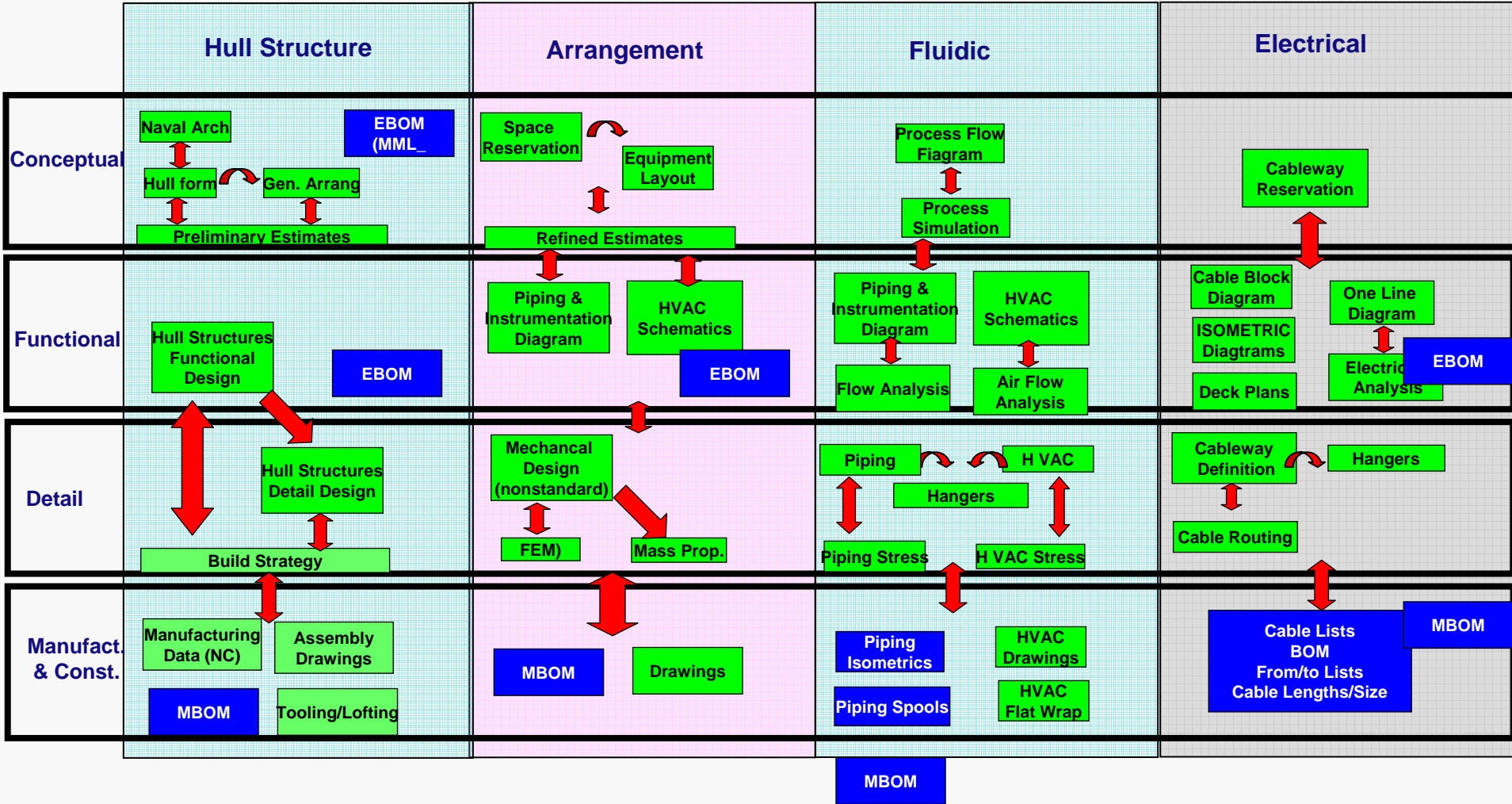
[FROM TRIBON]



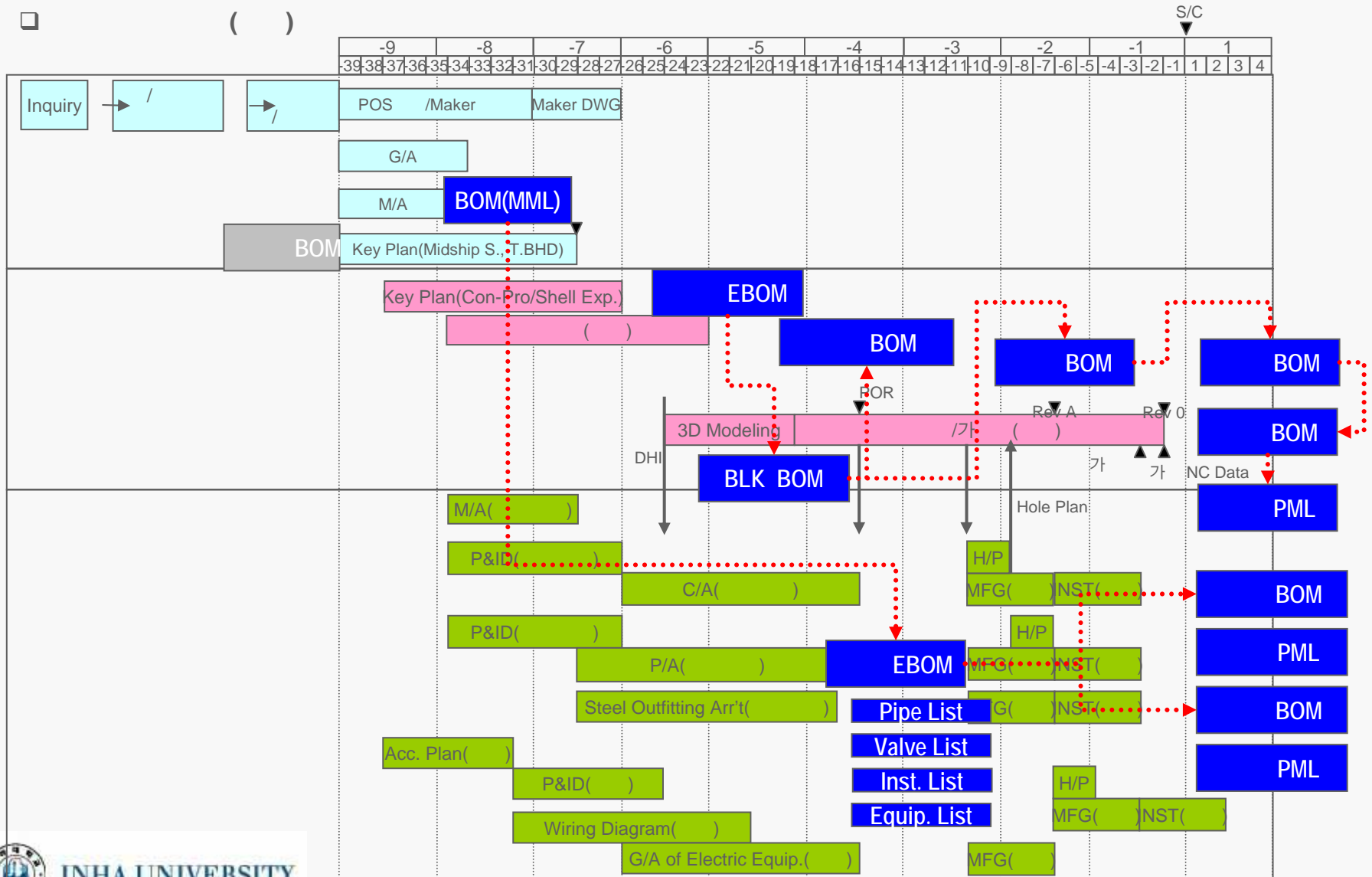


BOM

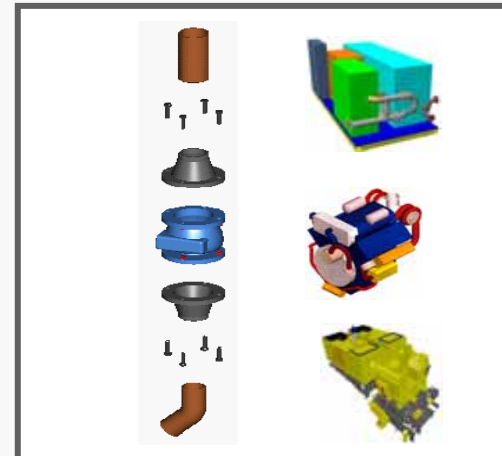
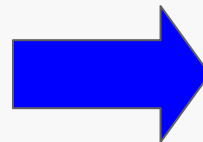
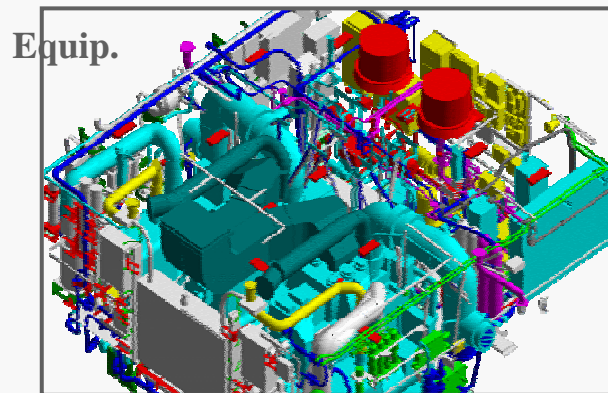
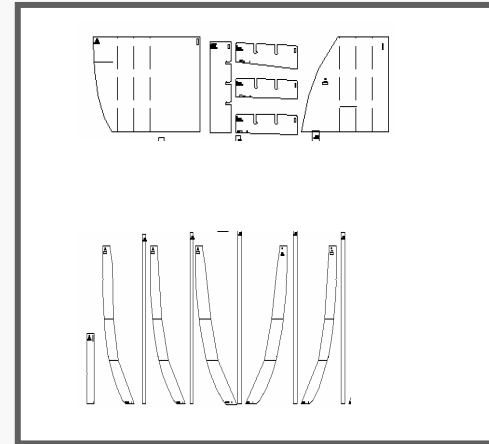
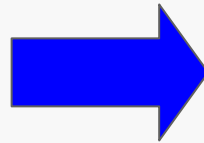
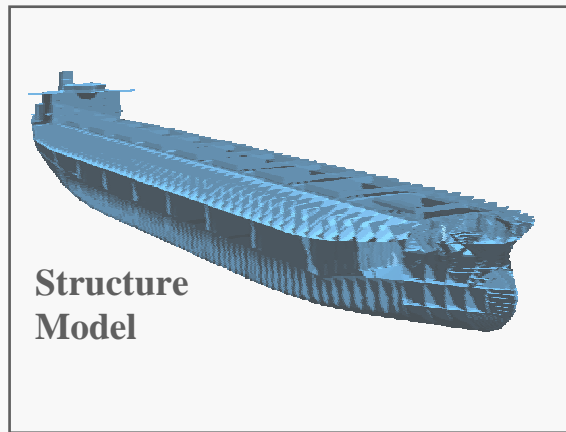
[Modified from Dassault Systemes]



BOM



Ship Ass'y to Raw Material Parts



Navigator Views

- Project Id
 - Design
 - Hull blocks
 - 114
 - 127
 - 136
 - Plane Panels
 - 136-102SP
 - 136-701P
 - 136-701S
 - 136-401P**
 - Plates
 - Stiffeners
 - Pillars
 - Flanges
 - Brackets
 - 136-401P-BRA1
 - 136-401P-BRA2
 - 136-401P-BRA3
 - 136-401P-BRA4
 - 136-405P
 - 136-405S

Model View Scenes

Navigator Views

- Project Id
 - Design
 - Hull blocks
 - Outfitting modules
 - 114
 - 114B
 - 114P
 - 114S
 - 127
 - 127P
 - 127S
 - 136
 - Pipes
 - Equipments
 - FD#221W001
 - FD#514E068
 - Structures
 - 362K004
 - 362K004-P8
 - 362K004-P4
 - 362K004-P1

Model View Scenes

CHANGE PLATE
CHANGE PROFILE
UTILITYS

Structure Design

DIRECTION : Pick up the plate for information.

CROSS SECTIONAL DATA

(%) DNV rule

	ACTUAL (%)
SAREA (cm2) :	98925
N.A. (mm) :	13530
In (m4) :	1400.907 155.8
Z,BOTTOM(m3) :	103.540 139.6
DECK (m3) :	80.190 108.2
f1,BOTTOM :	1.280
DECK :	1.181
f2,BOTTOM :	0.914
DECK :	1.181

OBJECT INFORMATION

One plate of
INNER STB

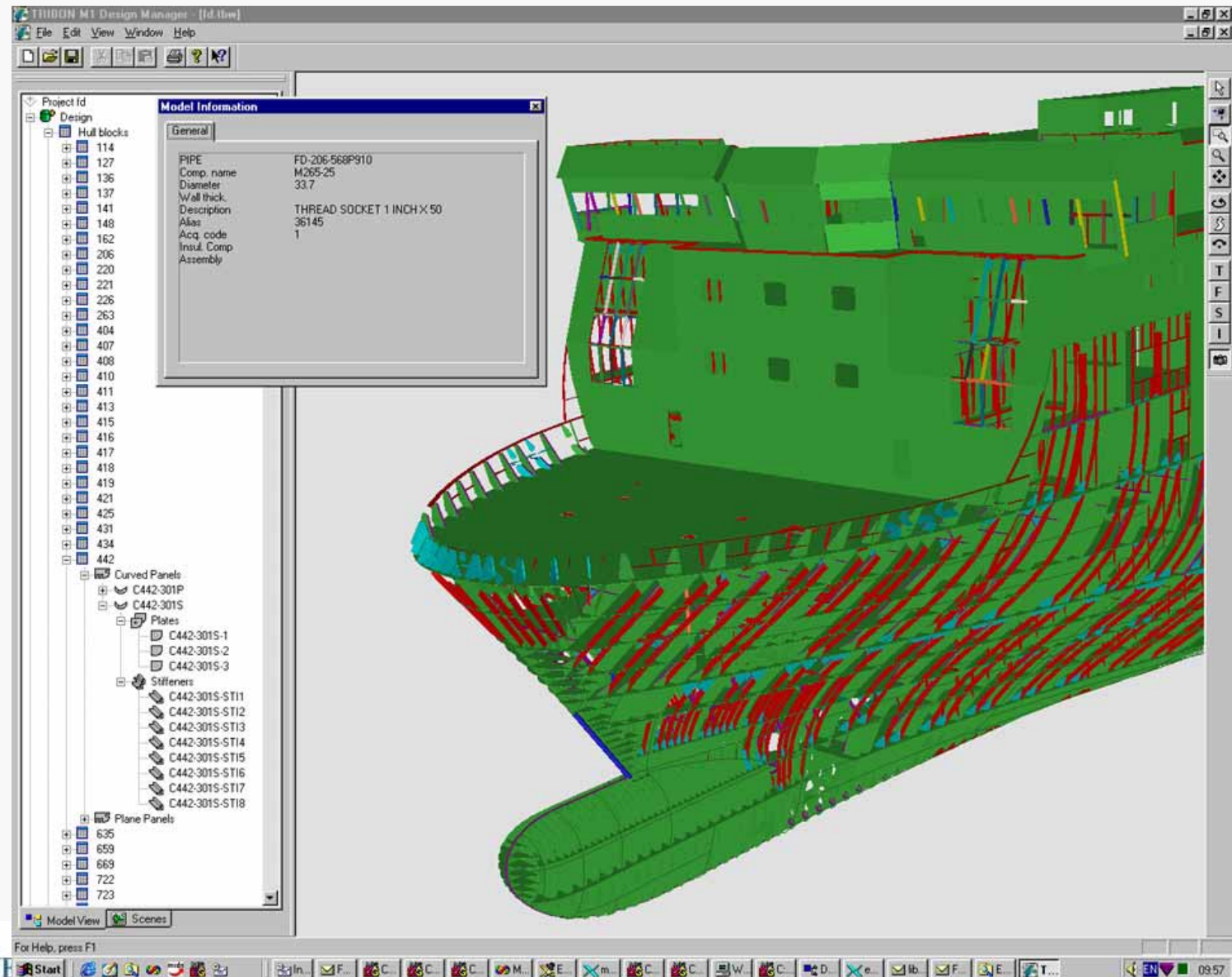
B :	3515 mm
t :	21.0 mm
L :	4859 mm
B :	A832
Start point	
y :	3365 mm
z :	3000 mm
End point	
y :	3365 mm
z :	3000 mm

Y : mm

Z : mm

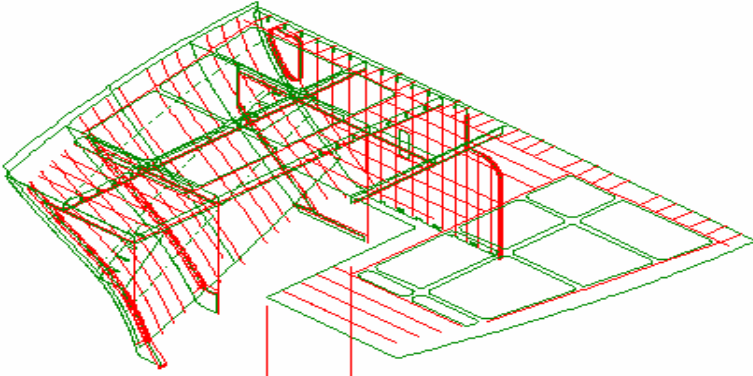


- E-BOM



● < Parts List >

TRIBON PARTS LIST



Name	Qty	Side	Nested	Qual	Thk	Wgt
ES233---1	1	PS		A	20.0	1466
ES233---2	1	PS		A	20.0	1730
ES233---3	1	PS		A	20.0	1997
ES233---4	1	PS		A	20.0	1996
ES233---5	1	PS		A	20.0	2004
ES233---6	1	PS		A	20.0	1993
ES233---7	1	PS		A	20.0	1859
ES233---8	1	PS		A	20.0	1838
ES233-ZONE_01-UPPER-1	18	SB	ES233-10A-01	A	10.0	7
ES233-ZONE_01-UPPER-10	4	SB	ES233-75A-01	A	7.5	436



M-BOM (BOM)

PLATE N/C CUTTING (PC1 ,PC2, PC3)

GRADE	MATERIAL ROLL NUMBER	도면 번호	102808103CNS06	
		작성 일자	1008.07.23	페이지
		인화 번호	1 * 20.0	20
		1182	T-H-J	

자재 사용현황 및 생산정보		순번		부재 번호		수량	단위	비고
자재 번호	10196DDUPLQ20	1	0	1028-103-BK1A-A	5		33	
자재 수량	1	2		1028-103-BK1P-A	5			
자재 규격	12 * 1828 * 6096 NM	3		1028-103-BK7P-A	1			
부재 규격	1050.3 KG	4		1028-103-BK7A-A	1			
부재 무게	621.5 KG	5		1028-103-BK7P-A	1			
SCRAP 률	40.6 %	6		1028-103-BK1A-A	1			
결단 길이	79.7 M	7		1028-103-BK1P-A	6			
마단 길이	24.7 M	8	✓	1028-103-BK1P-A	4			
마단중회전길이	12.3 M	9						
결단중회전길이	10.6 M	10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						
		21						
		22						
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		30						
		31						
		32						
		33						
		34						
		35						
		36						
		37						
		38						
		39						
		40						
		41						
		42						
		43						
		44						
		45						
		46						
		47						
		TOTAL NUMBER OF PARTS :		26 EA				

DAEDONG SHIPBUILDING CO., LTD.
HULL DESIGN OFFICE

M-BOM (BOM)

ttx02 - VT220

PLATE REPORT
=====

Blk	Rig	Pe	Shp	Mem	Area	Weight	Cg_X	Cg_Y	Cg_Z	Leng.	P_Wd	P_Th
514	R13	50N	PBS	P04	1.28116e+08	1.15305e+09	297570	-7726	26092	15019	4265	18
514	R13	50N	PBS	P03	1.28116e+08	1.15305e+09	297570	7726	26092	15019	4265	18
826	FOR	80C	3DS	P23	1.58103e+07	1.42293e+08	305250	4068.	26242	3965	1993	18
836	FOR	80C	3DS	P24	1.58103e+07	1.42293e+08	305250	-4068	26242	3965	1993	18
833	FOR	80A	3DS	P30	1.75449e+07	1.57904e+08	305250	-4068	10820	4400	1993	18
823	FOR	80A	3DS	P29	1.75449e+07	1.57904e+08	305250	4068.	10820	4400	1993	18

ttx03 - VT220

STIFF REPORT
=====

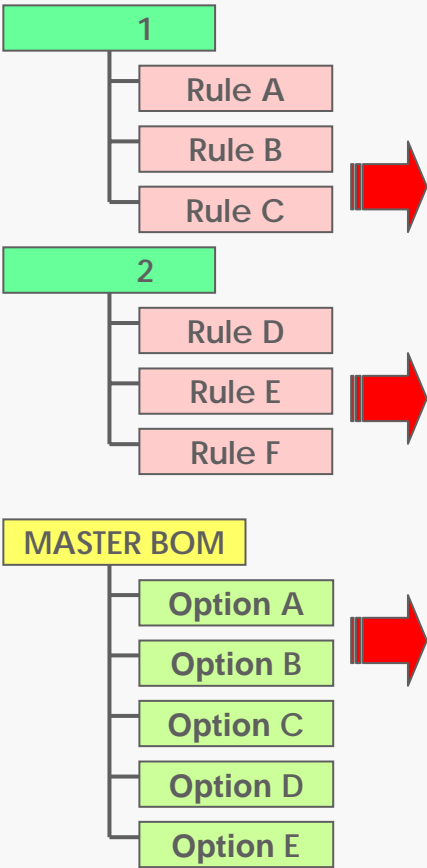
Blk	Rig	Pe	Shp	Mem	Area	Weight	Cg_X	Cg_Y	Cg_Z	Leng.	P_Wd	
514	R13	50N	PBS	B15	1.816e+07	1.224e+08	295737	8153.	24154	11342	600X12+180X20T	3775
836	FOR	80C	3DS	B32	3.213e+06	2.153e+07	305077	-3704	25994	1993.	600X12+180X20T	3775
514	R13	50N	PBS	B12	2.401e+07	1.621e+08	297397	-7				3270
836	FOR	80C	3DS	B33	3.213e+06	2.153e+07	305077	-3				3375
514	R13	50N	PBS	B12	2.405e+07	1.622e+08	297397	-7				3375
514	R13	50N	PBS	B12	2.405e+07	1.622e+08	297397	-7				1993
835	FOR	80B	3DS	B34	3.211e+06	2.153e+07	305077	-3				1993
754	R13	50N	3DS	B11	2.405e+07	1.622e+08	297397	-7				3390
514	R13	50N	PBS	B35	3.308e+07	3.244e+08	297342	72				18
514	R13	50N	PBS	B15	1.816e+07	1.224e+08	295737	-8				18
514	R13	50N	PBS	B12	2.405e+07	1.622e+08	297397	-7				18
514	R13	50N	PBS	B70	3.308e+07	3.244e+08	297342	-7				18
744	R13	50N	3DS	B36	2.405e+07	1.622e+08	297397	73				18
826	FOR	80C	3DS	B96	3.211e+06	2.153e+07	305077	37				18
514	R13	50N	PBS	B77	2.405e+07	1.622e+08	297397	73				18
826	FOR	80C	3DS	B95	3.211e+06	2.153e+07	305077	37				18
514	R13	50N	PBS	B80	2.405e+07	1.622e+08	297397	73				18
826	FOR	80C	3DS	B94	3.211e+06	2.153e+07	305077	37				18

ttx00 - VT220

JOINT REPORT
=====

Host_Blk	Guest_Blk	J_Length	Joint Type
514	514	15019.4760	BUTT
514	744	15019.4760	BUTT
514	826	3965.0000	BUTT
514	825	231.7934	BUTT
826	826	1993.7357	BUTT
826	825	1993.7357	BUTT
514	514	15019.4760	BUTT
514	754	15019.4760	BUTT
514	836	3965.0000	BUTT
514	835	231.7934	BUTT
836	836	1993.7357	BUTT
836	835	1993.7357	BUTT
744	744	15019.4760	BUTT
744	744	15019.4760	BUTT

BOM



형상 관리

BOM 정보

선명: 추가

선명: General Ship A1

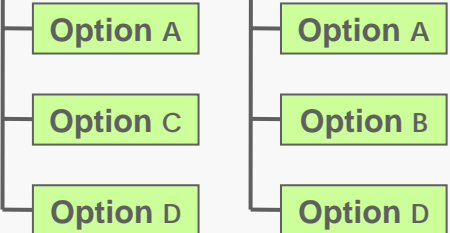
사양 선택: Combo1 사양 추가

선택된 사양: 사양 2 사양 삭제

Feature	Option Number	Option Desc	Option Spec	BOM					
				General Ship A1			General Ship B3		
				기본 사양	사양 1	사양 5	기본 사양	사양 1	사양 7
Satellite commu	OPT-0095		Sat-com B			√			√
	OPT-0096	Satellite communica	Sat-com C	√					√
	OPT-0097		Sat-com F				√		
Main Engine	OPT-0064		MAN B&W, MCR : 4		√	√		√	
	OPT-0065	Main Engine	MAN B&W, MCR : 5		√			√	√
	OPT-0115		MAN B&W, MCR : 6		√			√	
Engine room ho	OPT-0066		Counter Weight			√	√		
	OPT-0067	Engine room hatch	Manual han ench						
M.E. T/C & Alp	OPT-0073		T/C : MAN B&W TC			√			
	OPT-0074	M.E. T/C & Alpha	T/C : MAN B&W TC				√		
Stern lube seal	OPT-0075		Air seal ring type			√			√
	OPT-0076	Stern lube seal	Oil seal ring type						
Composite boiler	OPT-0077		Oil fired / Exh. Gas			√			
	OPT-0078	Composite boiler	Oil fired / Exh. Gas						√
G.E	OPT-0079		1800kw x 720rpm			√			
	OPT-0080	G.E	1800kw x 720rpm	√					
Service Air Res	OPT-0081		1.0m3			√	√		
	OPT-0082	Service Air Reservo	2.0m3						
Incinerator	OPT-0089		700,000 kcal/h			√			
	OPT-0090	Incinerator	750,000 kcal/h	√					
E.R. vent. Fan	OPT-0091		1,700m3/min			√			
	OPT-0092	E.R. vent. Fan	1,000m3/min						
Main generator	OPT-0093		1,800kW			√			
	OPT-0094	Main generator	1,800kW						
General	OPT-0068	Provision crane	3X 10MT 5WL etc.			√			

O K

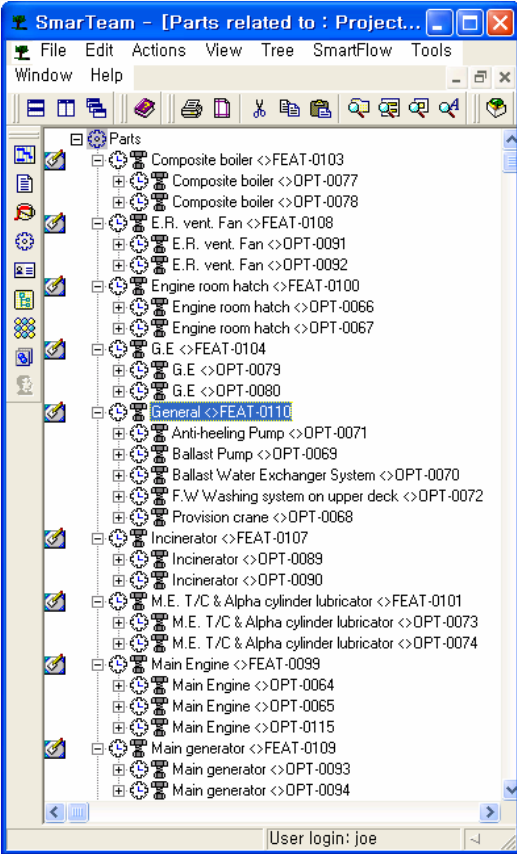
BOM 1 BOM 2



Rules
Validation Check
BOM BK21-



E-BOM (MML)



Master Option



이전 화면

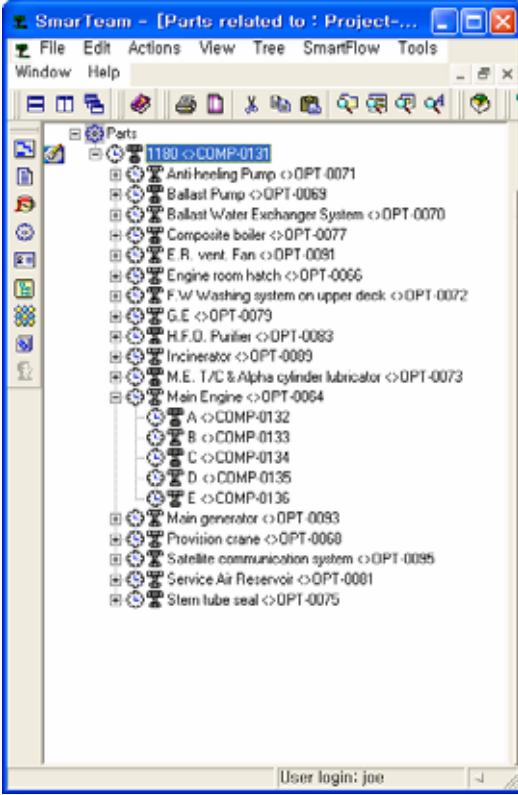
현재 선택 정보: 선택 취소, 신규 추가

사양: 사양 삭제, 사양 추가

Item Master			BOM	
Feature	Option Number	Option Desc	Option Spec	T180
Satellite comms	DPT-0095	Satellite comms	Sub.com B	V
	DPT-0096		Sub.com C	
	DPT-0097		Sub.com F	
Main Engine	DPT-0064	Main Engine	MAN B50W, MCR	V
	DPT-0065		MAN B50W, MCR	V
	DPT-0115		MAN B50W, MCR	
Engine room hatch	DPT-0067	Engine room hatch	Control hatch	V
	DPT-0068		Manual hatch	
M.E. T/C & Alpha	DPT-0074	M.E. T/C & Alpha	T.C. MAN B50W TC	V
	DPT-0075		T.C. MAN B50W TC	
Stem tube seal	DPT-0076	Stem tube seal	As sealing type	V
	DPT-0077		Oil sealing type	V
Composite boiler	DPT-0078	Composite boiler	Oil head F. sh. Gas	V
G.E.	DPT-0079	G.E.	1000kw x 725rpm	V
	DPT-0080		1000kw x 725rpm	V
	DPT-0081		10,600 l/h at 600c	V
Purifier	DPT-0082	M.E.L.D. Purifier	2,950 l/h	V
	DPT-0083		2,950 l/h	
	DPT-0084		4,500 l/h	
	DPT-0085		2,900 l/h	
Service Air Res.	DPT-0086	Service Air Reservo	1.9m ³	V
	DPT-0087		2.9m ³	
Incinerator	DPT-0088	Incinerator	700,000 kcal/h	V
	DPT-0089		760,000 kcal/h	V
E.R. vent. Fan	DPT-0090	E.R. vent. Fan	1,700m ³ /min	V
	DPT-0091		1,800m ³ /min	V
Main generator	DPT-0092	Main generator	1,000kw	V
	DPT-0093		1,000kw	V
Provision crane	DPT-0094	Provision crane	3x 10MT 3rd. elev	V
	DPT-0095		3000kg x 40m. In	V
General	DPT-0070	Anti-heeling Pump	5000kg x 20 mm	V
	DPT-0071		5000kg x 20 mm	V
	DPT-0072	F.W. Washing system	Main line 6.1PG450	V

O K Cancel

Configuration Editor

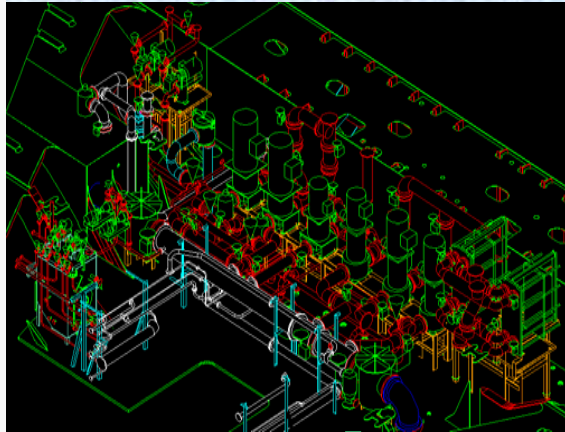


Master BOM

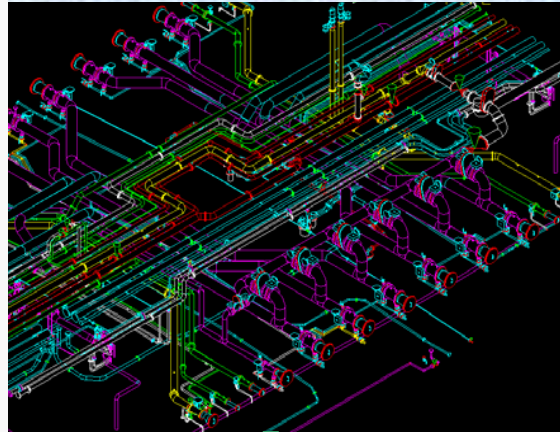


Piping System E-BOM

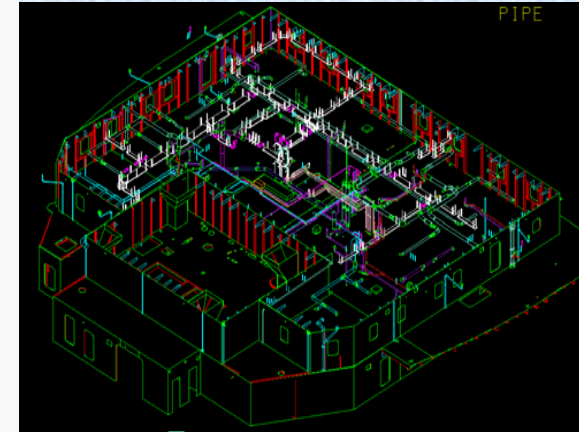
Engine Room Piping



Hull Piping



Accom. Piping



Piece List

NO	REV	NO	PIECE NUMBER	QTY	MATERIAL	DI	LENG	REQD	P.A.	R/T	OUT	IN	W/O	W/O	REMARK
1			SP27-01-1000	1.00	PPSP-25	254	887	3.7	P	OP	84				
2			SP30-01-1000	1.00	PP40-100	1004	543	10.2	P	PT	80				
3			SP01-01-1000	1.00	PPSP-100	1004	381	8.9	P	PT	81				
4			SP28-01-1000	1.00	PP40-100	1004	524	14.5	P	PT	81				
5			SP29-02-1000	1.00	PP40-100	1004	1200	22.5	P	PT	81				

Cutting Plan

D I A	SCHEDULE	MATERIAL	원자재 길이	잔재 길이	부재 길이	STAGE	Pc's no
100A	40	EX	6000	121	1397	3	5
					4482	3	3
100A	40	EX	6000	121	1397	3	5
					4482	3	3
100A	40	EX	6000	261	1748	3	12
					3991	3	2
100A	40	EX	6000	261	1748	3	12
					3991	3	2
100A	40	EX	6000	58	2601	3	10
					3341	3	1
100A	40	EX	6000	58	2601	3	10
					3341	3	1
100A	40	EX	6000	331	547	3	7
					2531	3	11
					2591	3	4
100A	40	EX	6000	331	547	3	7

PIPE M-BOM

Piece List									
HULL NO.	MEG. W/P NO.	MEG. DWG NO.	STAGE	LNST. W/P NO.	LNST. DWG NO.	REV.	DEPT.		
S1028	10BMP1102	10BB			10BMP131TM	0			

97-08-26
Page : 1

Weight List									
HULL NO.	W/P NO.	STAGE	작업 내용	DWG. NO.	REV.	DEPT.	작성자	TEL(☎)	
S1028	10BMP1102	10BB		10BMP131TM	0				

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Page : 1

Material List									
NO.	자재 번호	DESCRIPTION	단위	수량	단위중량	개정사유	POS. NO.	비고	
1	71119-0105	SPP(B) PIPE, E 25A	M	1.1	2.6		G.S.I		
2	71119-0108	SPP(B) PIPE, E 40A	M	3.4	10.4		G.S.I		
3	71119-0120	SPP(B) PIPE, E 100A	M	0.2	2.2		G.S.I		
4	71119-0520	SPPS(B) PIPE, E #40, 100A	M	1.9	29.5		G.S.I		
5	71119-0525	SPPS(B) PIPE, E #40, 125A	M	1.3	26.6		G.S.I		

97-08-26
Page : 1

Piece Drawing

DWG. NO. 10BMP131TM
Dwg. BI. YHC
DATE 97-08-23
FR 31 + 130
OFFIC. (PVO) 1 6

HULL NO.	SYSTEM	LINE NO.	PC'S NO.	STAGE	TYPE	선급	수령	수령 부서	품명
S1028/29	FM	58	004	118A	F	-	-	-	중량

NO.	종류 및 규격	QTY	입장	차지 번호	REMARK
1	COPPER PIPE, SMLS 2.0T x 45A	1813	1613	71029-1493	
2	BRAZING TYPE COUPLING (G1226T) 2.0T 45PHI	1	20	73YE9-1417	

VIEW INFORMATION	표기 정보	제각 정보
1. 정면도	2. 좌측면도	3. 상면도
4. 평면도	5. 단면도	6. 등시도

고조	중조	소조	작성	검核	확인	승인	수입	NOT TEST	내면	외면	용접
0	0	0	0	0	0	0	0	0	0	0	0

000 FILE NAME : DAEDONG SHIPBUILDING CO., LTD. P1008-0101E



Pipe M - BOM

Pipe Support

Seat

NO.	DESCRIPTION	MARK NO.	MAT'L	SIZE	QTY	WEIGHT	REMARK
26	RIB PLATE	W1-26	SS400	230 x 122 x 164	7	19.1	
25	RIB PLATE	W1-25	SS400	230 x 187 x 164	2	4.6	
24	RIB PLATE	W1-24	SS400	230 x 137 x 164	2	6.3	
23	RIB PLATE	W1-23	SS400	290 x 85 x 164	2	4.1	
22	RIB PLATE	W1-22	SS400	290 x 167 x 164	3	10.3	
21	RIB PLATE	W1-21	SS400	185 x 117 x 164	4	6.6	
20	RIB PLATE	W1-20	SS400	185 x 87 x 164	4	5.2	
19	BRACKET	W1-19	SS400	315 x 277 x 184	1	7.9	
18	BRACKET	W1-18	SS400	377 x 315 x 184	6	59.6	
17	BRACKET	W1-17	SS400	487 x 315 x 184	1	16.9	
16	BRACKET	W1-16	SS400	462 x 315 x 184	1	15.9	
15	BRACKET	W1-15	SS400	422 x 315 x 184	3	35.1	
14	BRACKET	W1-14	SS400	582 x 315 x 184	1	21.4	
13	BRACKET	W1-13	SS400	432 x 315 x 184	1	15.7	
12	BRACKET	W1-12	SS400	372 x 230 x 184	4	27.3	
11	BRACKET	W1-11	SS400	557 x 220 x 164	1	11.7	
10	BRACKET	W1-10	SS400	1064 x 230 x 164	2	69.1	
09	WEB PLATE	W1-09	SS400	2030 x 315 x 164	1	69.0	
08	WEB PLATE	W1-08	SS400	1910 x 315 x 164	1	66.6	
07	WEB PLATE	W1-07	SS400	2070 x 315 x 164	1	70.6	
06	WEB PLATE	W1-06	SS400	3300 x 230 x 164	1	87.6	
05	WEB PLATE	W1-05	SS400	3385 x 230 x 164	1	85.9	
04	TOP PLATE	W1-04	SS400	1460 x 280 x 204	1	65.0	
03	TOP PLATE	W1-03	SS400	1460 x 540 x 204	1	81.2	
02	TOP PLATE	W1-02	SS400	1500 x 720 x 204	1	111.6	
01	TOP PLATE	W1-01	SS400	2825 x 1380 x 204	1	323.6	



MFG. OF WINDLASS/WINCH SEAT

PAGE	/
HULL NO	S-1048/47
DWG. NO	



Why BOM ? What BOM?

- - ATO, ETO, MTO, MTS
- - (P,P,R,S/C)
- BOM
 - Modular BOM?
 - Project BOM?



- Accuracy: 98~100%
- MRP 98%
- → Exception Message 가 → BOM → !
- 1. Team Meeting
- 2. Sampling WOD
- 3. Manufacturing & Disassemble
- 4. Greatest Experts





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