



CRASHWORTHINESS OF CONCRETE STRUCTURES FOR FLOATING OFFSHORE WIND TURBINES (FOWT)

Lucas Márquez

Supervisors: Philippe Rigo

Hervé Le Sourne

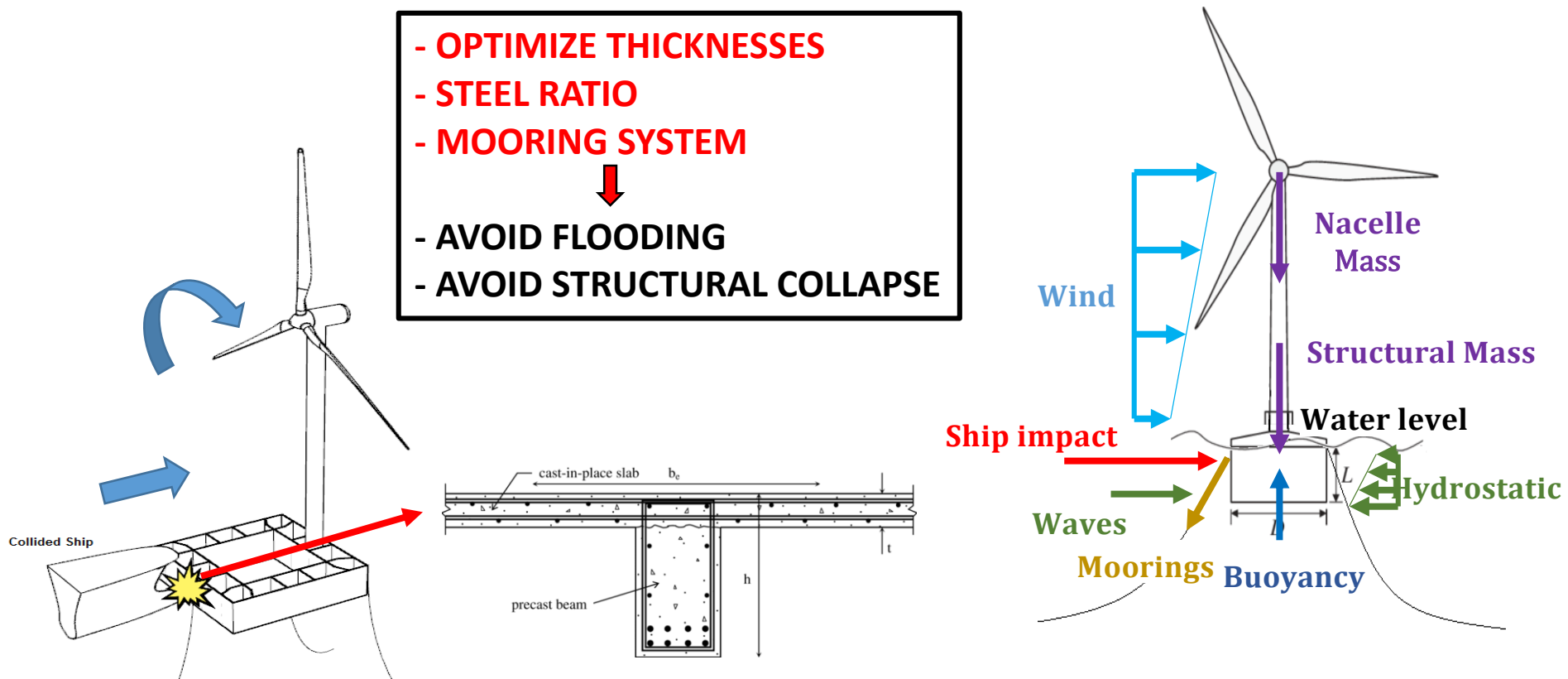


AIM OF THE PROJECT

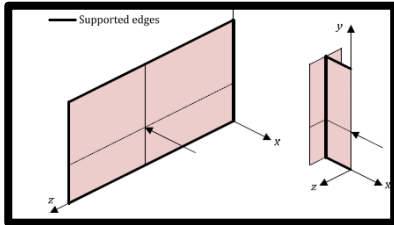
Analytical model

- **Resistance** and **damage** reinforced concrete members
- **Motions of the floater** including **hydrodynamics** effects

- **OPTIMIZE THICKNESSES**
 - **STEEL RATIO**
 - **MOORING SYSTEM**
- ↓
- **AVOID FLOODING**
 - **AVOID STRUCTURAL COLLAPSE**



ASSESS COLLISION DAMAGE? SUPER-ELEMENTS



THEORY OF PLASTICITY



SUPER-ELEMENTS



STRUCTURE BEHAVIOR

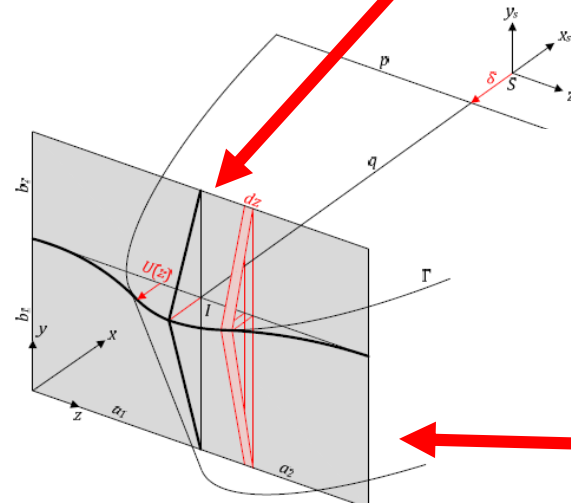
SOLID DEFORMATION

$$\dot{E}_{int} = \iiint_V \sigma_{ij} \cdot \dot{\epsilon}_{ij} \cdot dV$$

SHIP KINETIC ENERGY

$$\dot{E}_{ext} = F \cdot \dot{\delta}$$

DISPLACEMENT FIELD



$$\dot{E}_{ext} = \dot{E}_{int} \rightarrow F(\delta)$$

