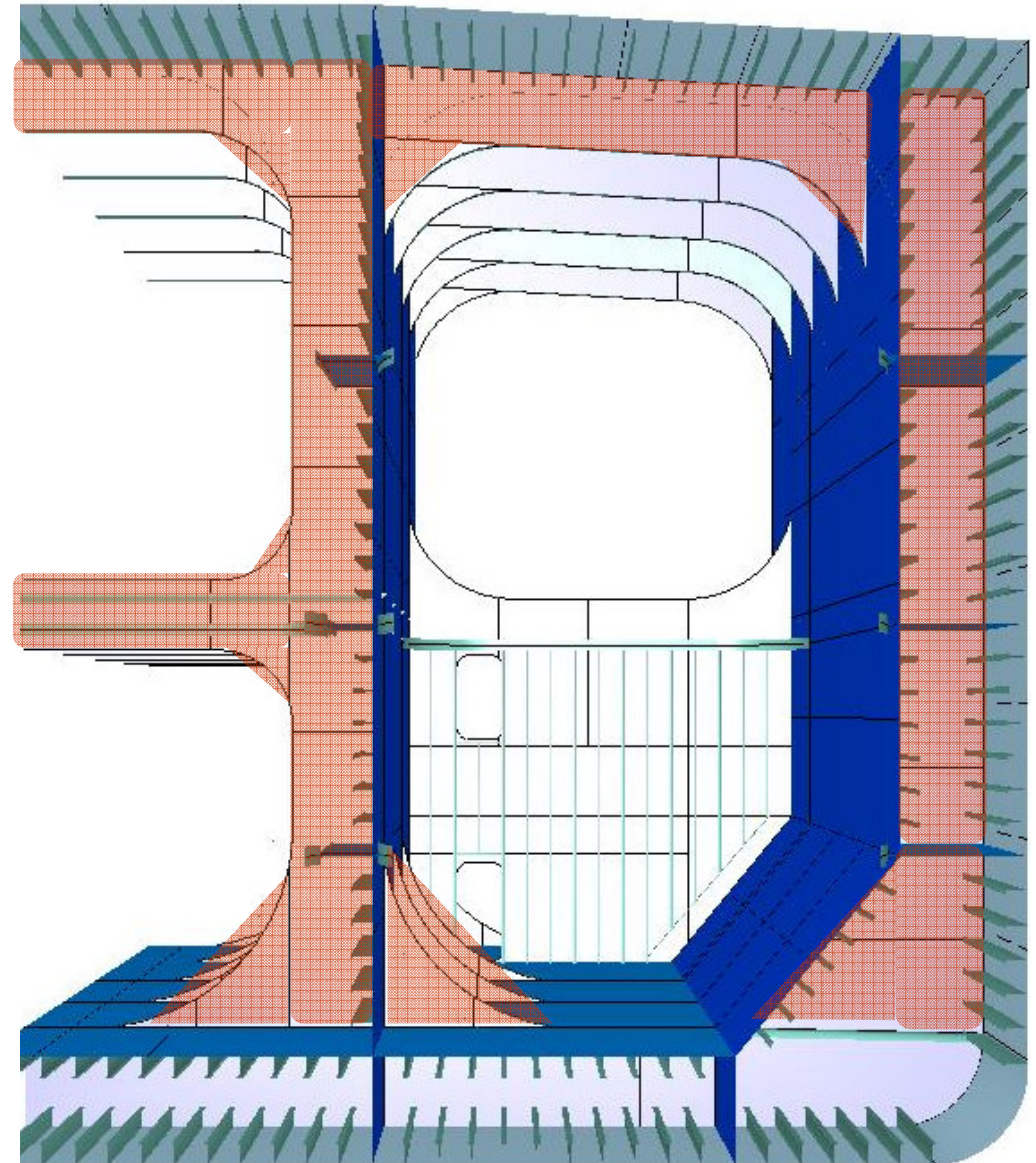


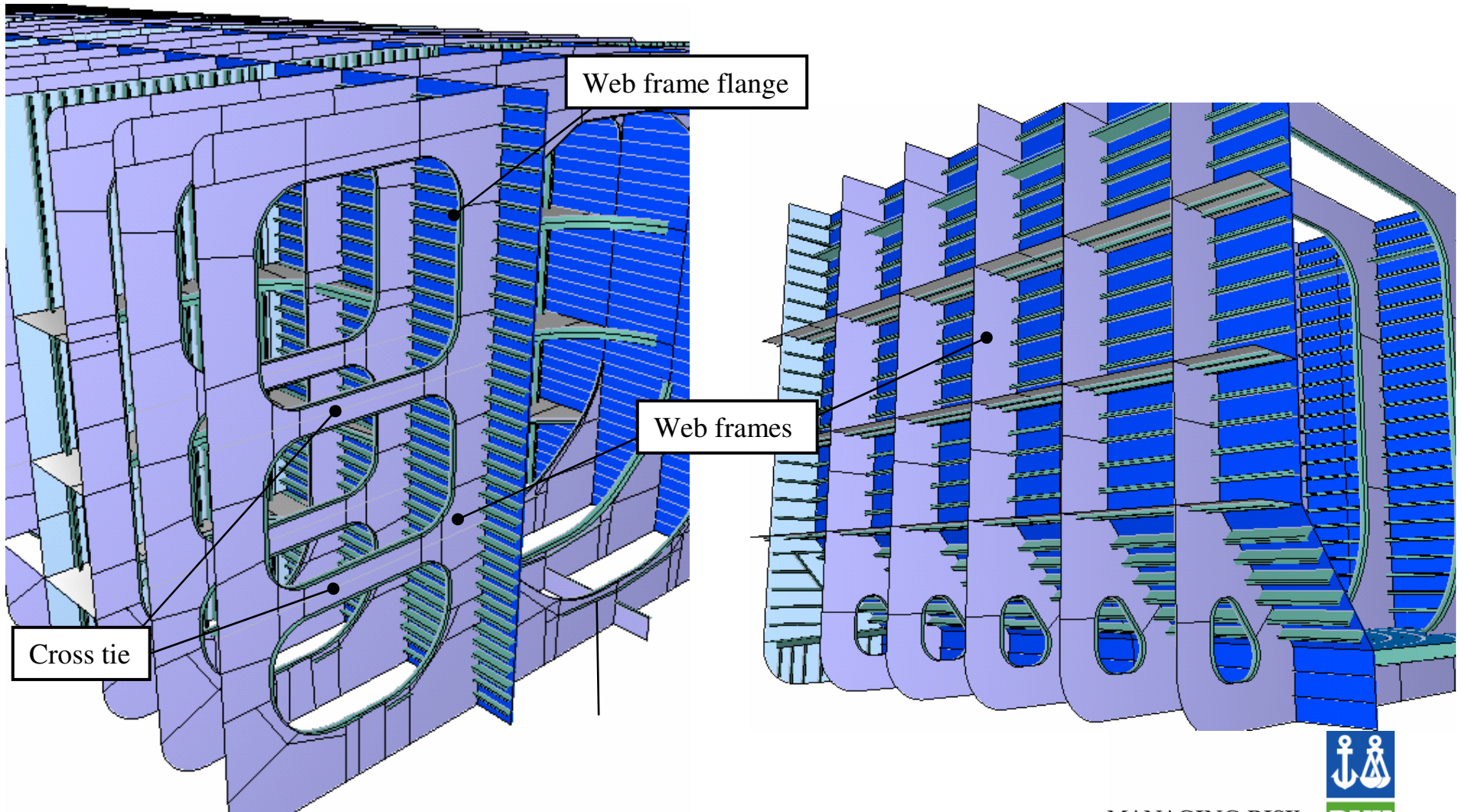
Hull Structural Breakdown - Web frames

6. Web frames

1. Side
2. Bottom
3. Deck
4. Transverse bulkhead
5. Longitudinal bulkhead
6. Web frames

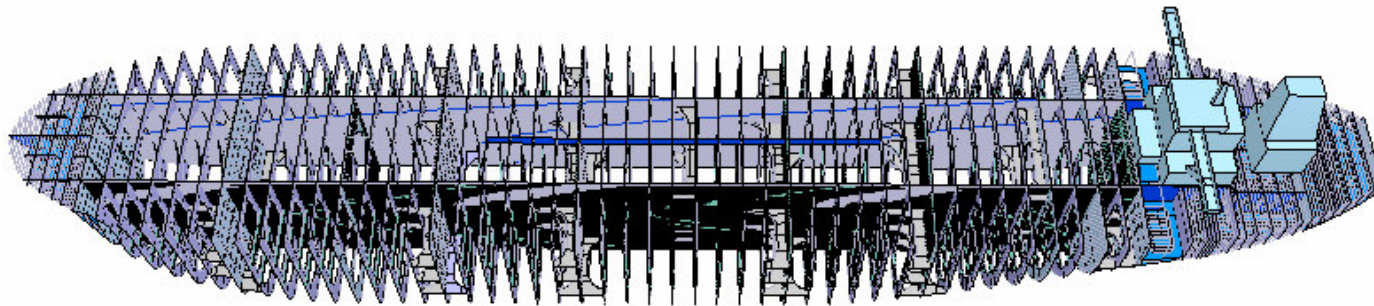


Structural build up of web frame



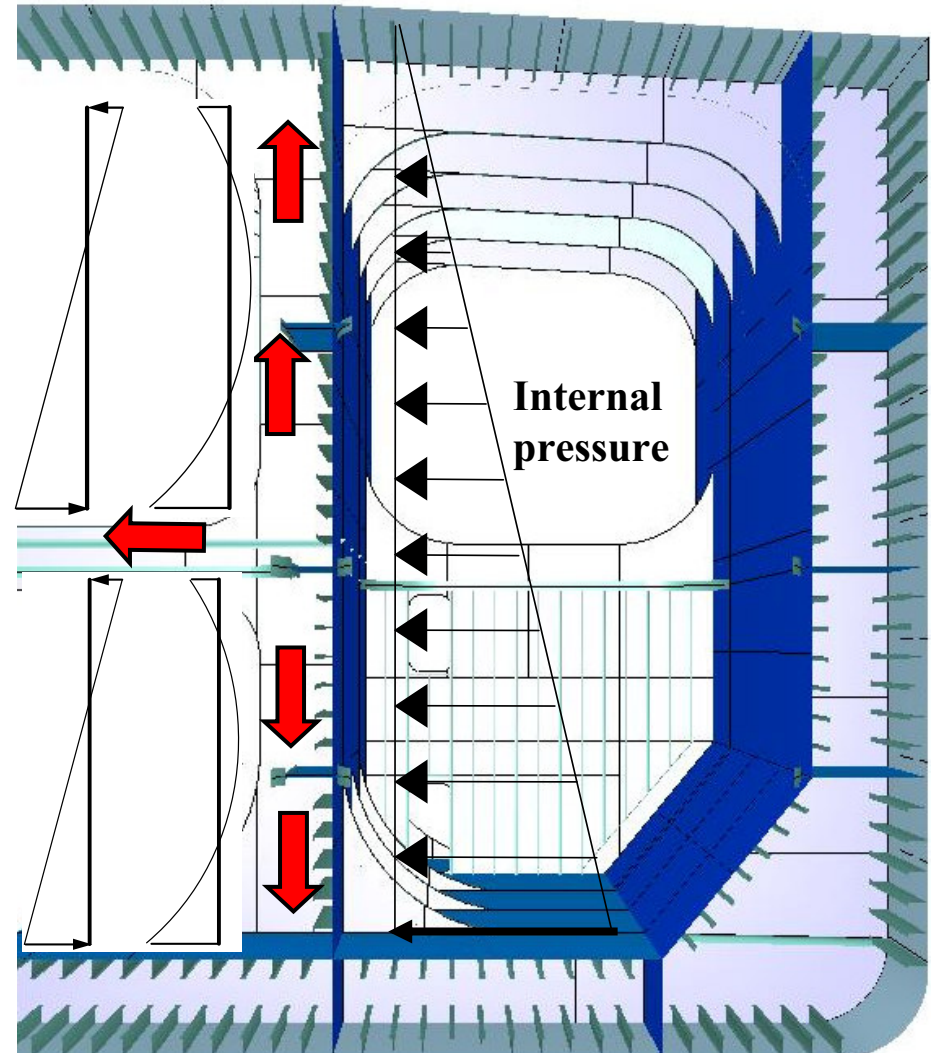
Function of web frames

- Web frames are supports for the longitudinal stiffeners
- Web frames contributes to the hull girder transverse strength



Function of web frame

- Web frames are supports for the longitudinals
- Web frames take up local loads from the longitudinal stiffeners and transfer them further into the hull girder
- Web frames keep the cross sections together and contribute to the transverse stiffness

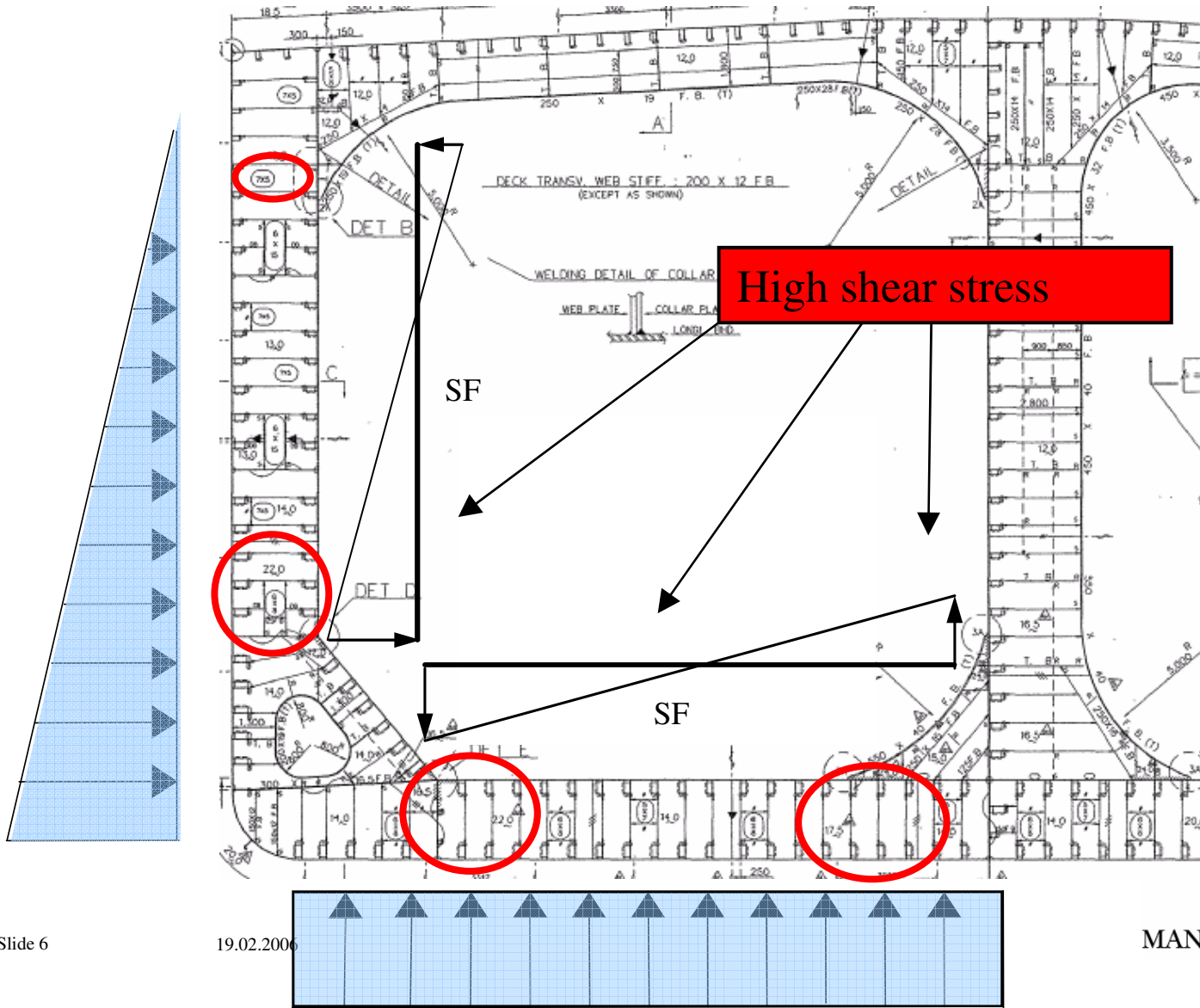


Characteristic damages



1. Corrosion / buckling of web frame
2. Corrosion / cracking of cross tie connection
3. Cracking of tripping bracket connection to web frame flange

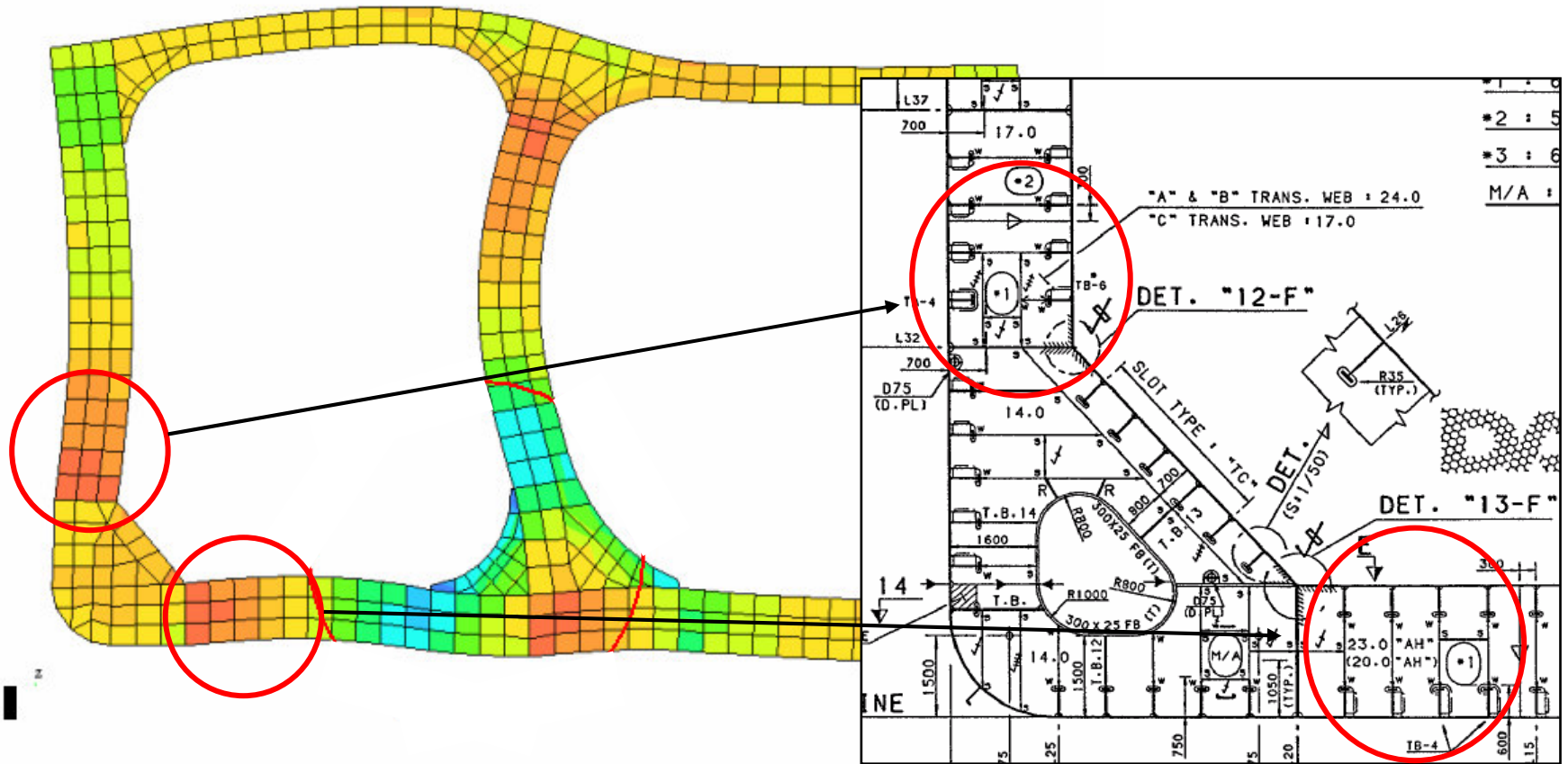
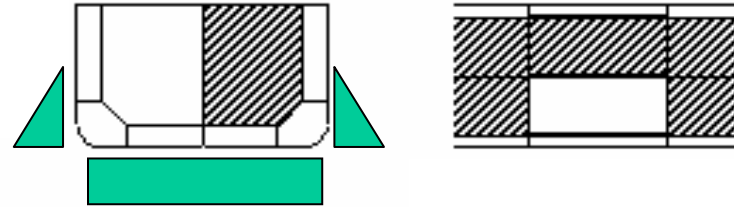
Shear buckling of web frame



TYP. WEB SEC. (SHEAR STRESS)

Shear buckling may occur in areas where shear stress is high

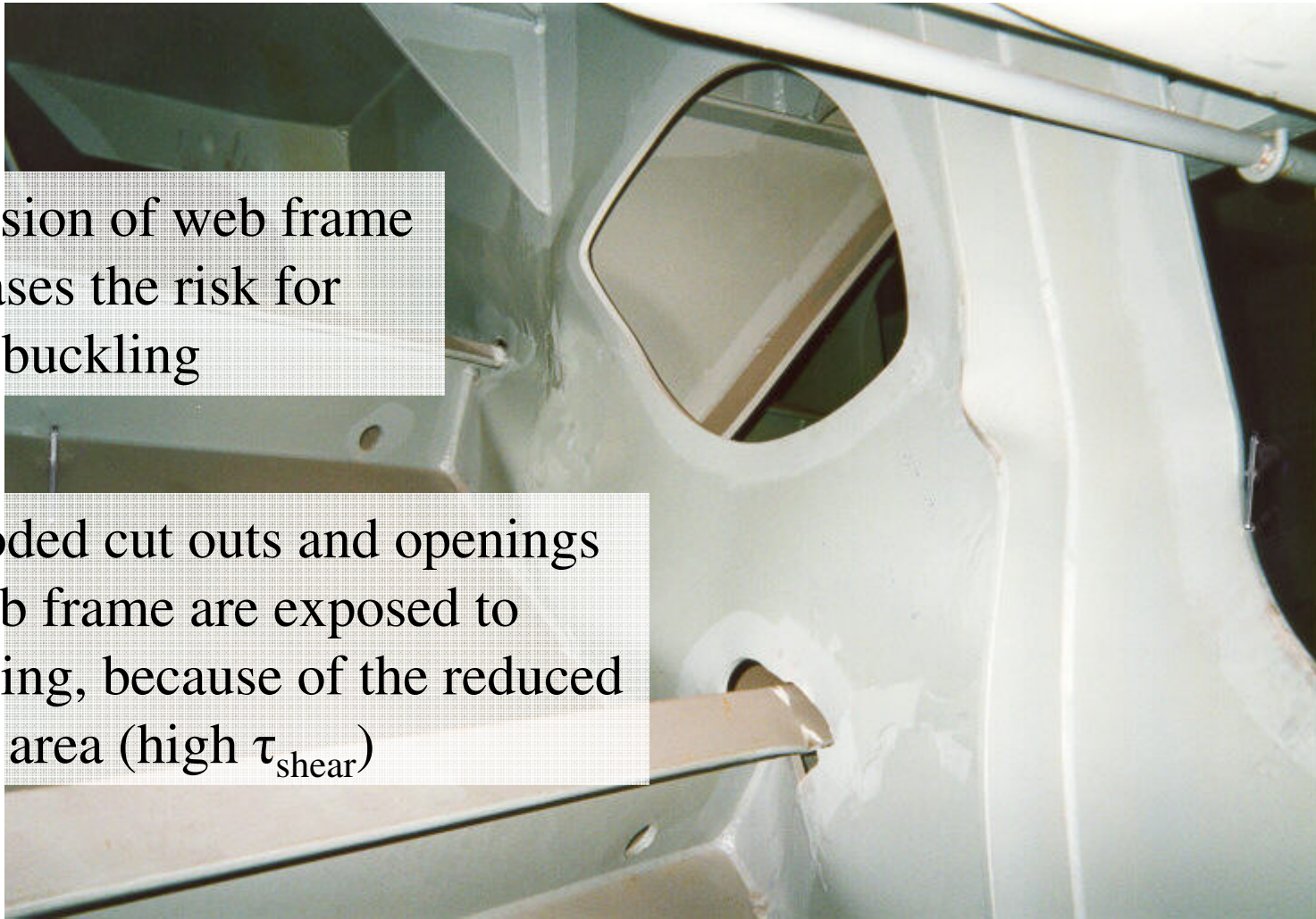
LC 2



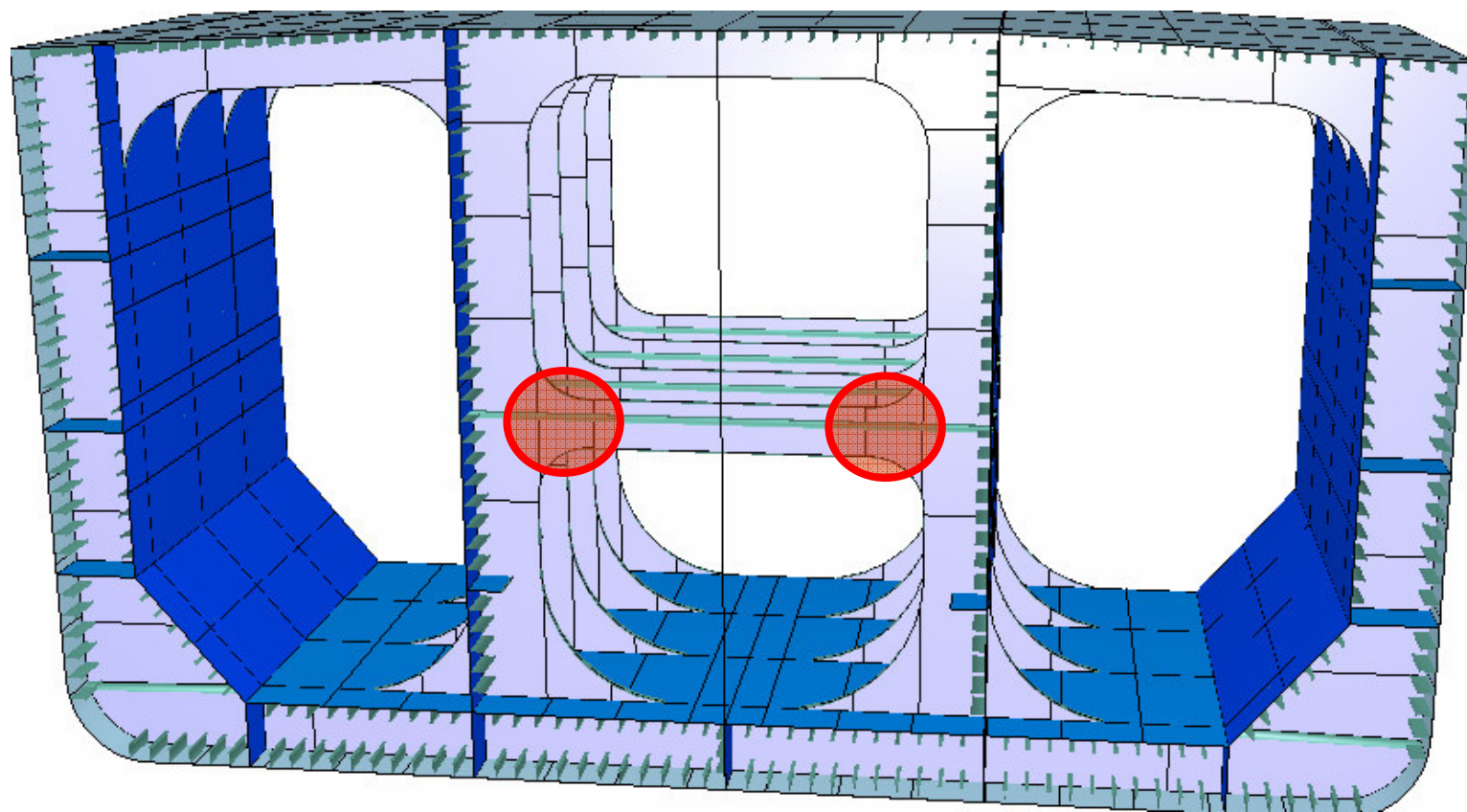
Shear buckling of web frame:

Corrosion of web frame increases the risk for shear buckling

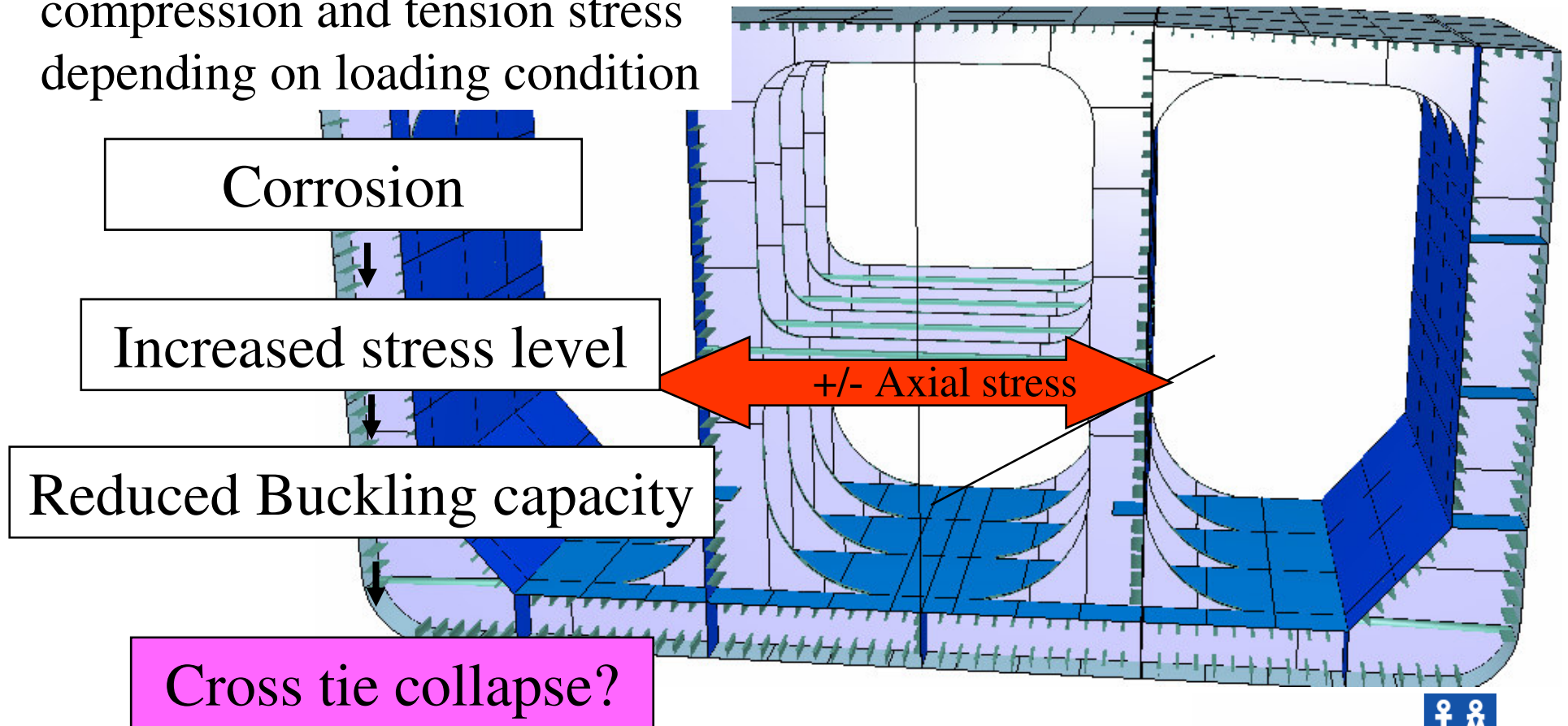
Corroded cut outs and openings in web frame are exposed to buckling, because of the reduced shear area (high τ_{shear})



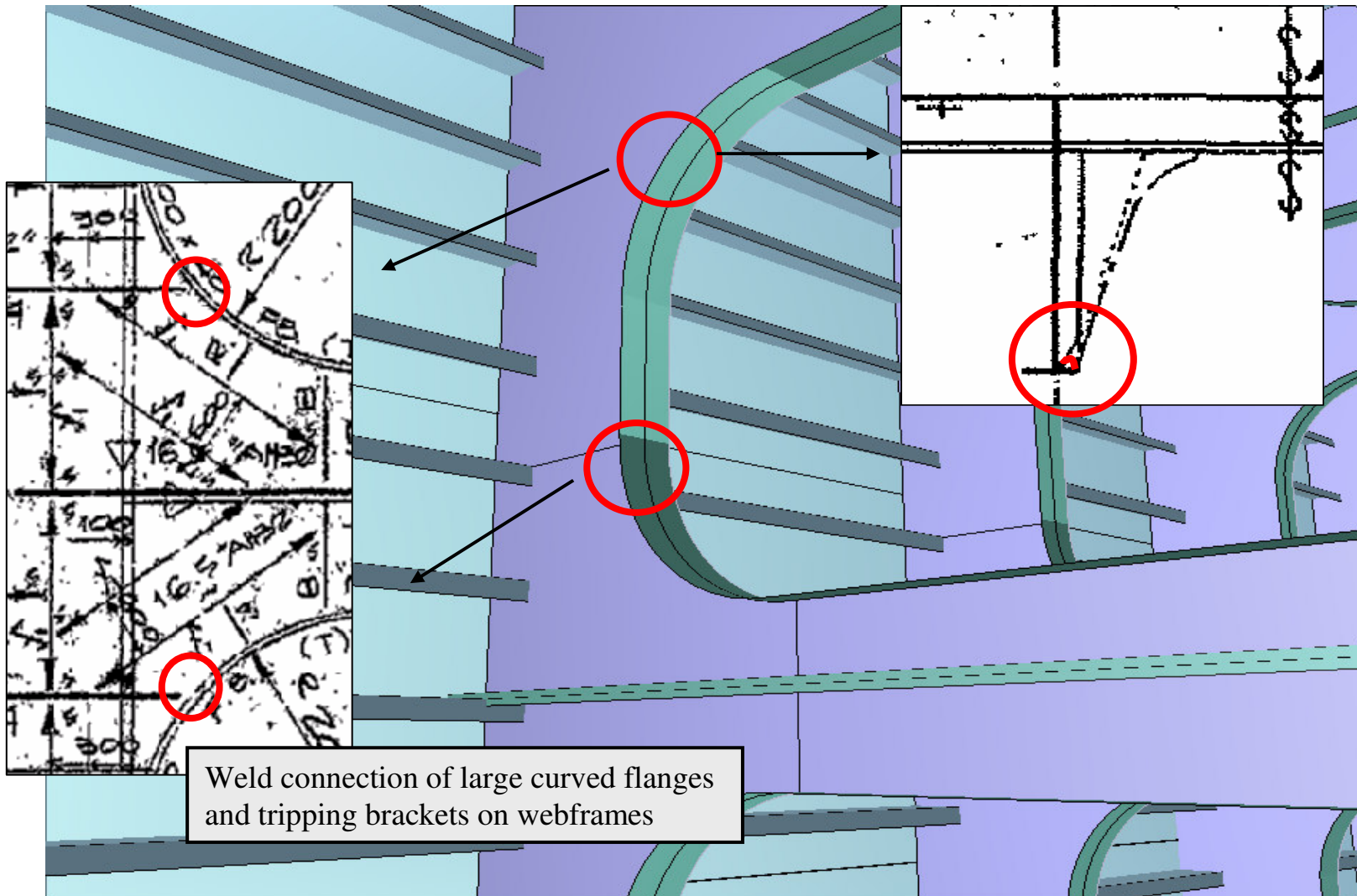
Corrosion of cross tie



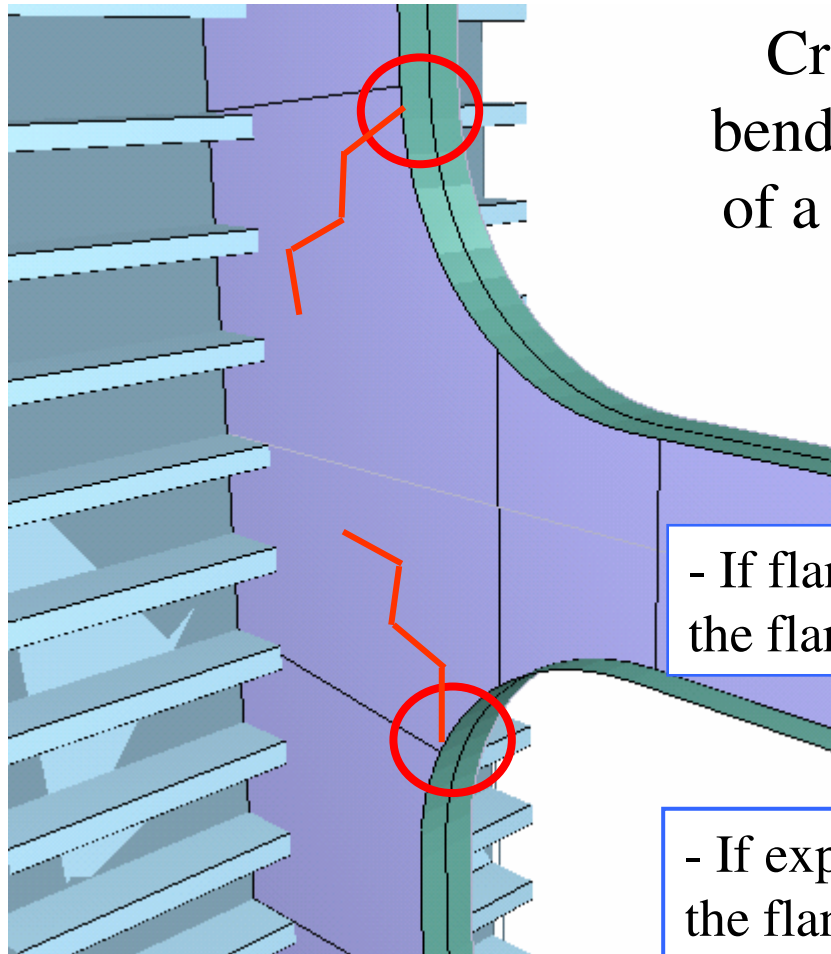
Cross ties are subject to both compression and tension stress depending on loading condition



Crack in tripping bracket connection to web frame flange



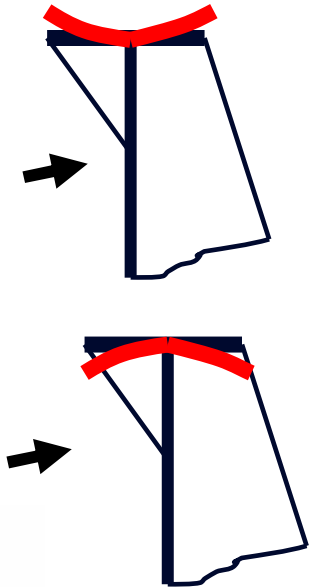
Cause for cracking in web frame flange



Cracks occur due to additional bending stresses from the presence of a tripping bracket in the curved part of the flange

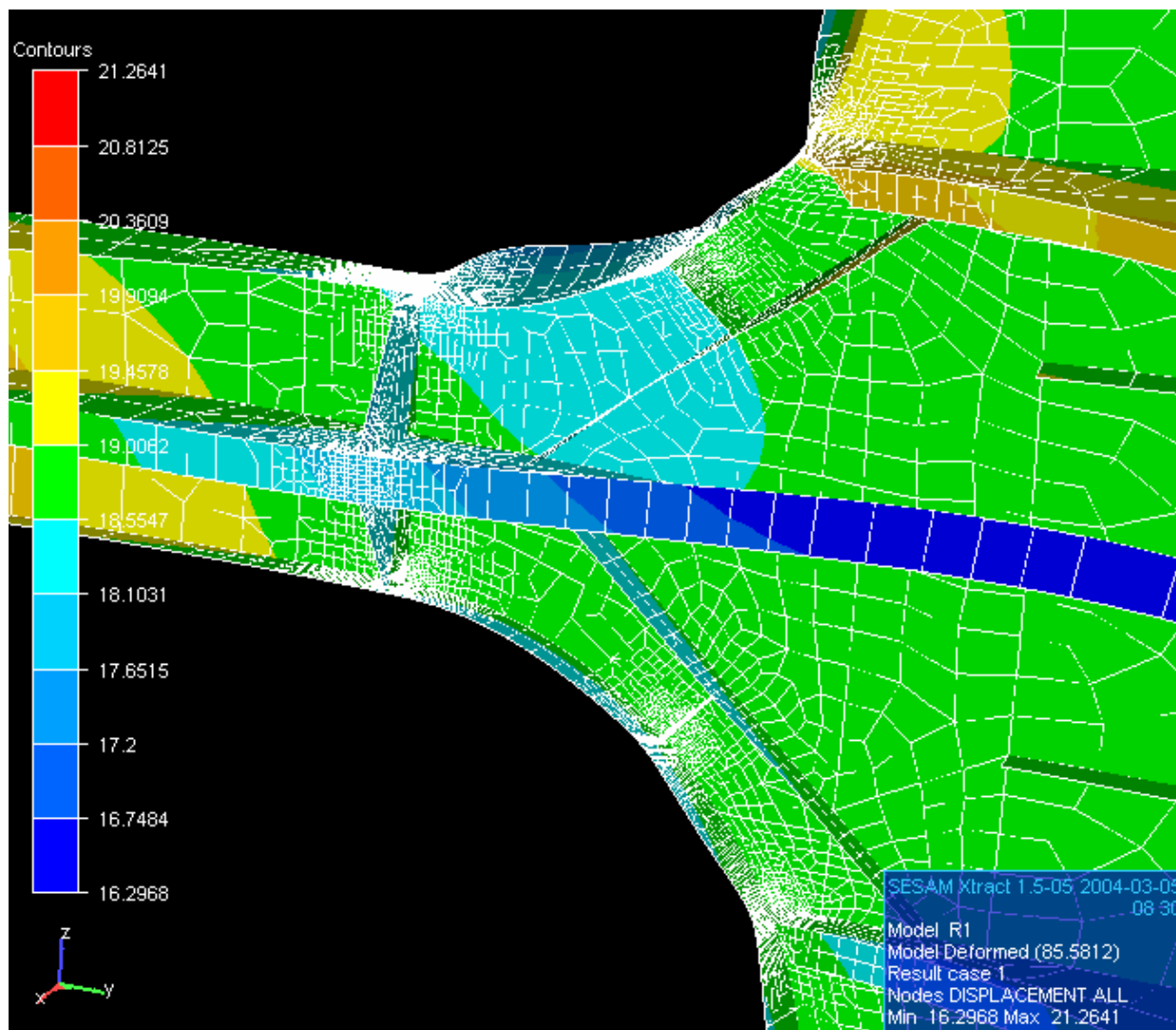
- If flange is exposed to tension, the flange will bend outwards

- If exposed to compression, the flange will bend inwards

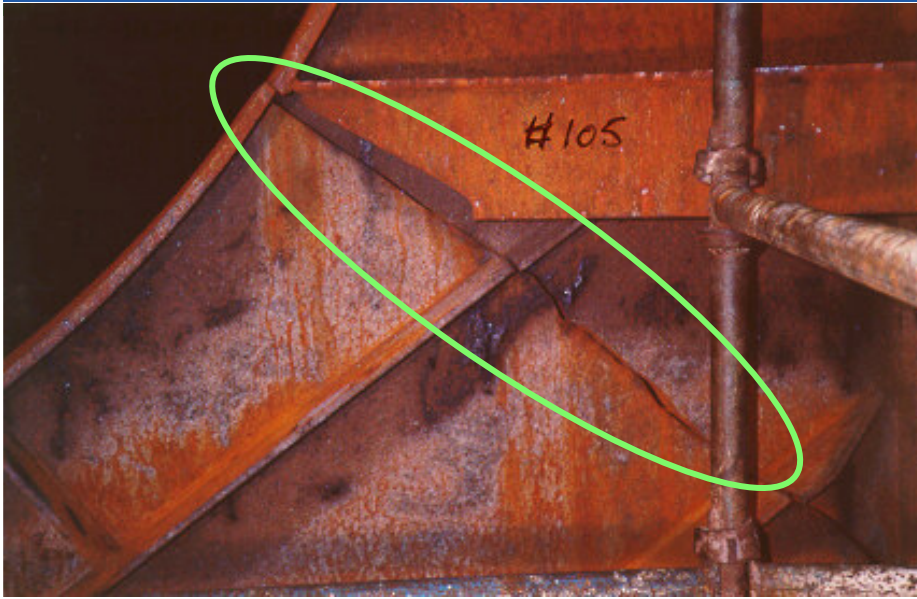


MAN Deflection pattern of free flange

FEM plot of cross tie with deflections 6. Web frames



Cracks in web frame



- Webframe support for longitudinals – reduced support – excessive load on longitudinals

- Increased loads on adjacent webframes

- May lead to loss of stiffened panel

