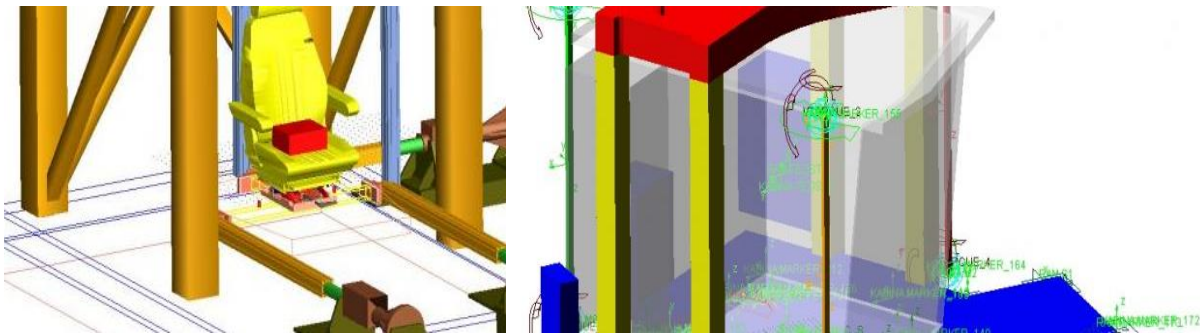


Research program

VIBROISOLATION

Development of methodology of neural network creation and learning for control of vibroisolating elements such as pneumatic springs or dampers. Application of acquired knowledge to complex stabilization systems. Development of modeling of feedback control systems. Research of stability of biaxial gyro stabilizer, analysis of influence of passive resistors in stabilizer on its functional properties. Definition of working area and applicability of gyro stabilization in technical practice. Development of theoretical and experimental procedures leading to a mathematical description of the behavior of springs and dampers with an increased regard to extreme operating conditions (large deformations, high velocities) and energy dissipation materials. Research of cavitation in liquid damper and influence of cavitation bubbles on damper operational properties.



Research activities

ACTIVELY MANAGED VIBRO-INSULTATION MEMBERS

- ▶ Design of electric and pneumatic circuits for control of vibroinsulating elements.
- ▶ Design of neural network learning system and application for control of pneumatic spring or MR damper.
- ▶ Design and development of control algorithms with regard to achieving specified system parameters.
- ▶ Verification of achieved results on specified system parameters.
- ▶ Design of the driver's seat with implemented air spring in the seat including assessment of the effect of the air spring on the distribution of contact pressures between the seated person and the seat.
- ▶ Application of acquired knowledge to other vibroinsulation systems.

GYROSKOPIC STABILIZATION

- ▶ Research of biaxial stabilizer properties.
- ▶ Analysis of stability and influence of passive resistances on system stability.
- ▶ Experimental verification of biaxial stabilizer properties.
- ▶ Design of gyroscope.

PASSIVE VIBROINSULTATION

- ▶ Investigation of bubble formation in hydraulic damper oil.
- ▶ Identification of the principle of delay in the damper and its influence on operating characteristics.
- ▶ Experimental identification of properties of pneumatic springs and their mathematical description.
- ▶ Description of energy dissipation in structural materials.
- ▶ Development of constitutive and finite element models of vibroinsulating materials and their characterization.