Universität Rostock Traditio et Innovatio

nordic yards

EMship Advanced Design

Dynamic Behaviour of Floor Systems in Accommodation Areas

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Introduction

- Fullfill the Comfort Criteria
- Prevent Structural Damage
- Additional Mass
- Local Vibration Analyses

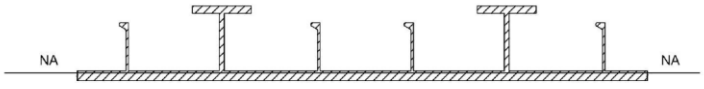
Thesis Summary

- The Scope:
  - Analysis of accommodation floor structures
- Objective:
  - Calculation of natural frequencies
- Requirements:
  - Software package ANSYS Mechanical APDL

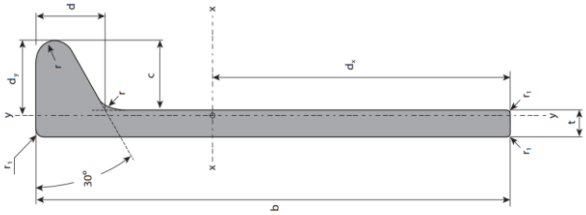
Analysis Procedure

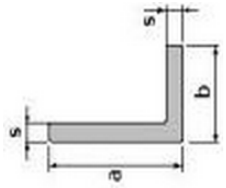
- Structures
- Finite Element Models
- FE Analyses
- Results

Equivalent Structure



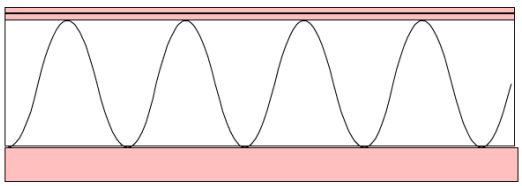
Original Structure

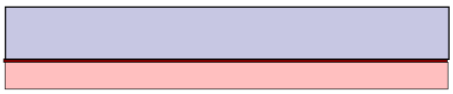




Based on: http://www.tatasteeleurope.com/

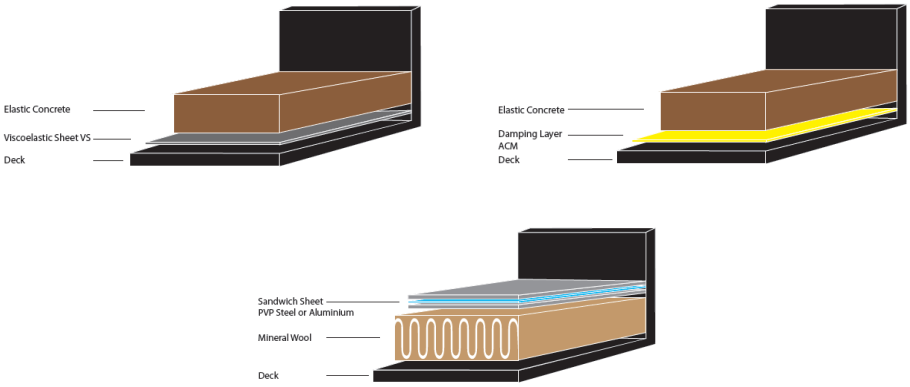
Floor Systems





Based on: Ødegaard & Danneskiold-Samsøe A/S Deck Covering Systems

Floor Systems

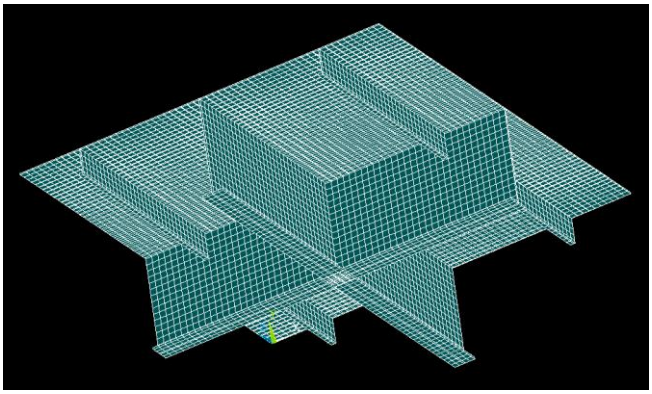


Based on: Weber Marine Floors

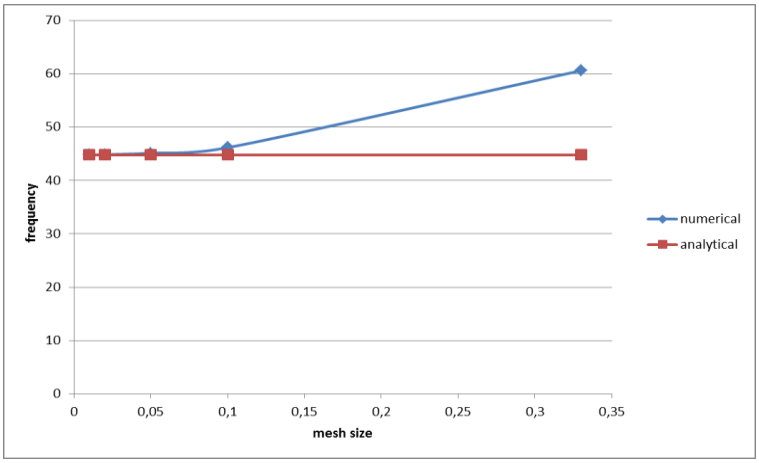
FE Model

- Characteristics
- Parameters of Study
- Element Types

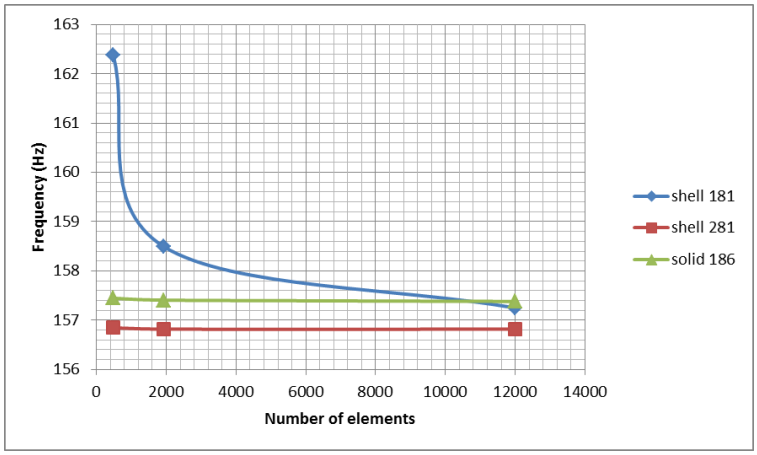
Mesh



Convergence Study



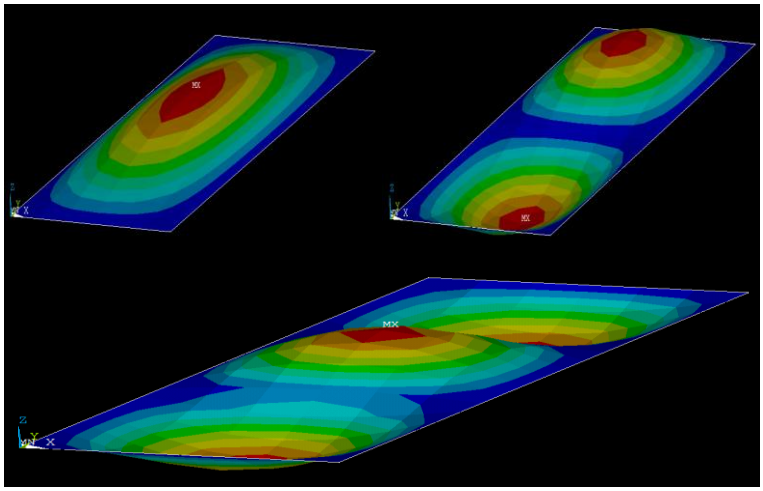
Convergence Study



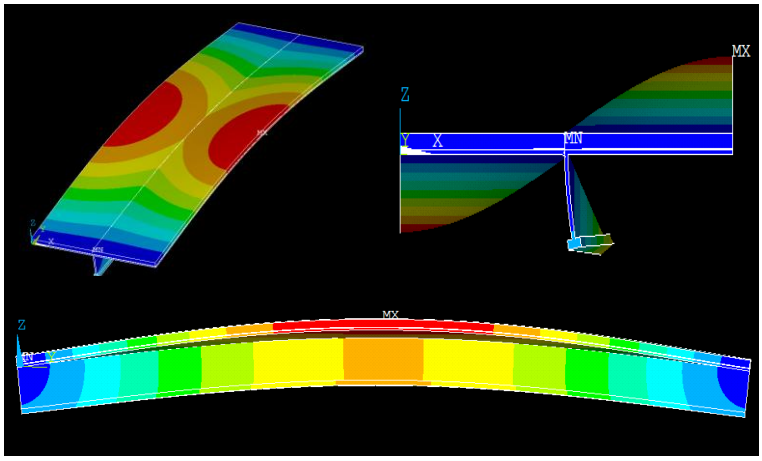
FE Analyses

- Modal Analyses
- Harmonic Analyses

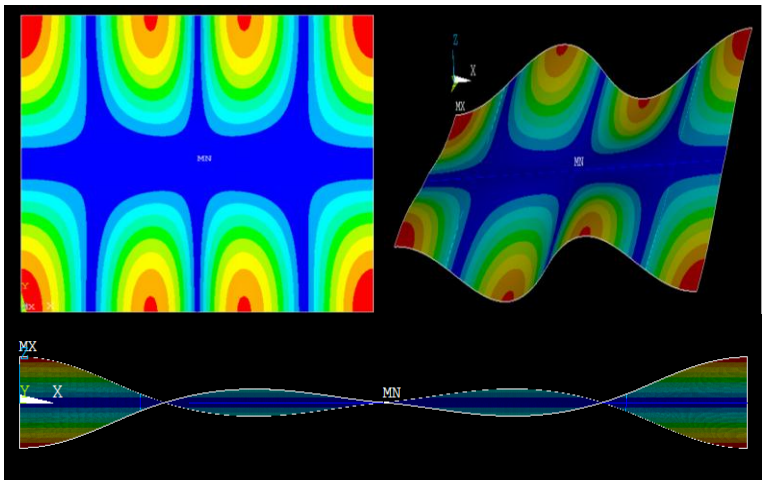
Mode Shapes



Mode Shapes



Mode Shapes



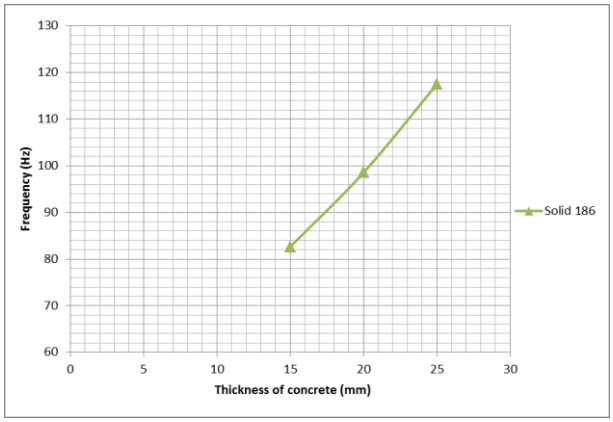
Validation of Results

- Analytical formulae
- GlLocVibs (Numerical)

mesh sizes	steel plate natural frequency numerical results	steel plate natural frequency analytical results	error
0,1	46,15	44,78	2,97%
0,05	45,13	44,78	0,78%
0,02	44,84	44,78	0,13%
0,01	44,79	44,78	0,02%

Results

Steel-Viscoelastic-Concrete



Results

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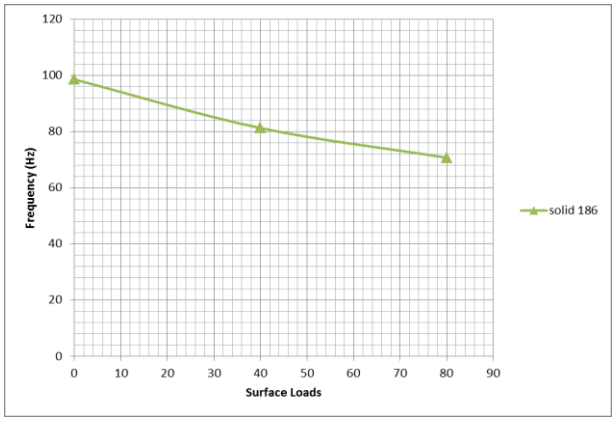

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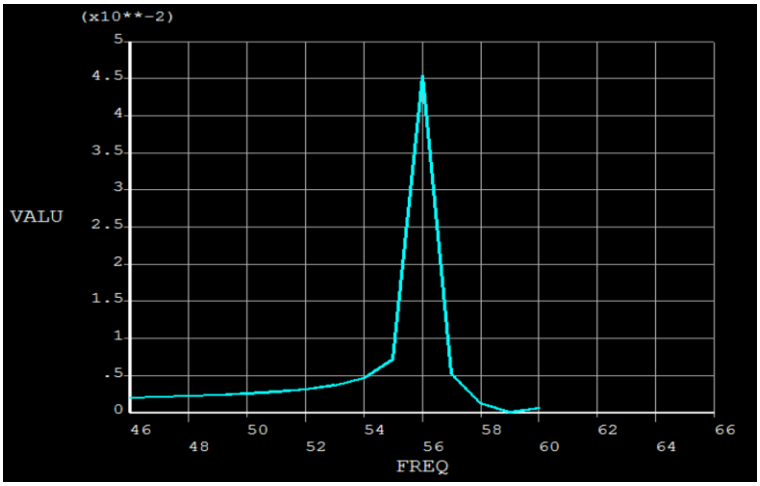

Conclusion

- Reducing superstructures weight
- Learning natural frequencies of floor systems
- Experimental validation is needed