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IUMI 2000 Conference

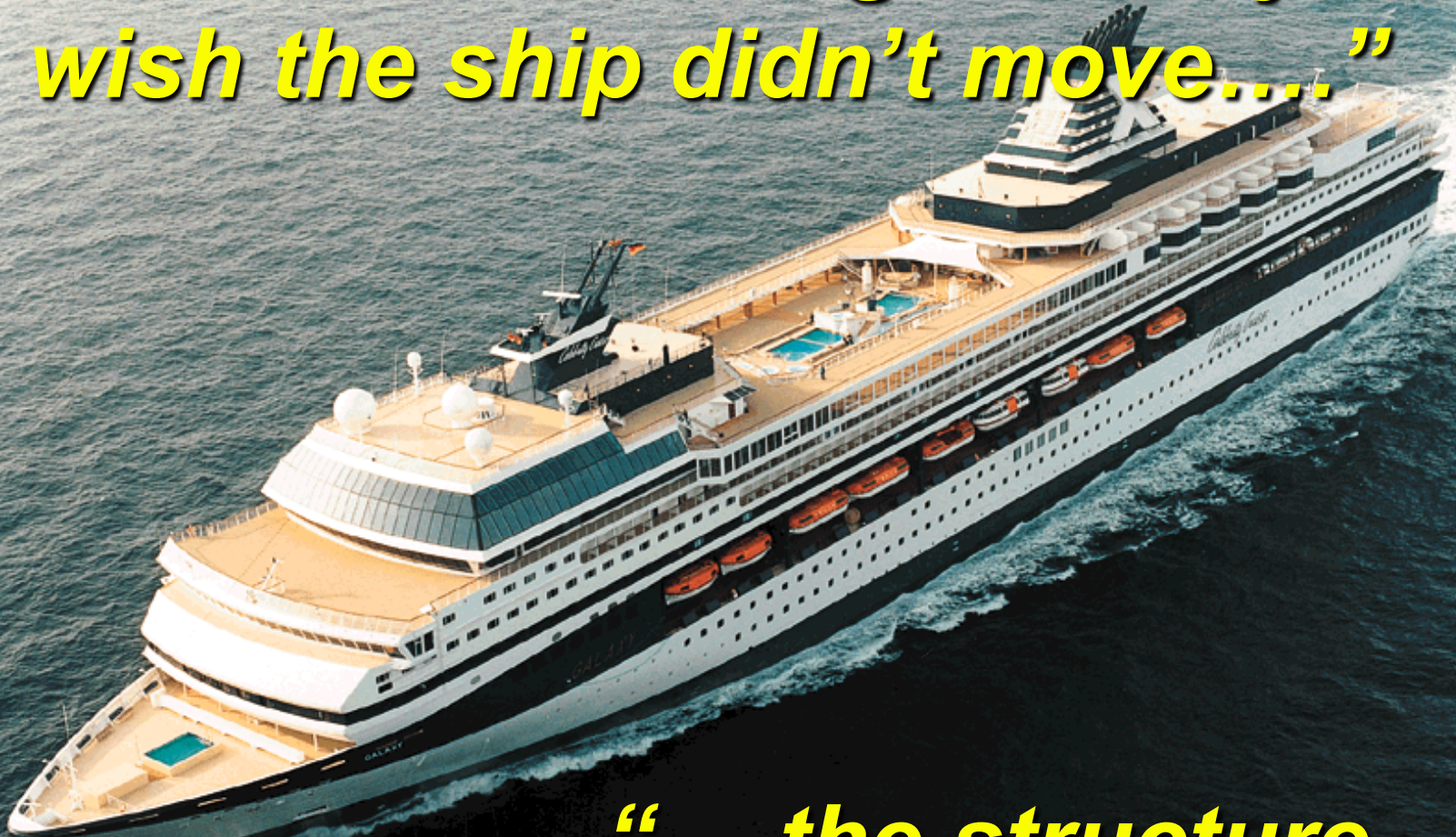
Structural Design Challenges of Large Cruise Ships



Robert Tustin
Lloyd's Register



“...the cruise was great we just wish the ship didn't move....”



Classification corollary “... the structure would be fine if only the ship didn't carry passengers...”

... early designs of large cruise ships adopted a traditional arrangement ...



... with an intact and continuous side shell structure similar to ferries and Ro-Ro ships ...

... continual focus and attention on safety and legislation has led to revised cruise ship layouts ...



... side recesses for lifeboat stowage give a complex structural response ...

... innovations for passenger comfort and amenity are also demanding layout changes ...



...most large cruise ships now have outside cabins with private balconies

... passenger amenities such as multi-deck theatres, restaurants and atriums ...



... and on the RCI ships a glass walled atrium encasing four glass lift capsules...

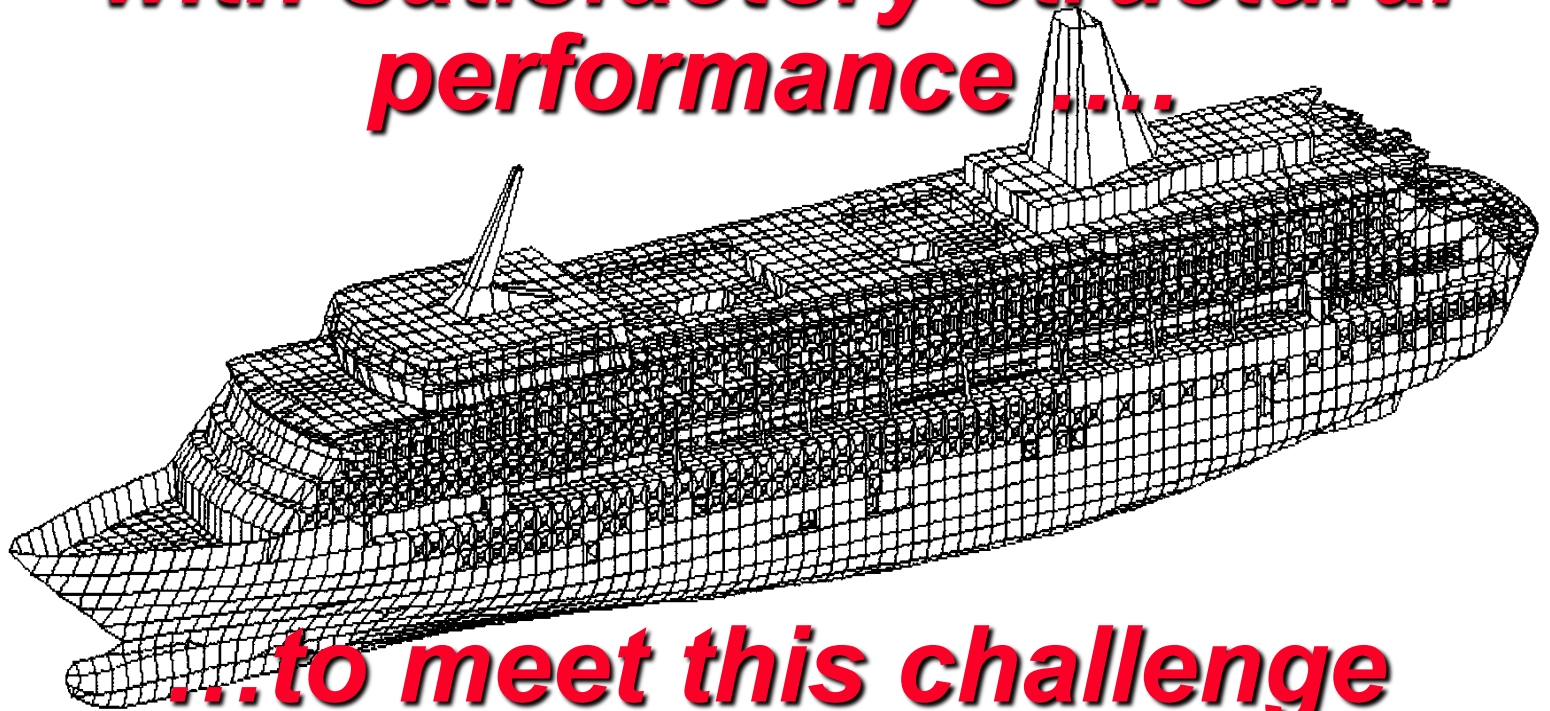


... designs of large cruise ships are being driven by demands for passenger amenity and safety



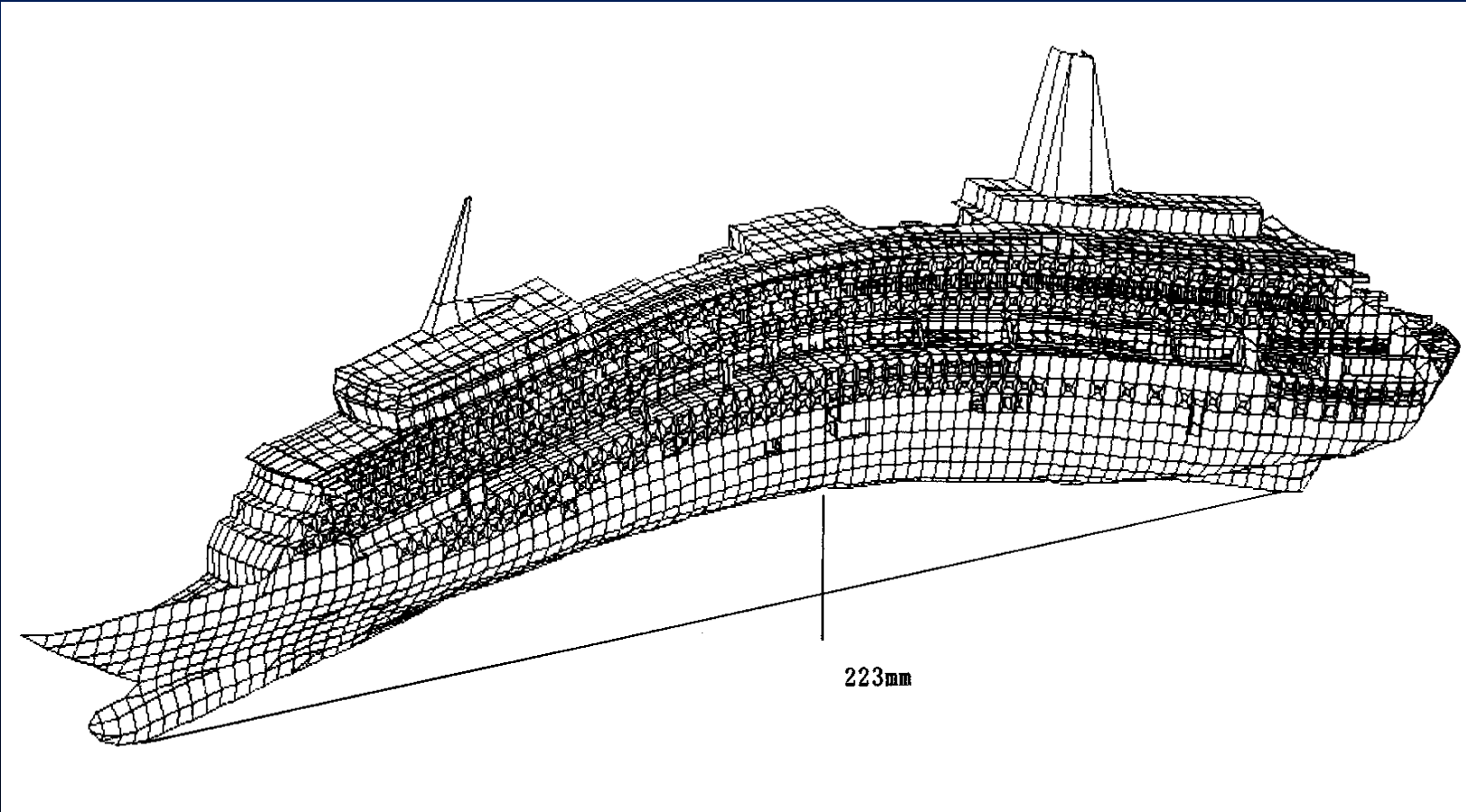
... these demands can conflict with, and be detrimental to, structural performance

***The challenge is to reconcile
passenger amenity and safety
with satisfactory structural
performance***



***...to meet this challenge
sophisticated structural
analysis techniques are
applied...***

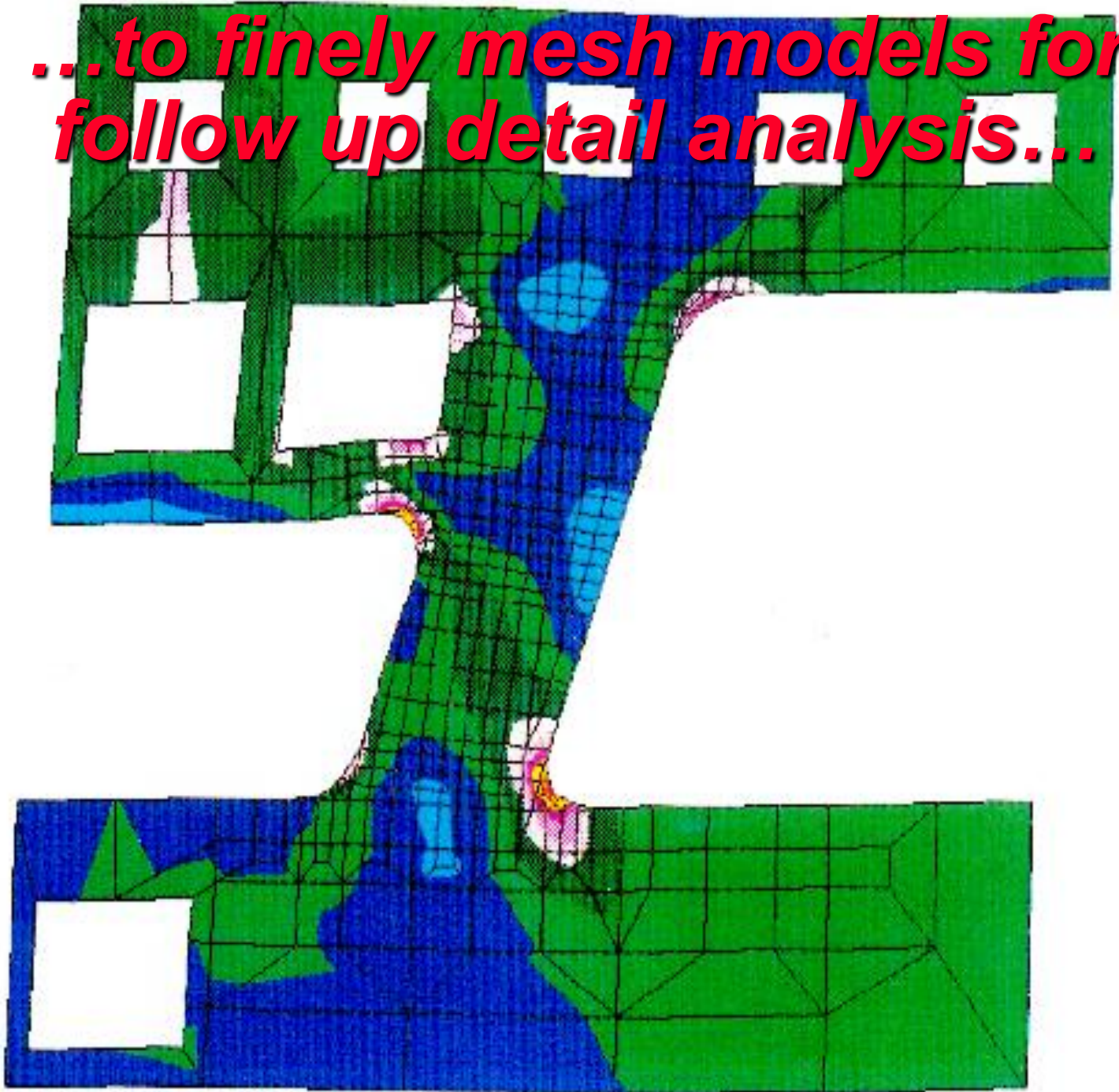
...to verify hull girder deflection and stress...



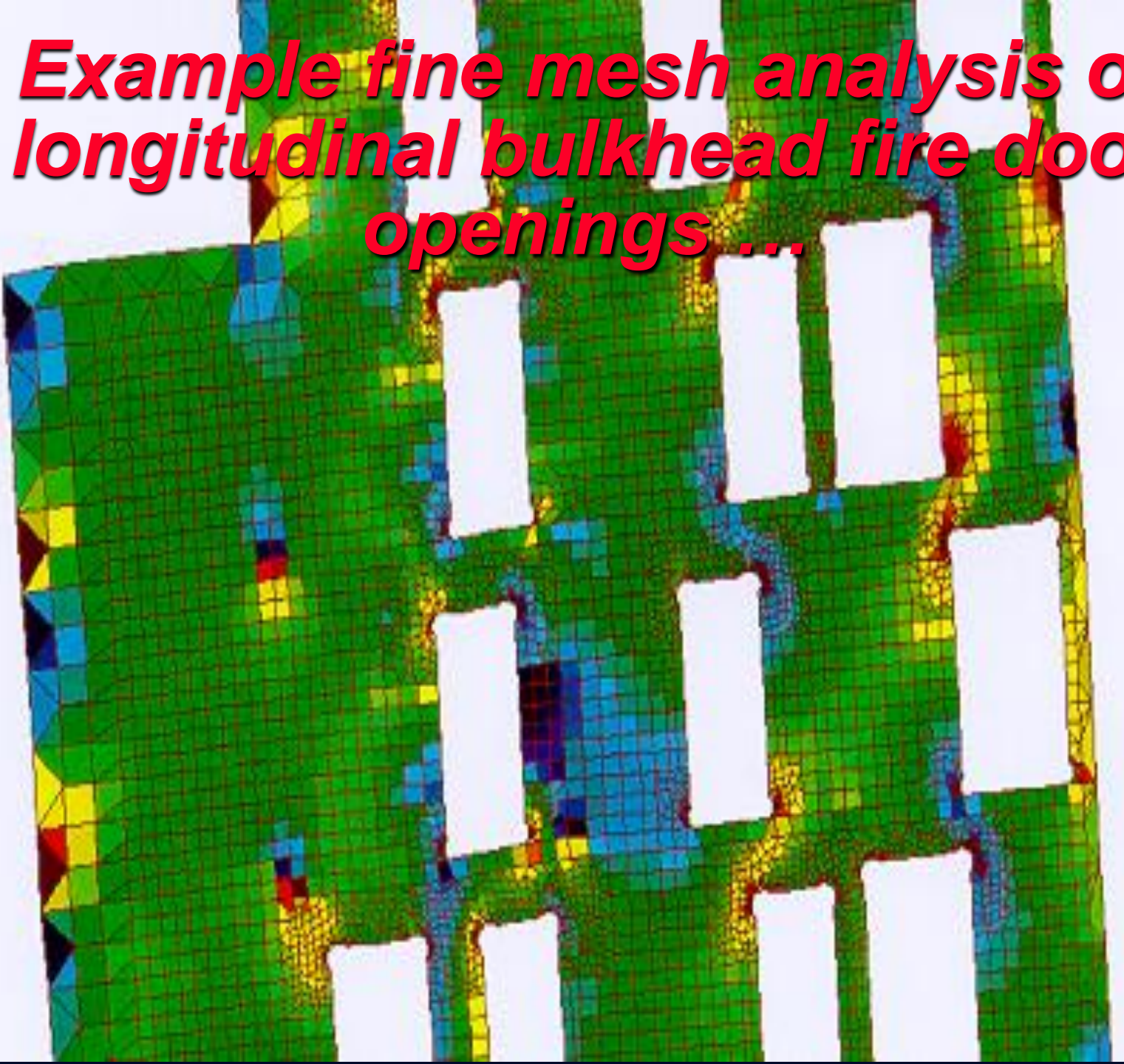
...and local stressing in way of lifeboat recesses, deck openings etc...



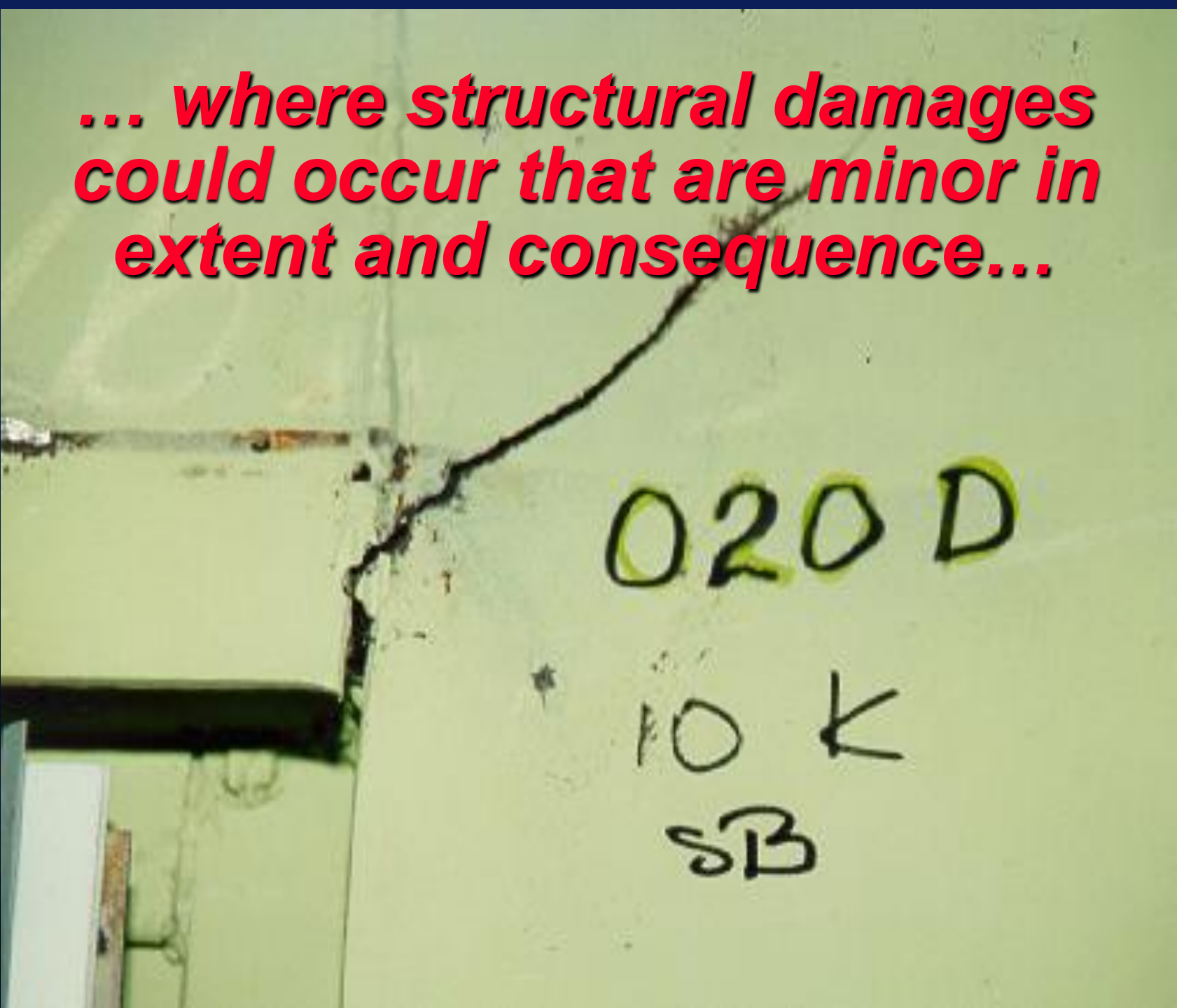
...to finely mesh models for follow up detail analysis...



Example fine mesh analysis of longitudinal bulkhead fire door openings ...



... where structural damages could occur that are minor in extent and consequence...



***... but significant in terms of
repair cost***



The challenge for Classification of the latest large ship designs then is to reconcile



... conflicting demands for passenger amenity and safety with structural performance



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