Sixth Framework Programme

IMPROVE

DESIGN OF IMPROVED AND COMPETITIVE PRODUCTS USING AN INTEGRATED DECISION SUPPORT SYSTEM FOR SHIP PRODUCTION AND OPERATION

2 October 2006

Title

- SIXTH FRAMEWORK PROGRAMME
- PRIORITY 1.6.2:
- SUSTAINABLE SURFACE TRANSPORT

IMPROVE :

➔RDMM = Rational decision making methods

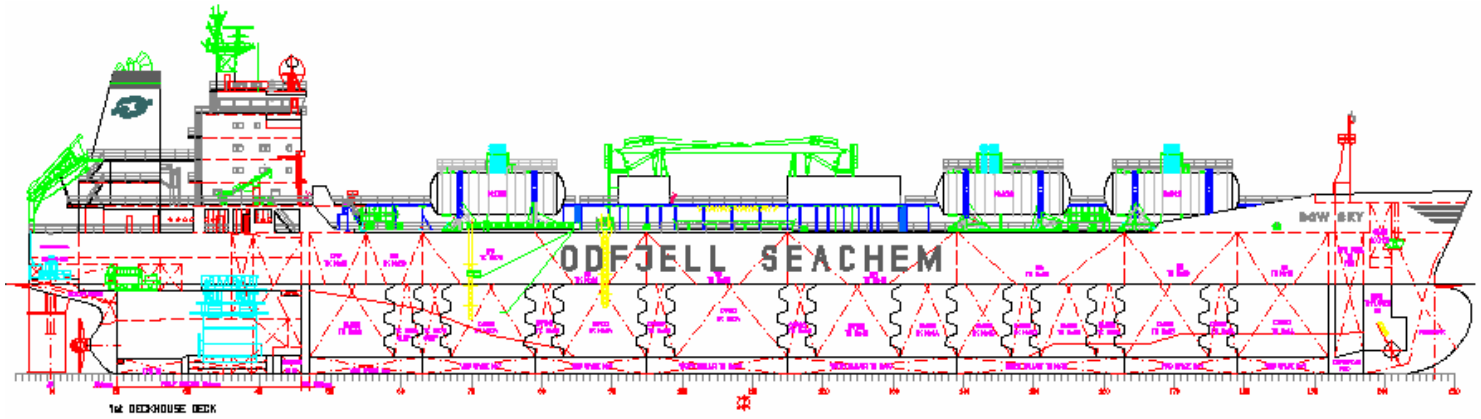
➔DSP = Decision Support Problem

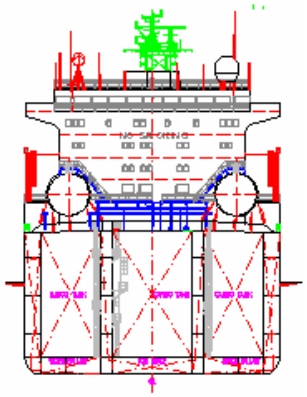
CHEMICAL TANKER
of
STOCZNIA SZCZECINSKA NOWA

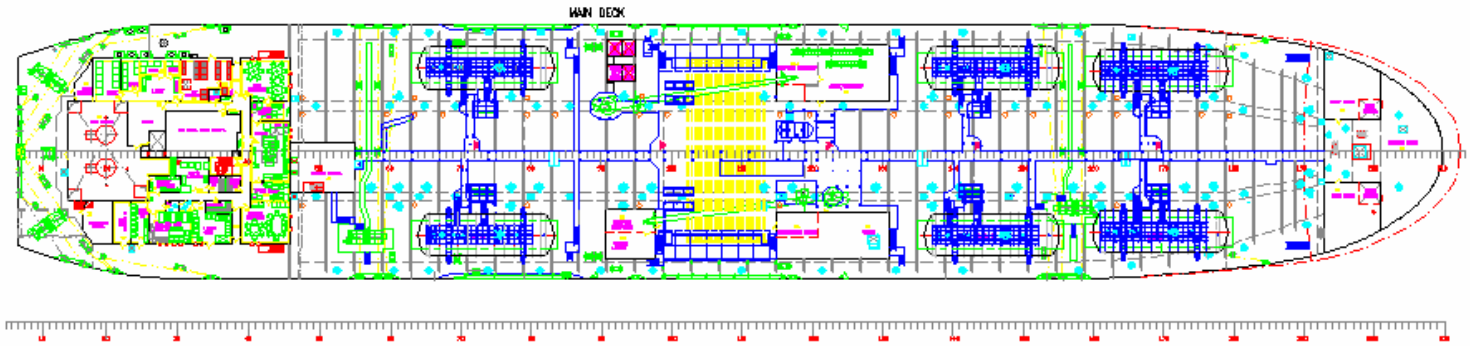
SHIP MAIN PARTICULARS

- Length O.A. 182.88 m
- Length B.P. 175.25 m
- Breadth moulded 32.20 m
- Depth to M.D. 17.95 m
- Design draught 10.80 m
- Scantling draught 11.50 m
- Deadweight 40 000 mt
- Service speed 15.3 kn

SHIP GENERAL ARRANGEMENT





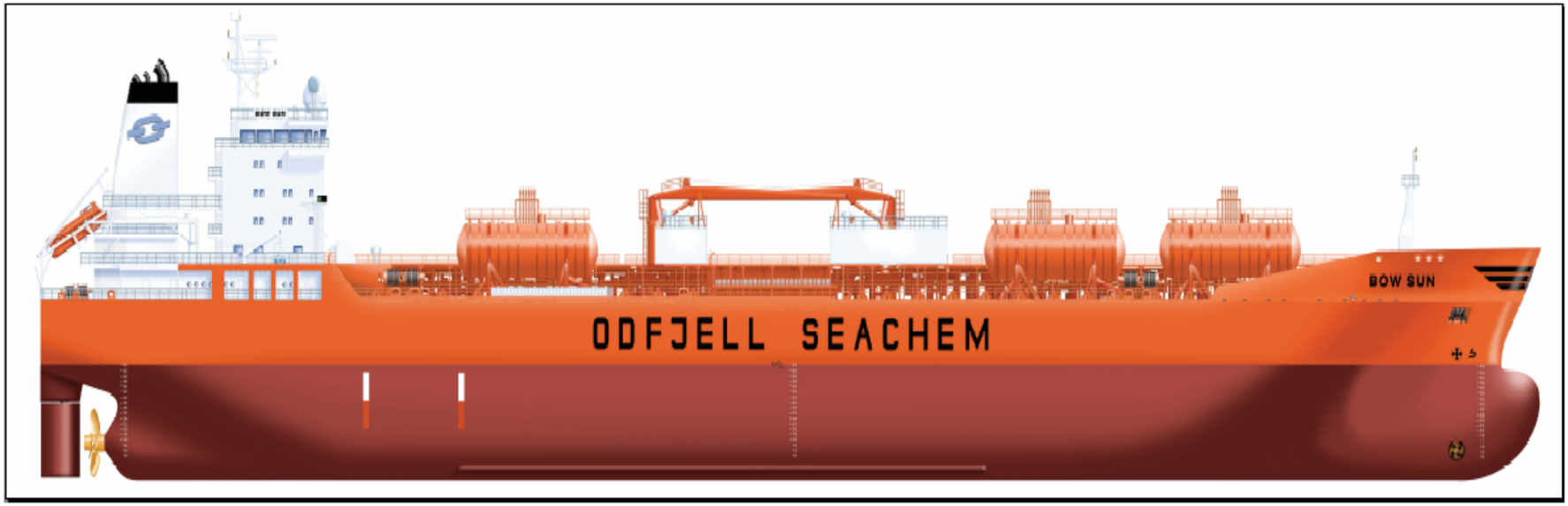


MAIN DATA

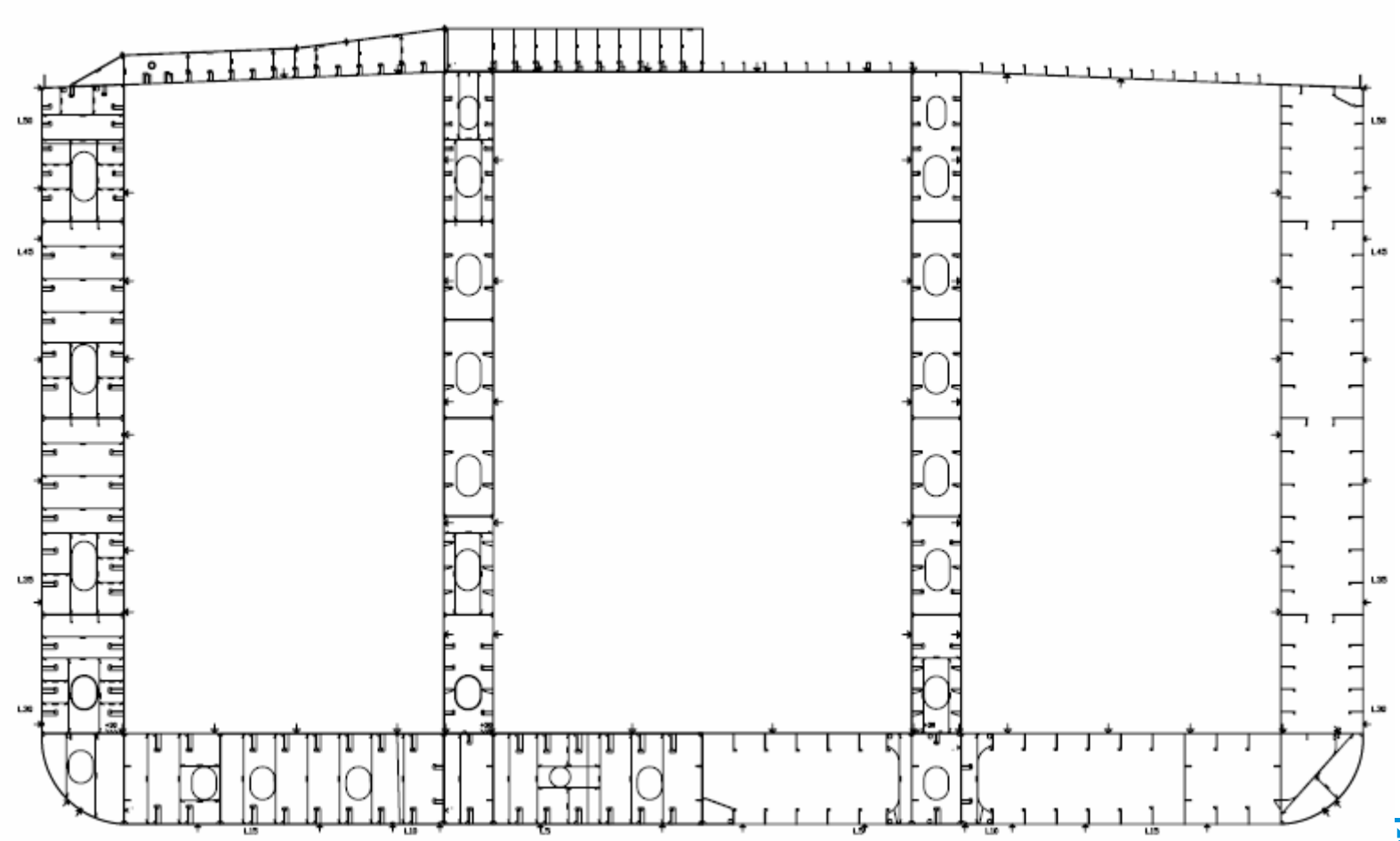
LENGTH O.A.	max 182,88	m
LENGTH B.P.	175,25	m
BREADTH MOULDED	32,20	m
DEPTH	17,95	m
DRAUGHT	10,50	m
DRAUGHT	11,50	m
DEADWEIGHT	36 000	mt
DEADWEIGHT	39 500	mt
CARGO TANKS CAPACITY	50 092	m^3
CARGO DECK TANKS CAPACITY	2 124	m^3
SERVICE SPEED	15,3	kn
COMPLEMENT	32prs+1Pilot+6(Suez Crew)	
CLASS: DNV;		

FLAG : Singapore

SHIP GENERAL VIEW



TYPICAL MIDSHIP SECTION

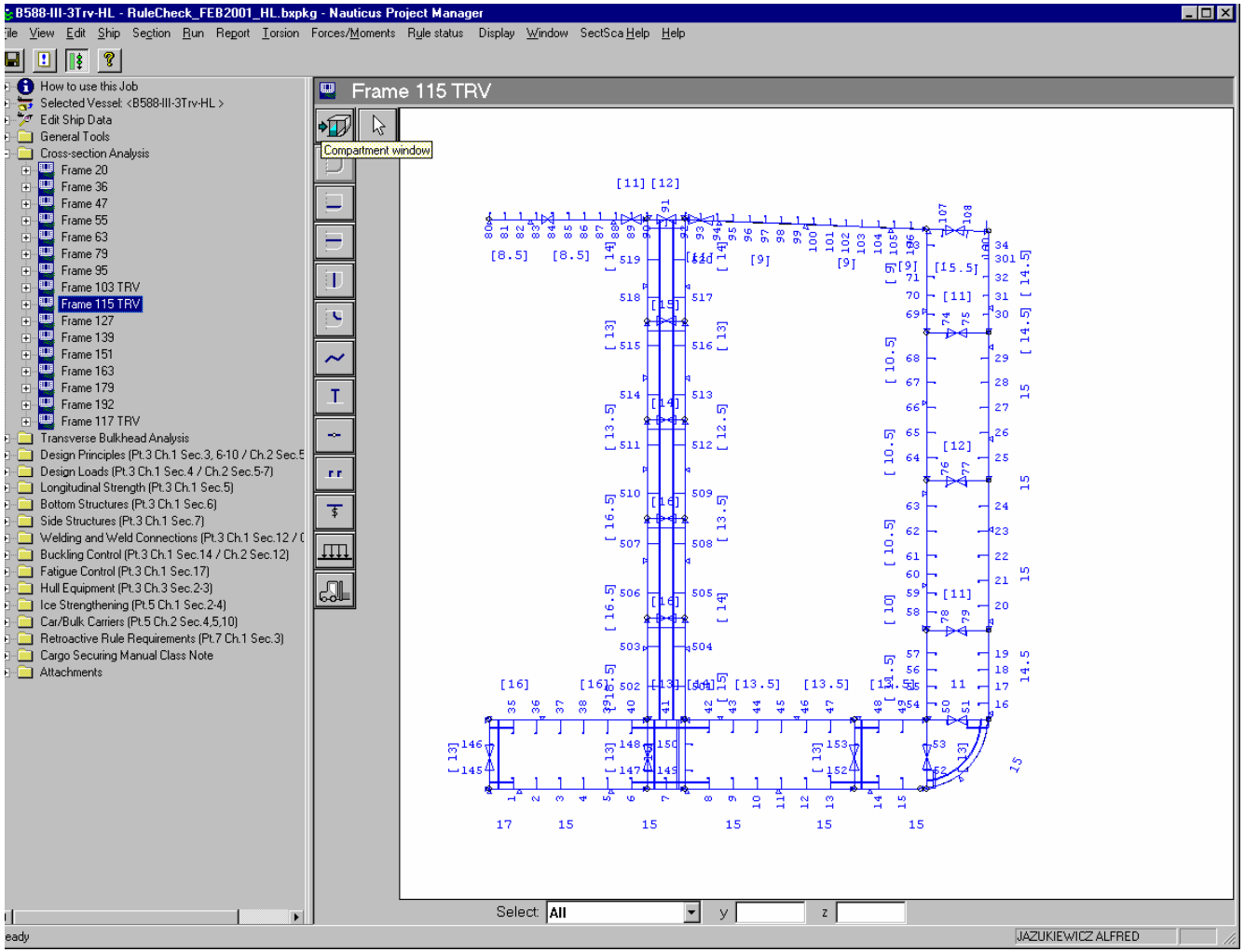


CLASS NOTIFICATION

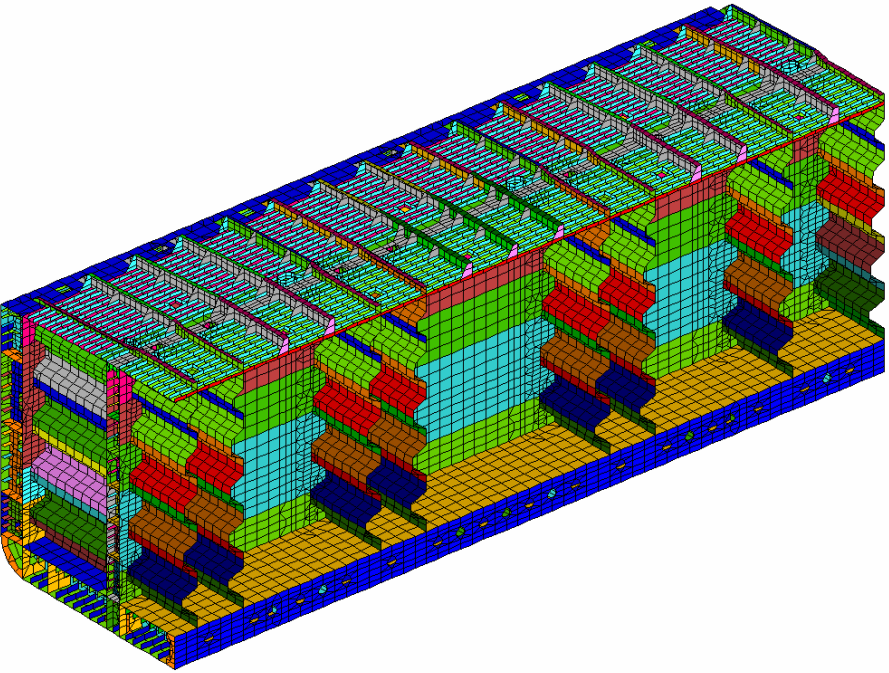
DnV + 1A1, Tanker for Oil Products and Chemicals
ESP, E0, NAUT-OC, LCS (SID), ETC, HL
(1.85 t/m3 for center tanks,
1.25t/m3 for wing tanks
1.70t/m3 for deck tanks)
VCS 2, PLUS-2, NAUTICUS (Newbuilding), Ship type 1&2.
Center/slop tanks a2, b3, c3, v3, f2, str 0.1, ss, T4 IIA / IIB /IIC
Wing tanks a2, b3, c3, v3, f2, str 0.1, ss, T4 IIA / IIB
Deck tanks a3, b3, c3, v3, f3, str 0.1, ss, T4 IIA / IIB

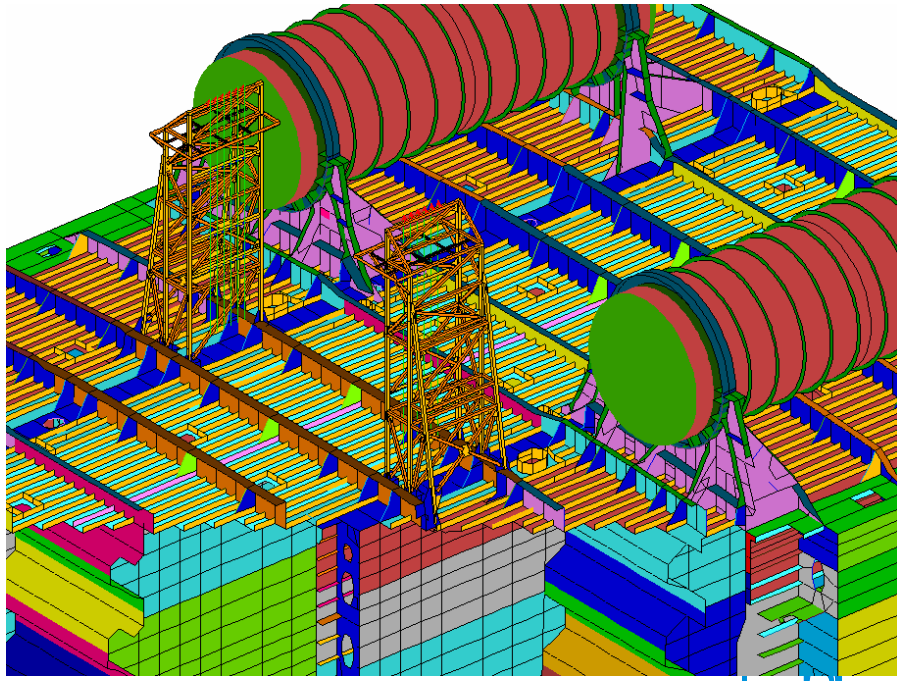
ABS + 1A1(E), Chemical and Oil Carrier SH, +AMS, +ACCU, OMBO, Ship type 1&2 (IBC CODE), ESP, VEC, R1, UWILD, COW.

DNV RULE STRENGTH CALCULATIONS

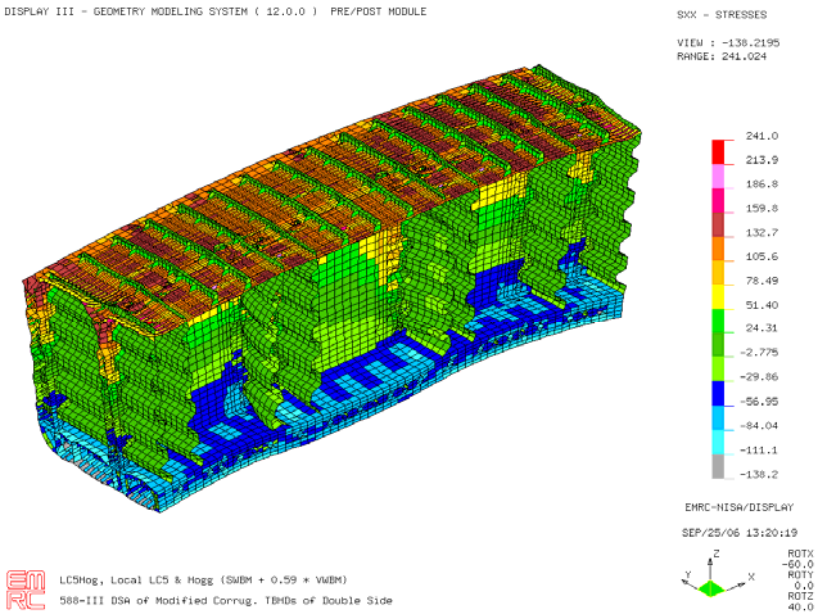


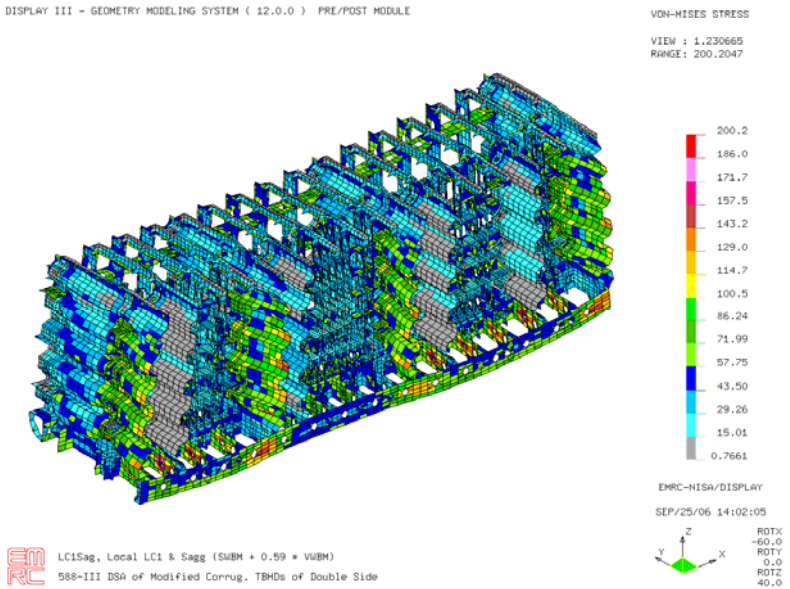
3D MODEL of CARGO HOLD REGION



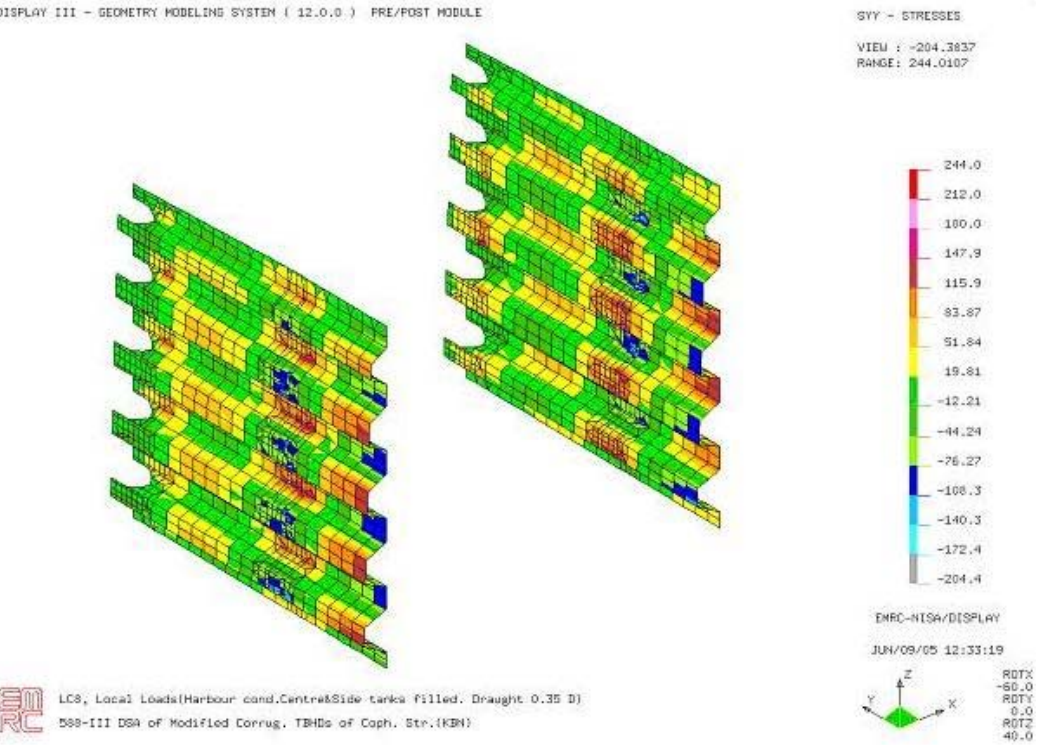


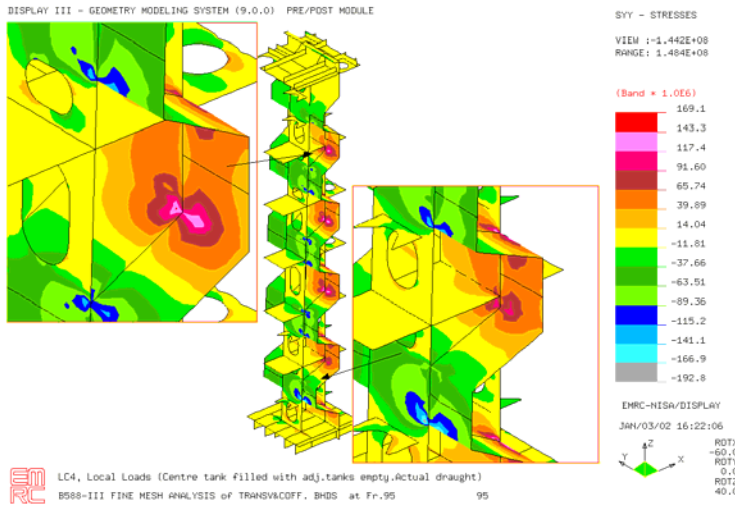
HULL STRUCTURE STRENGTH
DIRECT CALCULATION (global strength)



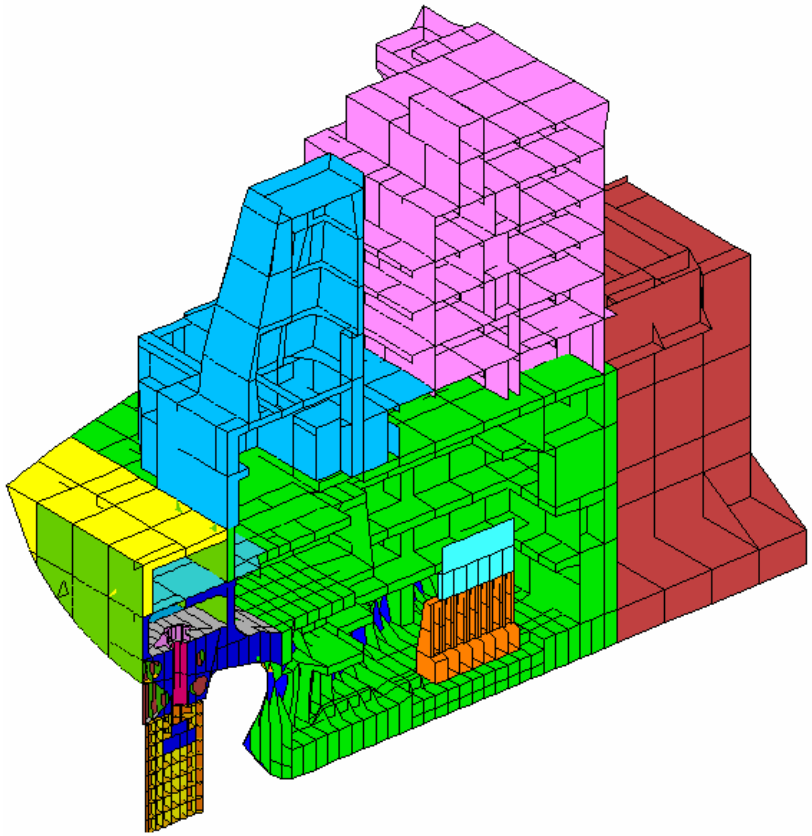


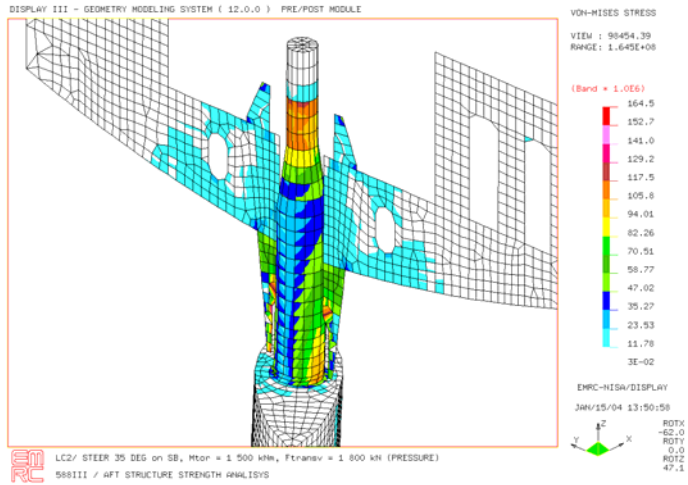
HULL STRUCTURE STRENGTH
DIRECT CALCULATION (local strength)

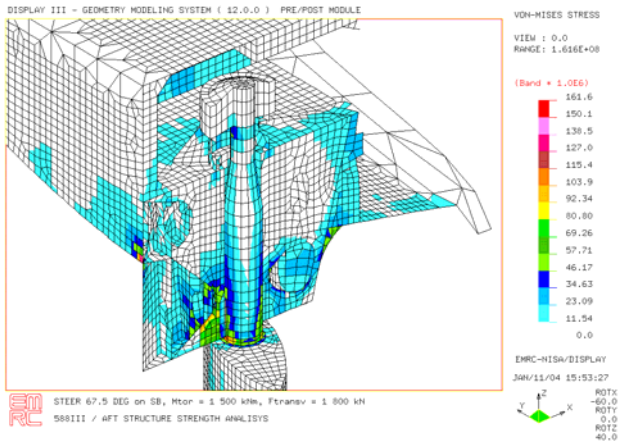




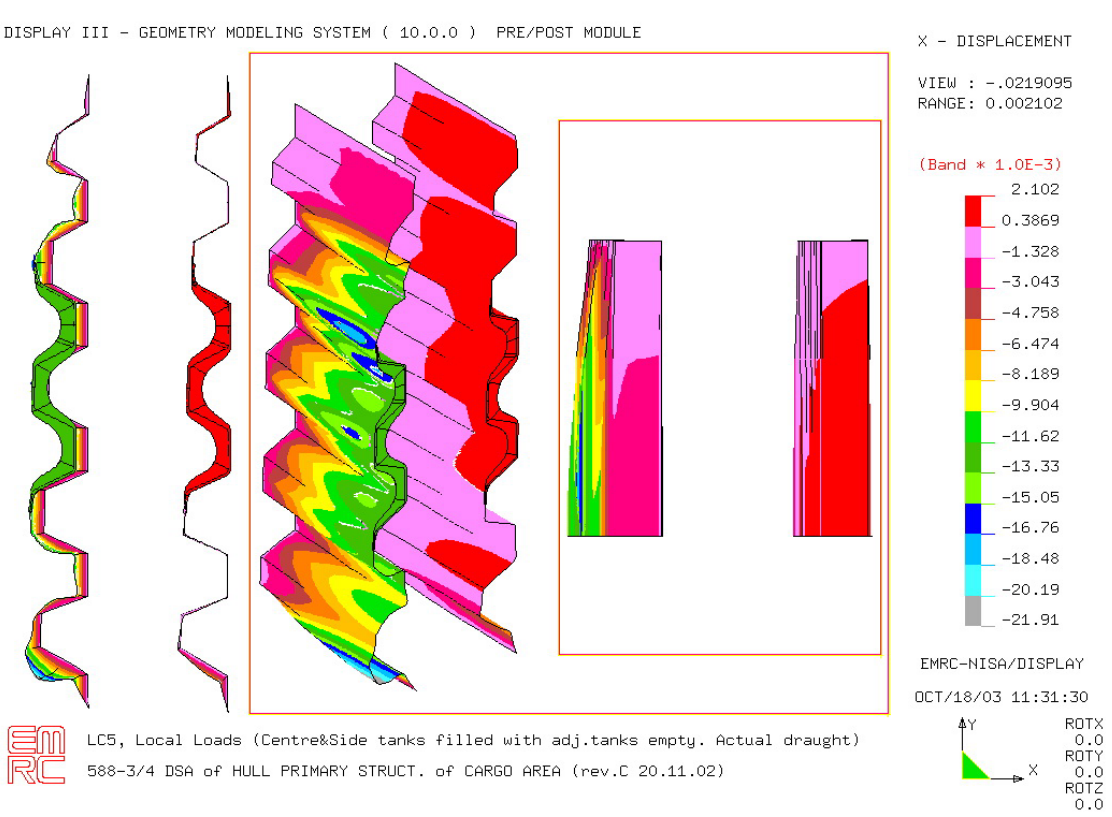
HULL STRUCTURE STRENGTH
DIRECT CALCULATION (aft region & steering gear)

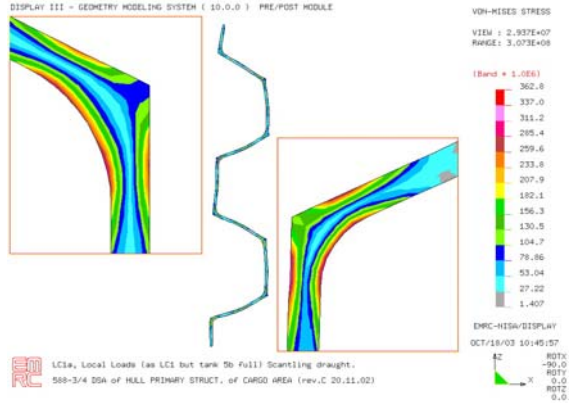


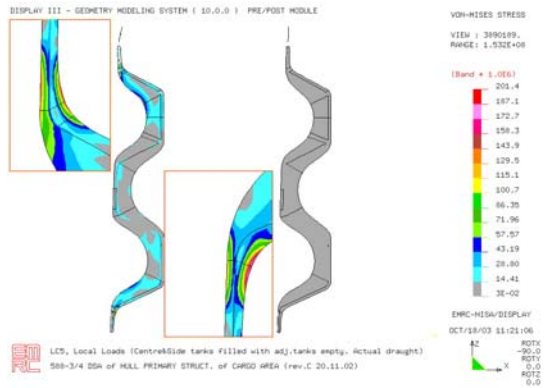




HULL STRUCTURE STRENGTH
DIRECT CALCULATION (due to modifications)







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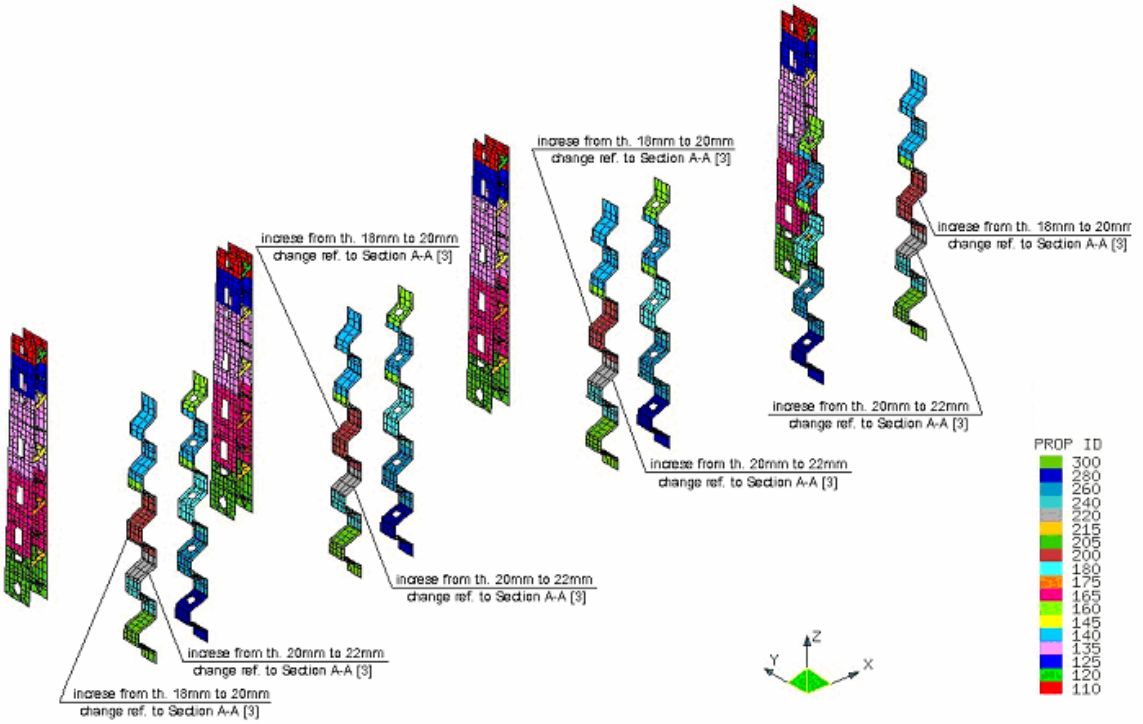
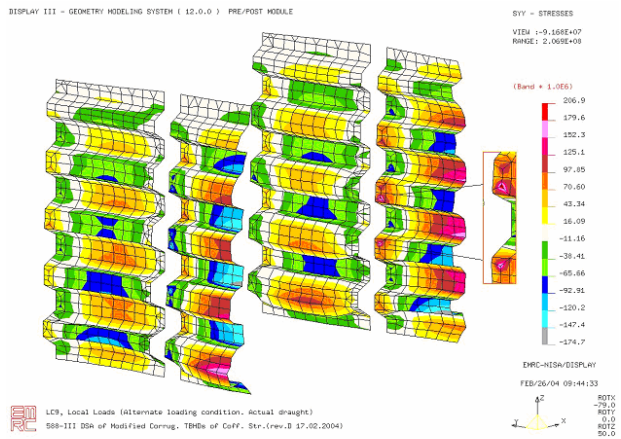
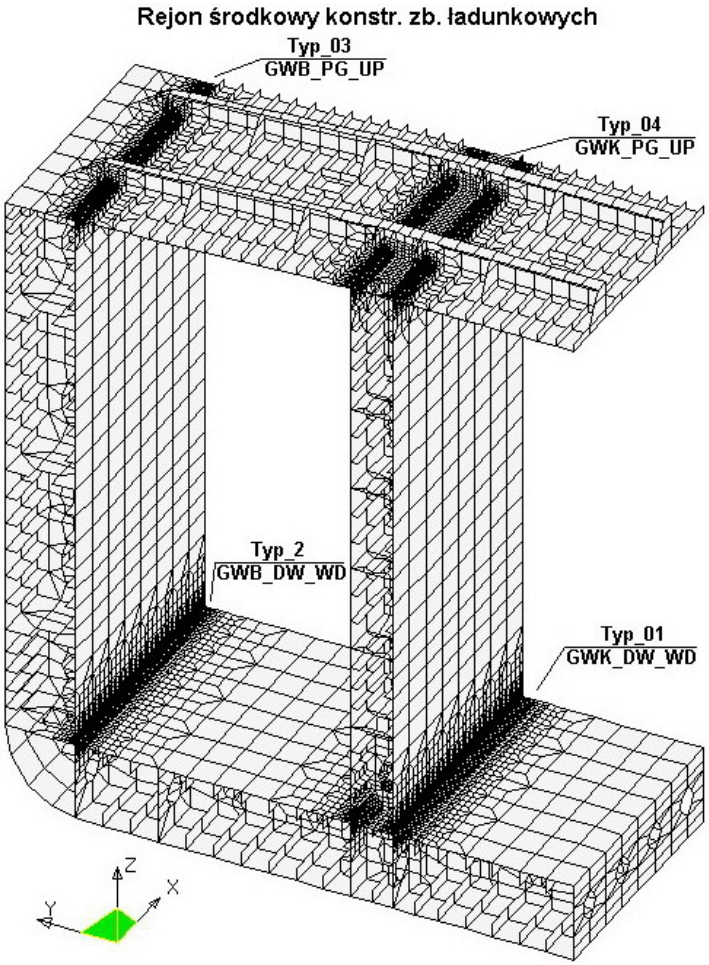
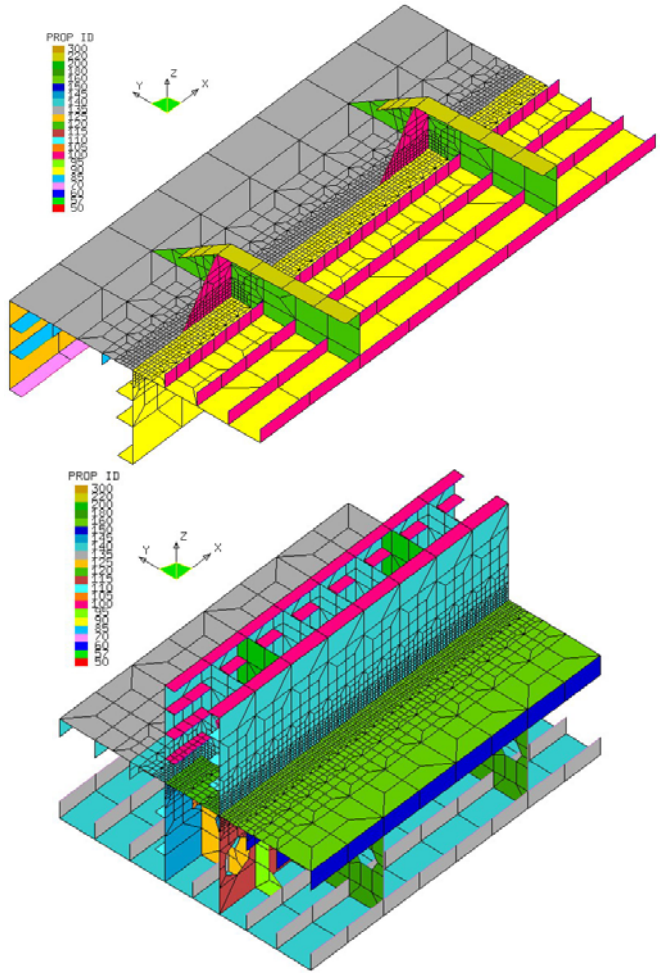


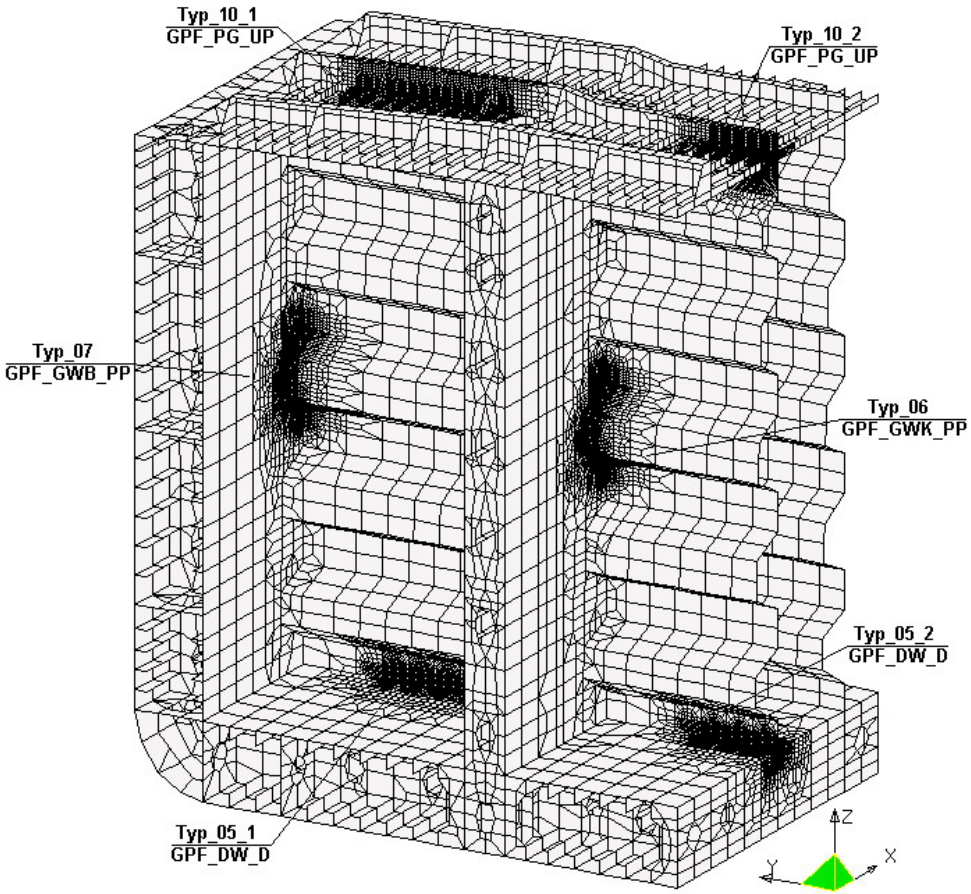


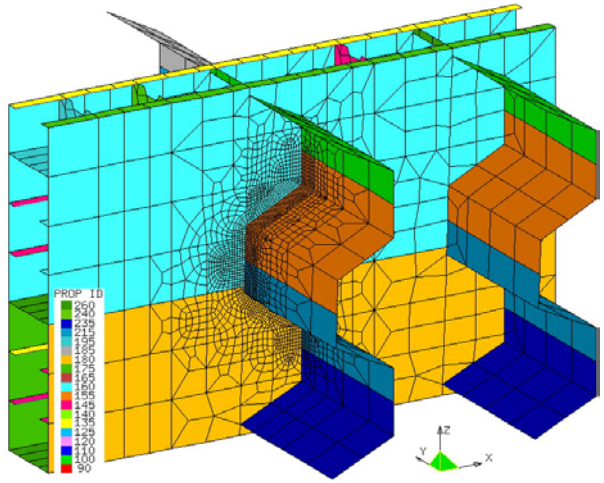
HULL STRUCTURE STRENGTH
DIRECT CALCULATION (fatique strength)

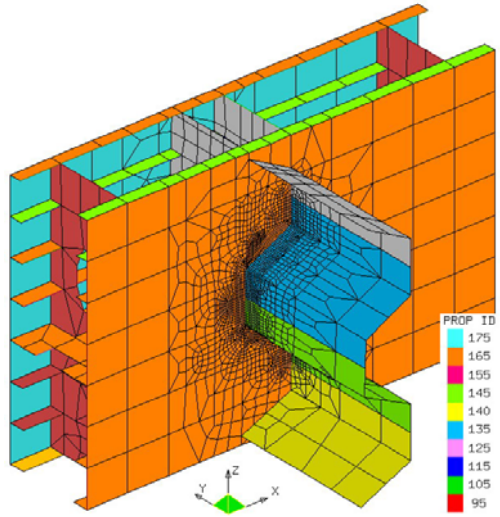




HULL STRUCTURE STRENGTH
DIRECT CALCULATION (fatique strength)



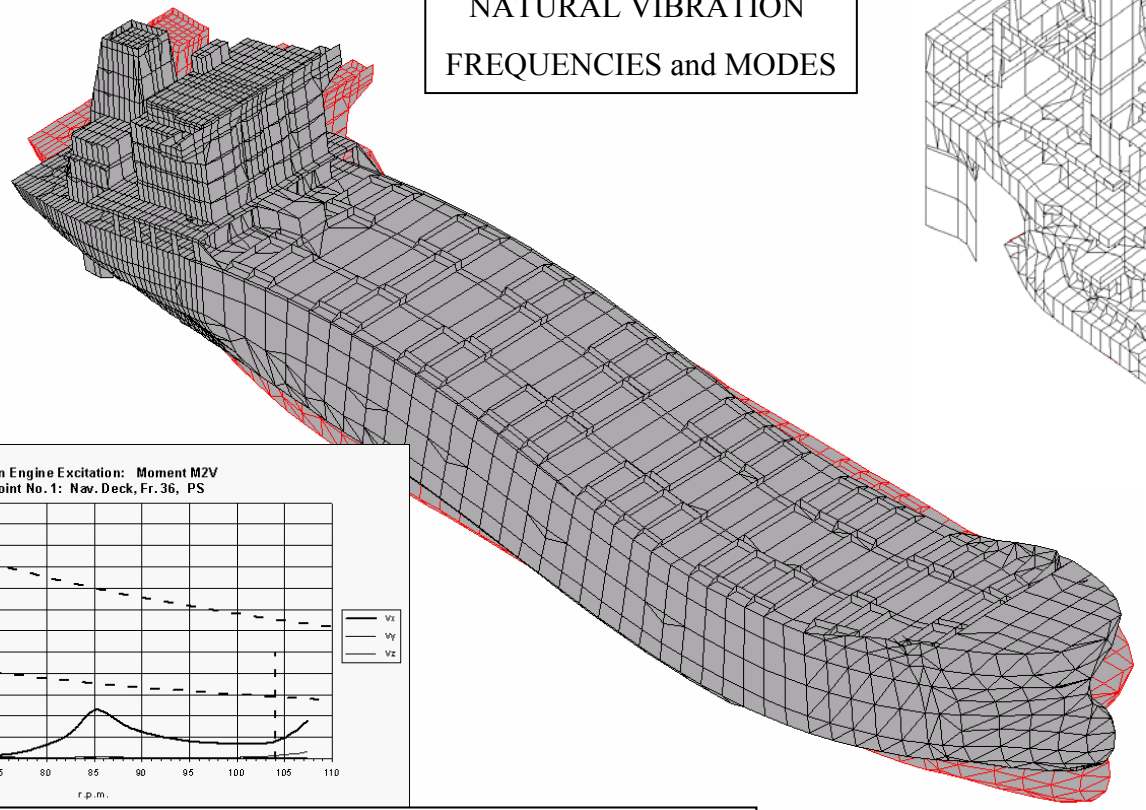


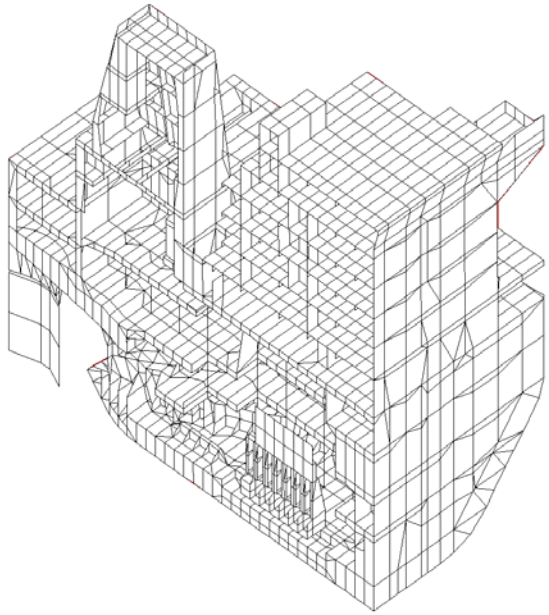


HULL and SUPERSTRUCTURE
GLOBAL VIBRATION CALCULATION

NATURAL VIBRATION

FREQUENCIES and MODES

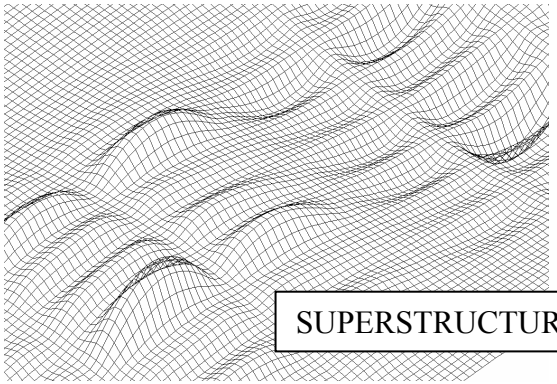




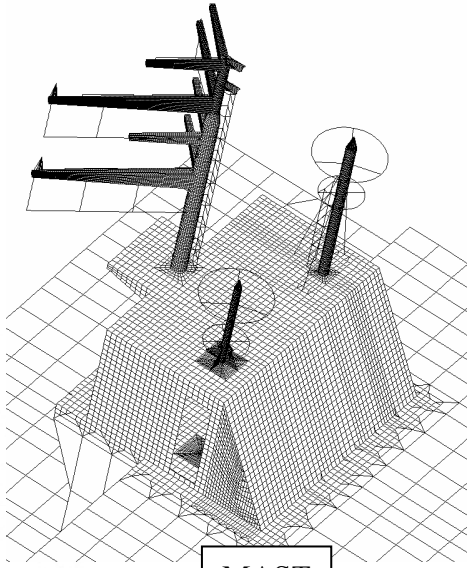
FORCED VIBRATION

RESPONSES to ME and PROPELLER EXCITATIONS

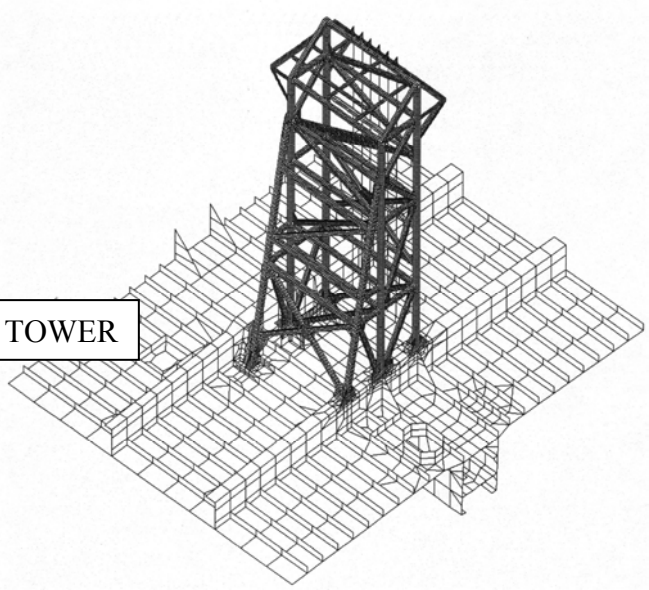
LOCAL STRUCTURE VIBRATION CALCULATION



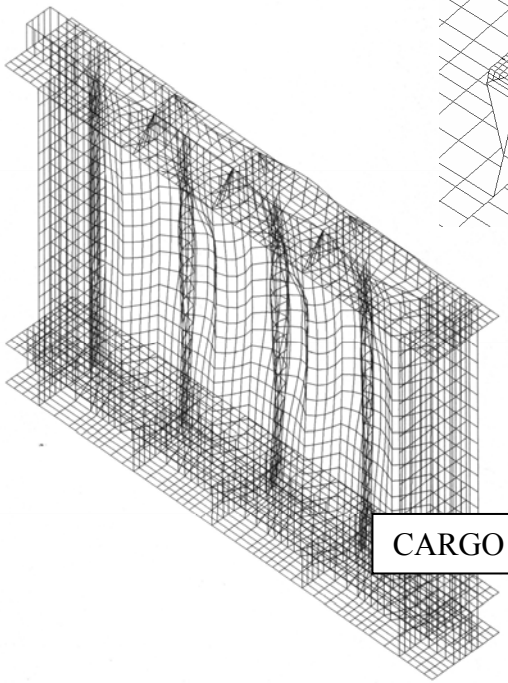
SUPERSTRUCTURE DECK



MAST



DECK TOWER



CARGO TANK BULKHEAD

SOFTWARE TOOLS APPLIED in CHEMICAL TANKER DEVELOPMENT

- Naval Architecture Soft.: NAPA
- Rule based structural design: SAFEHULL, NAUTICUS
- Hull structure design and modelling: TRIBON
- Direct Strength calculation: EMRC NISA II (FEM)
- Global and local vibration calculation: EMRC NISA II (FEM)

IMPROVED PRODUCT DESIGN of CHEMICAL TANKER

Use tools and methodologies developed within IMPROVE for:

- Improved Rules-based design
- Rearrangement of ship space (different number of cargo tanks)

Targets to achieve:

- Minimize material consumption, especially DUPLEX steel
- Minimize steelworks, especially welding of DUPLEX steel

Thank You for Your Attention !