

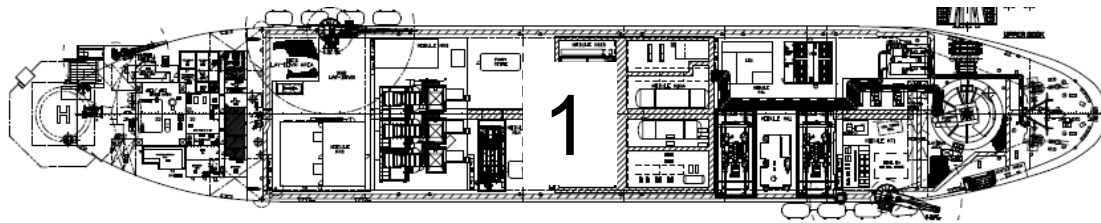


Modeling ships and ship collisions using Finite Element Analysis

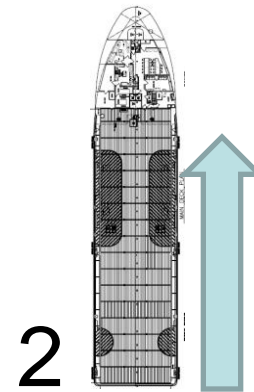
Simon Holmström,
Engineering Data Resources

27. May 2009

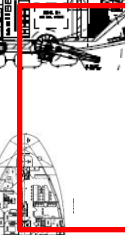
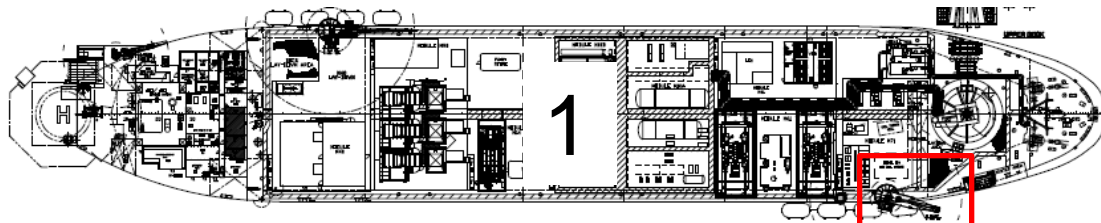
Ship collision



- Goal:
 - Evaluate structure of ship no:1



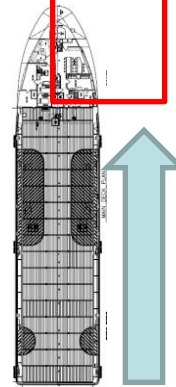
Ship collision -- Implicit Analysis



Local model

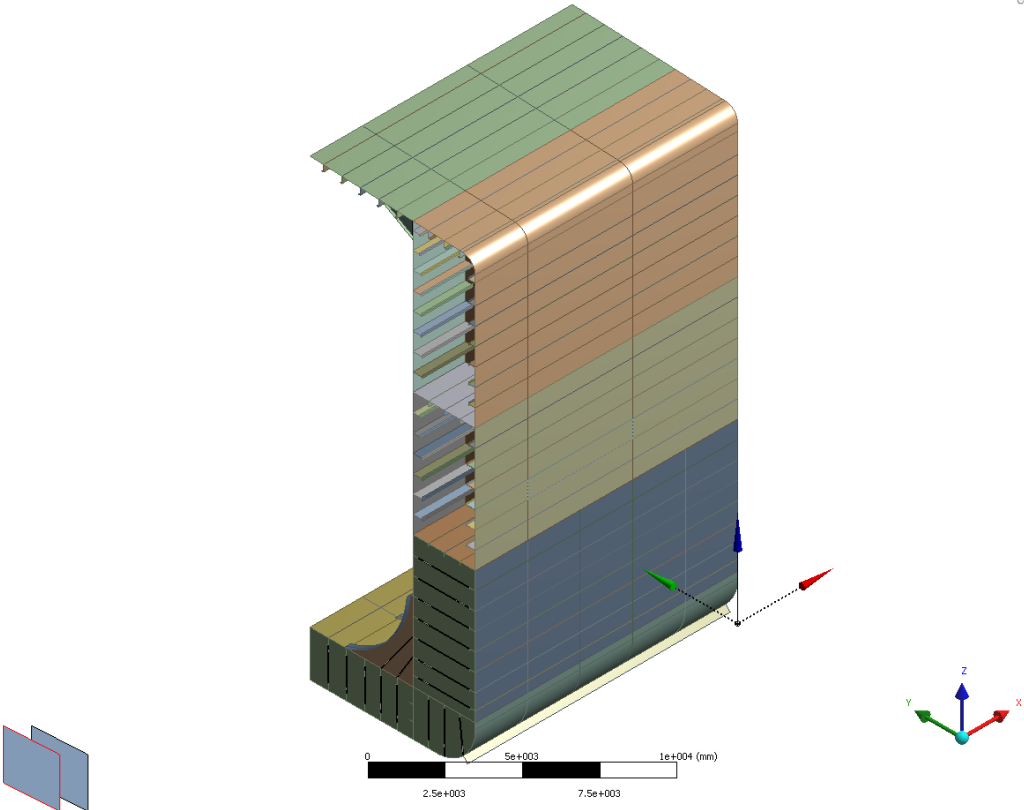
- Goal:
 - Evaluate structure of ship no:1
- Method:
 - Local model from blueprints

2



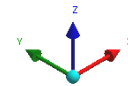
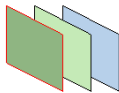
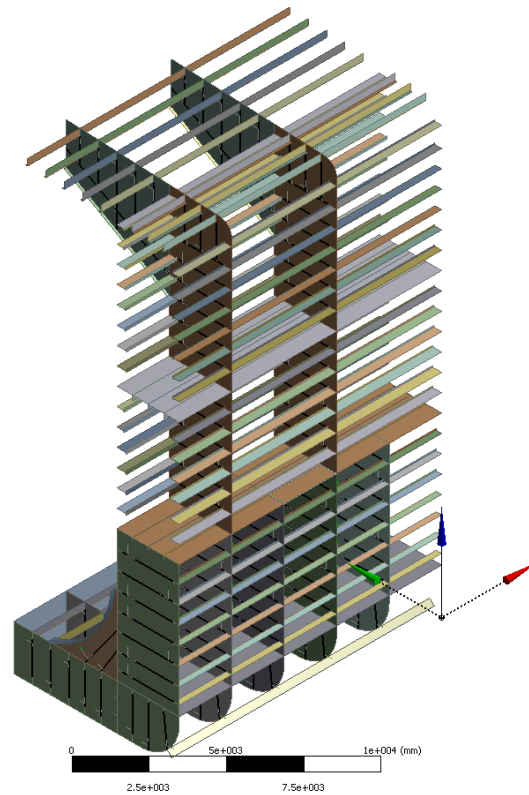
Geometry

ANSYS
v11



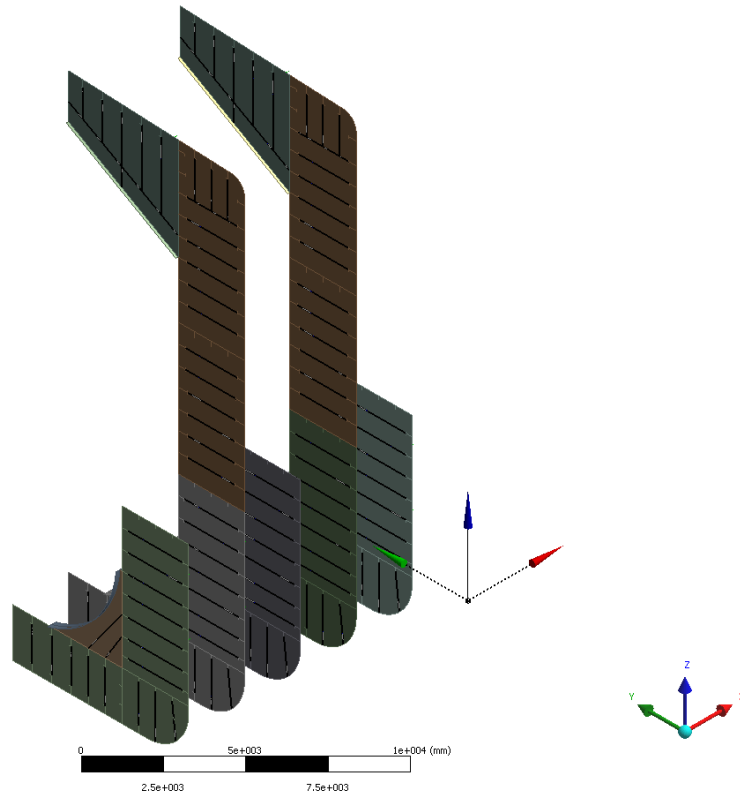
Geometry

ANSYS
v11



Geometry

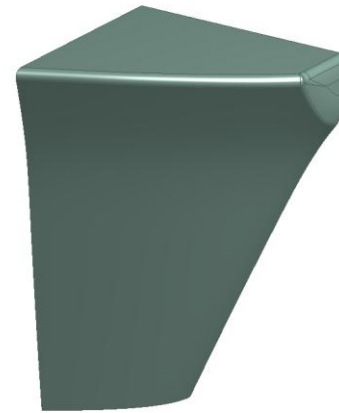
ANSYS
v11



Ship no:2

- Basic "bow shape"
- Rigid body
- Very conservative

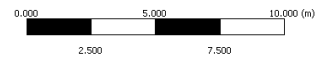
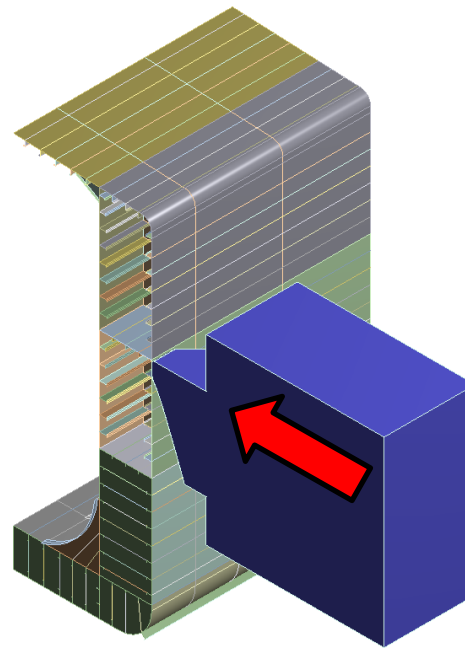
ANSYS
v21



0.00 750.00 1500.00 2250.00 3000.00 (mm)

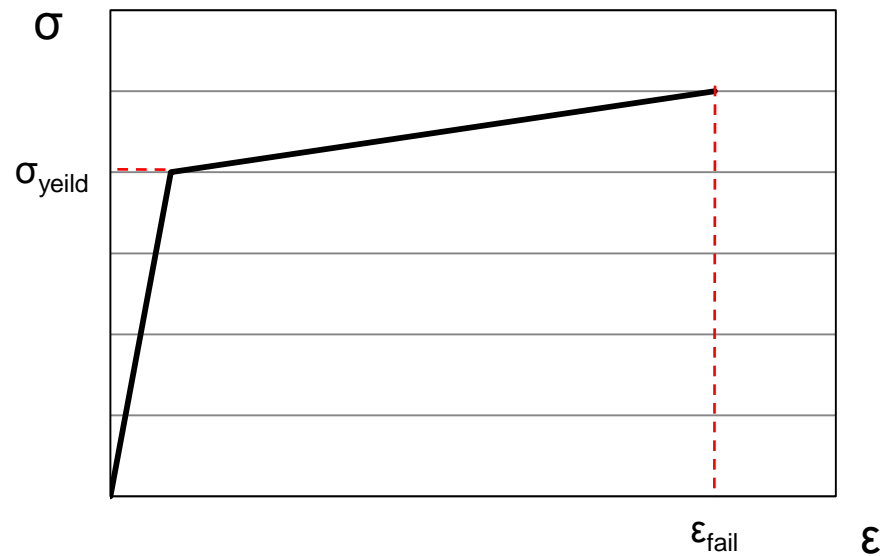


ANSYS Simulation



Material model

Bilinear isotropic hardening
with failure strain



1

NODAL SOLUTION

STEP=1

SUB =1

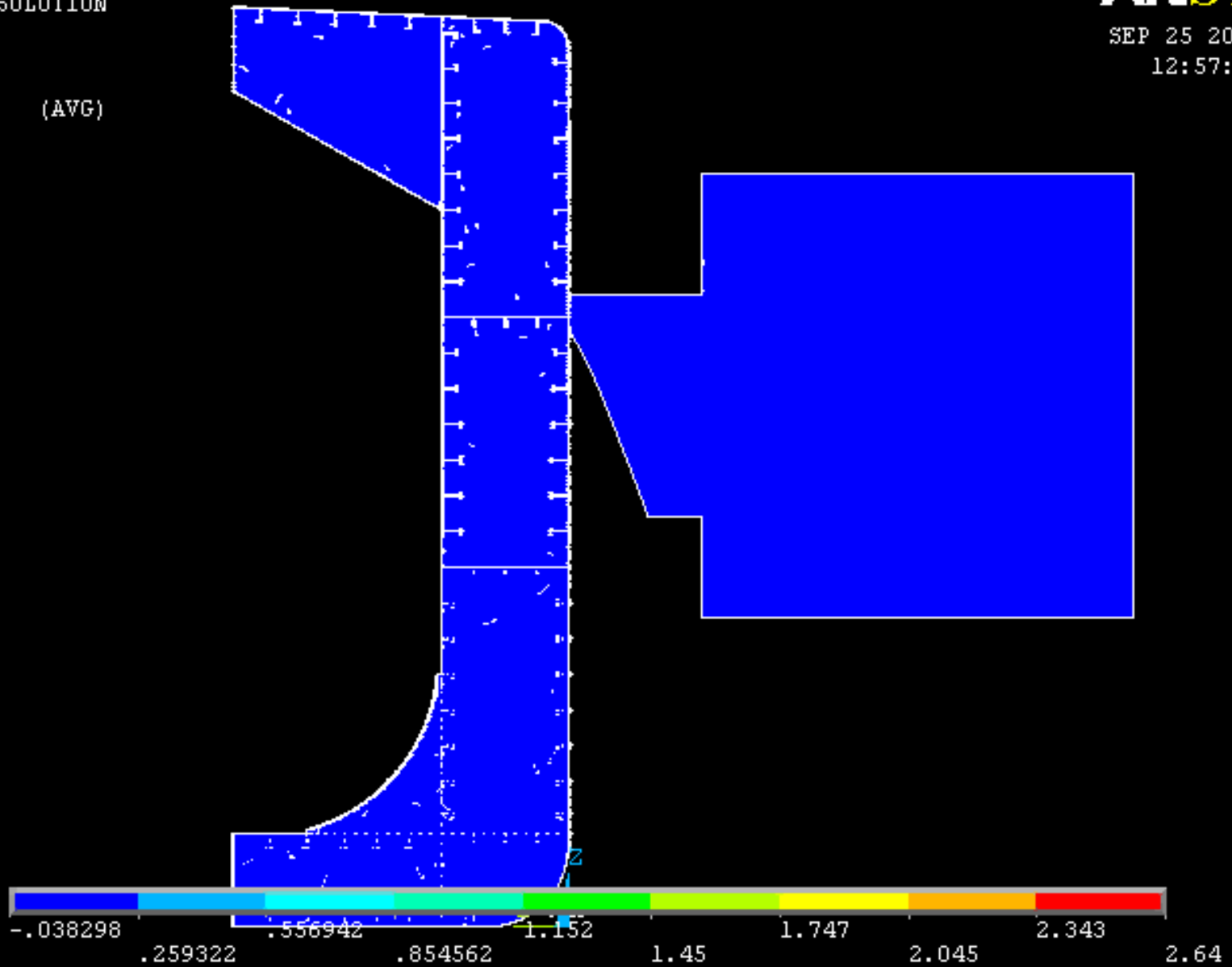
UY (AVG)

RSYS=0

ANSYS

SEP 25 2008

12:57:03



LS-DYNA user input

1

NODAL SOLUTION

STEP=1

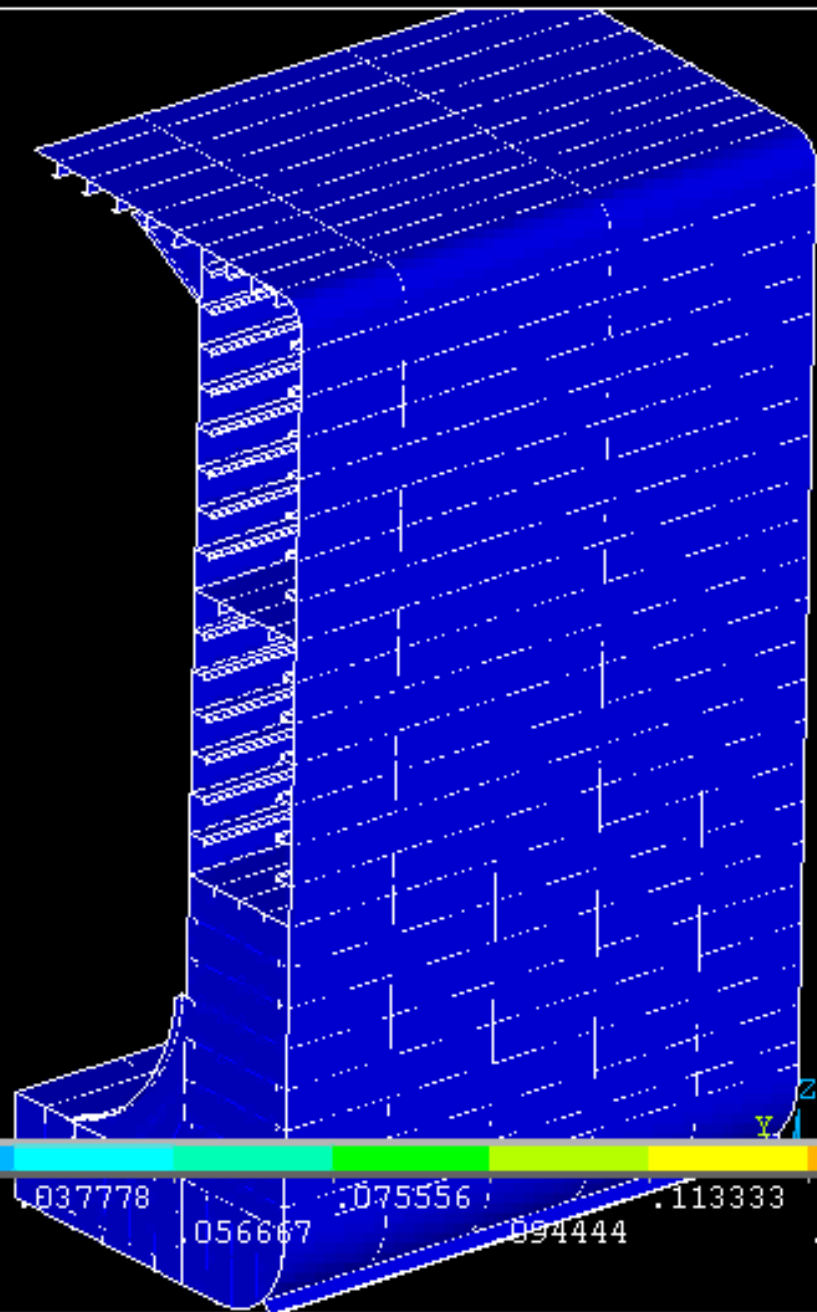
SUB =1

EPPLEQV (AVG)

ANSYS

SEP 25 2008

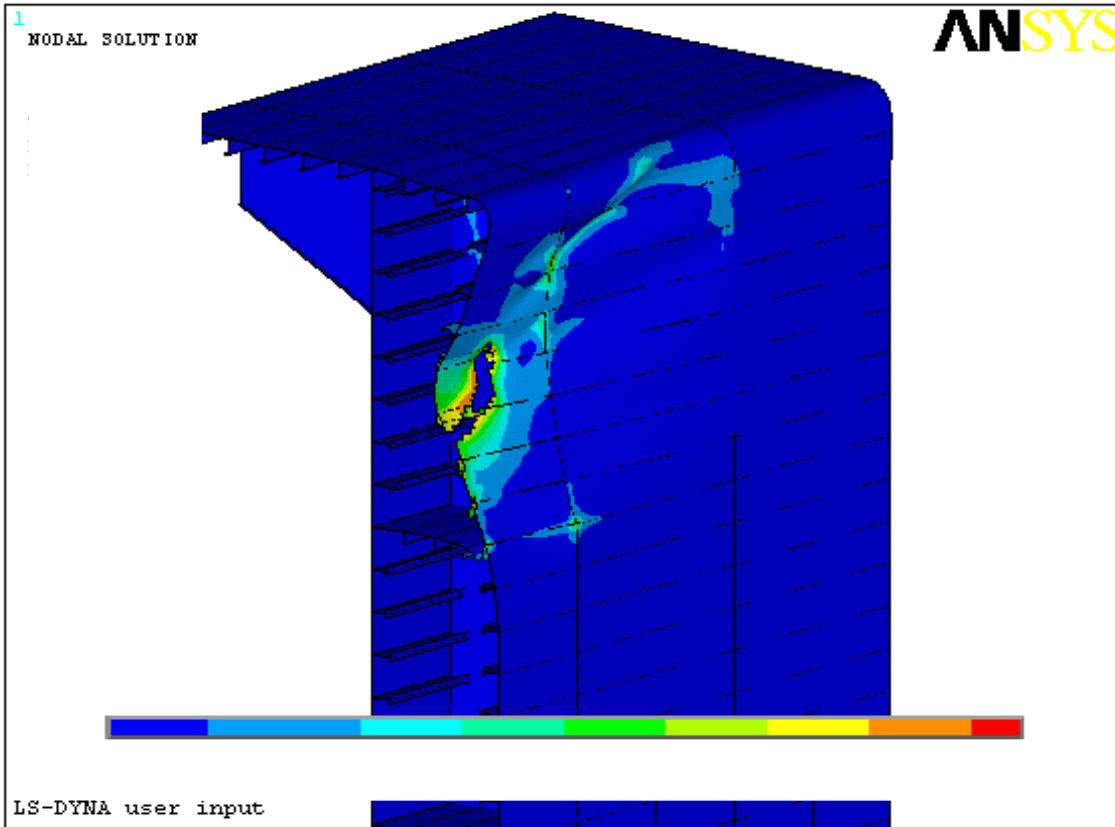
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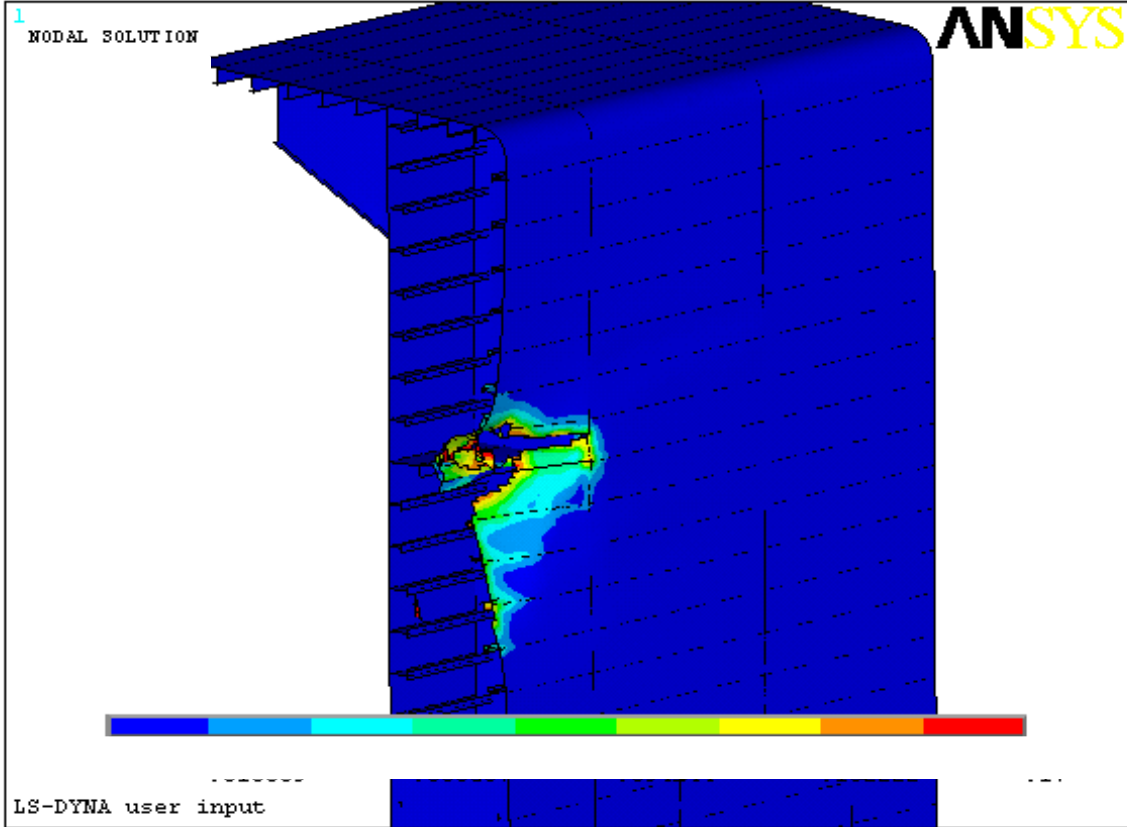
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LS-DYNA user input

Results



Results



Conclusions

- **Steel is a ductile material**
 - There is much strength left when reaching the yield limit
- **Simulating actual events**
 - Better understanding of the structural behavior
 - Easier to interpret and present results
- **Improved software & hardware makes it possible**
 - New interfaces → reduced engineering time
 - Improved hardware → reduced CPU time



Questions?