AKTIVITY NA ÚK

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ÚSTAV KONSTRUOVÁNÍ
Fakulta strojního inženýrství
VUT v Brně

Brno, 22. 4. 2020

ÚSTAV
KONSTRUOVÁNÍ

CONTENT

- **Intoduction**
  - Previous career in military
- **Research activities**
  - Military research
  - TAČR, Security research of Ministry of Interior
  - EDA – Europe Defence Agency
- **Teaching activities**
  - ZOK – Steel Construction and FEM,
  - ZSY_A, FEM – Structural analyses
  - ZAW, FEM – Advanced analyses
- **Publication**
- **Other activities, future plans**

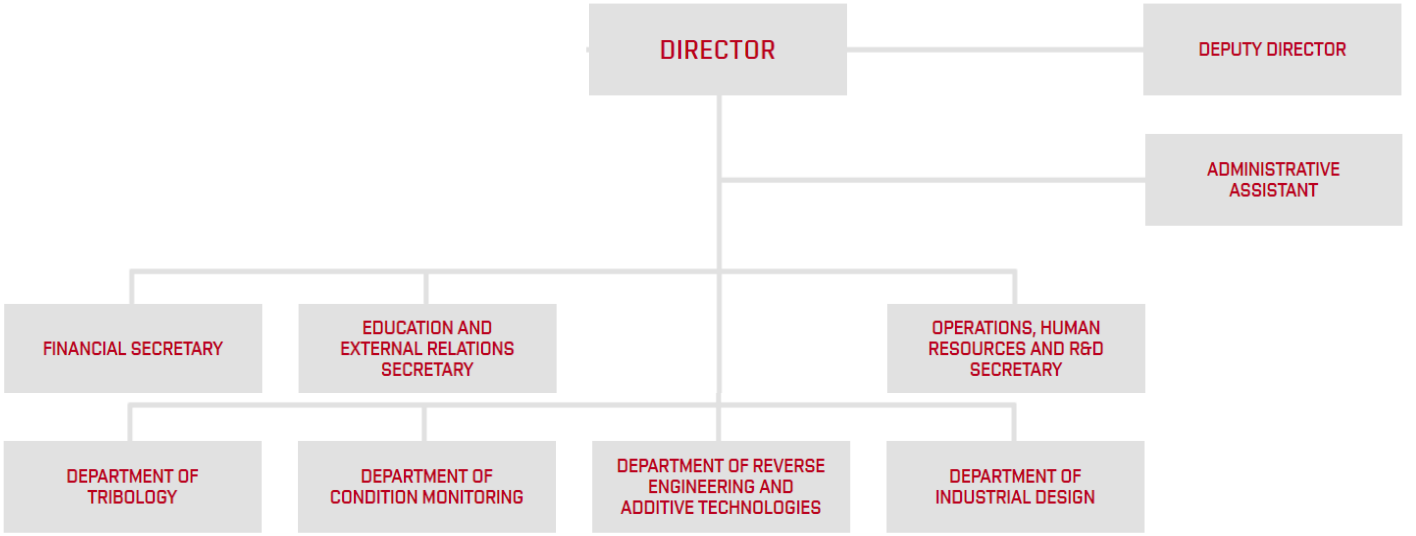
ORGANISATION TREE

Institute of Machine and Industrial Design

Participation on Master programme Mechanical Enginnering,

branch **Mechanical Enginnering Design**

- Steel Construction and FEM
- Finite Element Method - ANSYS Workbench
- FEM – Structutral analyses
- FEM – Advanced analyses



INTRODUCTION

Previous career in military

University of Defence

1992-2002 – Department of Engineer Structures
2003-2005 – Vicedean for Education
2005-2009 – assoc. prof., Department of Engineer Technology
2010-2019 – head of Department of Engineer Technology

Institute of Machine and Industrial Design

Cooperation more than 5 years

Actual state from 2020

University of Defence

2020- … – assoc. prof., Department of Engineer Technology, 50% part-time job

Brno University of Technology

2020- … – assoc. prof., Institute of Machine and Industrial Design, 30% part-time job

SVS FEM, s.r.o.

2020- … – Defence and Military Consultant, 20% part-time job

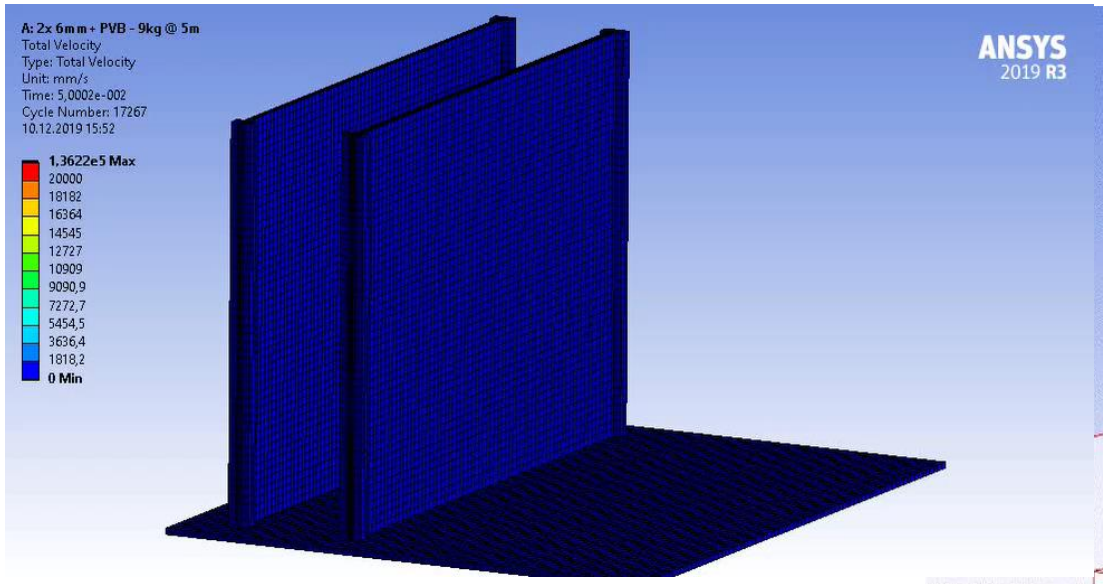
RESEARCH ACTIVITIES

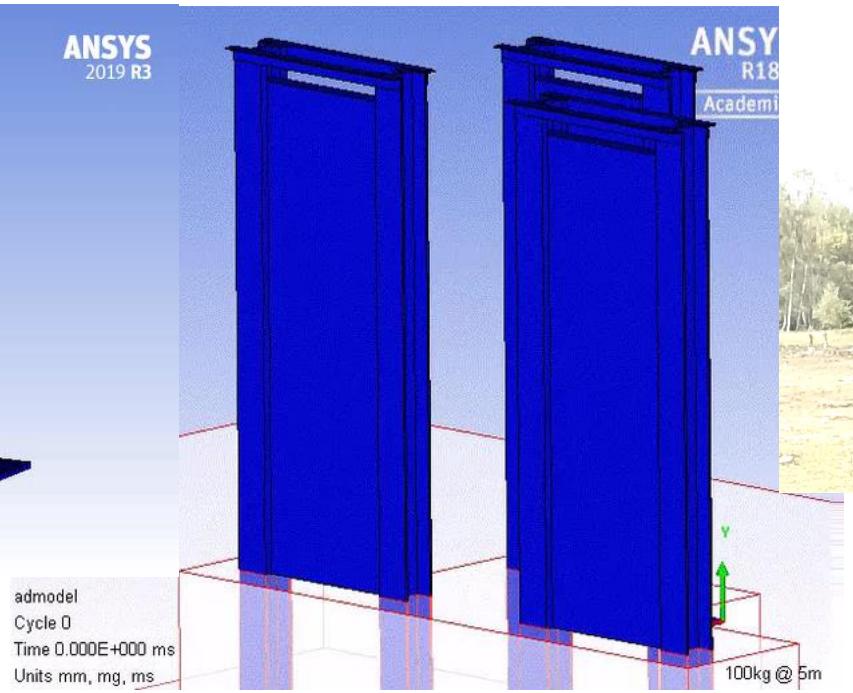
Military research, main topics:

Military mobility, design of military and temporary bridges

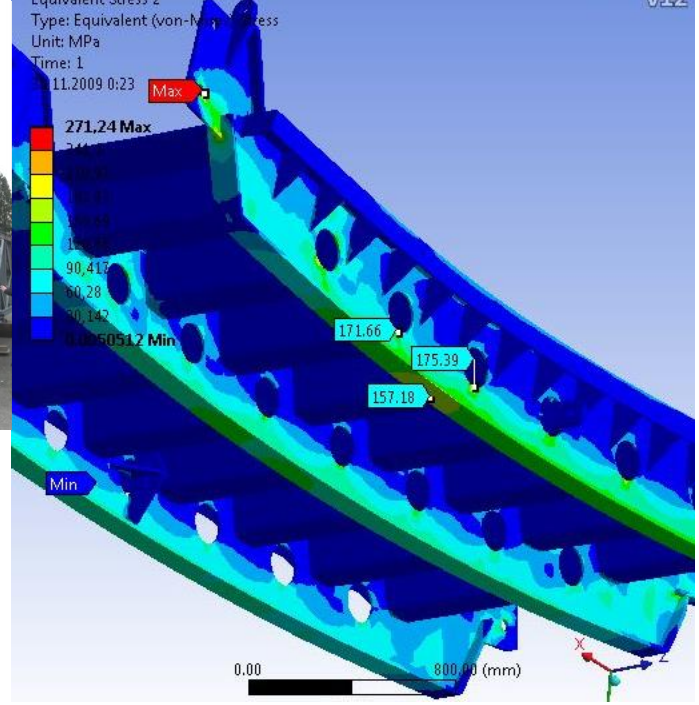
Protective structures, balistics responce, blast wave interaction

Advanced materials for protective structures





RESEARCH ACTIVITIES



TAČR, Security research of Ministry of Interior

University of Defence, CTU, FIRESTA

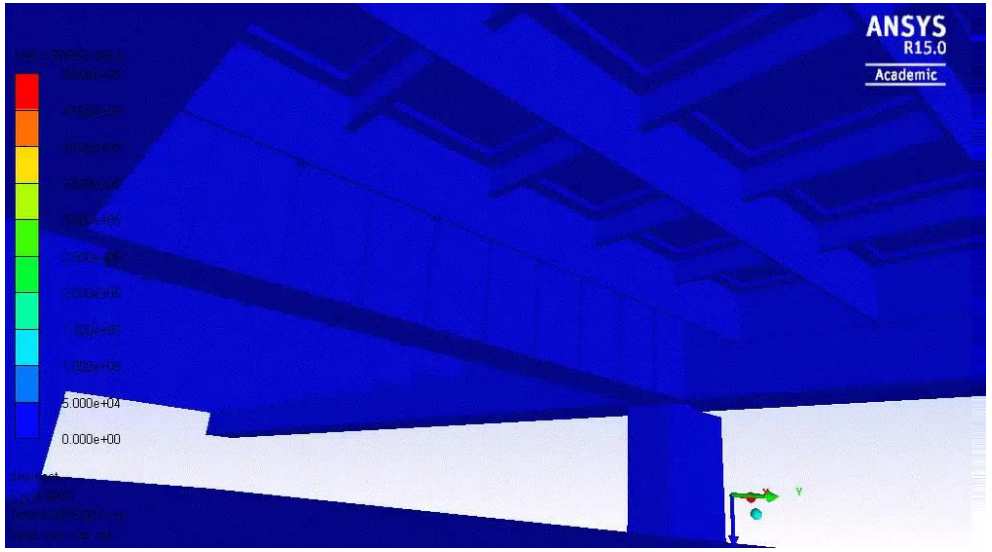
Several projects on temporary bridges for Ministry of Transportation

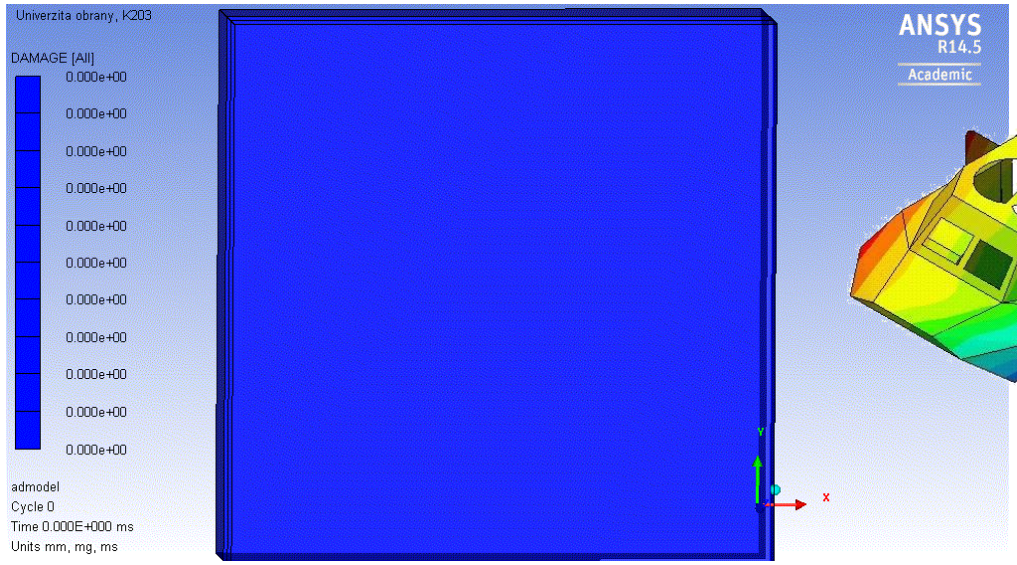
CTU, Klokner Institute

Security and Risk Assessment of Transportation Infrastructure

Military Research Institute, CTU, Poličské strojírny, SVS FEM

Research, development, testing and performance assessment of critical infrastructure parts





RESEARCH ACTIVITIES

EDA – Europe Defence Agency

National (Ministry of Defence) coordinator at Capability & Technology – CapTech Materials & Structures

Member of project management for several projects (ballistics, additive manufacturing, repair of advanced materials)

https://www.eda.europa.eu/what-we-do/activities/activities-search/captech-materials-structures

TEACHING ACTIVITIES

ZSY_A, FEM – Structural analyses

- Introduction to finite element method: basics of FEM, types of analyses, computation model and simulation, geometry, mesh, boundary conditions, interpretation of results.
- Linear 2D and 3D static tasks: stress and strain analysis, linear boundary conditions.
- Linear 2D and 3D static tasks: type of elements, symmetry, interpretation of results.
- Nonlinear 2D and 3D static tasks, nonlinear material.
- Nonlinear 2D and 3D static tasks, nonlinear deformation and contact.
- Linear stability.
- Modal analysis.
- Actual trends in structural analyses

TEACHING ACTIVITIES

ZAW, FEM – Advanced analyses

- FEM: types of analyses, parametric model, interpretation, verification and validation of results.
- Steady-state thermal analysis.
- Introduction to CFD.
- Introduction to Multiphysics analysis
- Introduction to dynamics: rigid body, transient dynamics analysis.
- Optimization.
- Explicit dynamics: impact, forming, blast.
- Simulation of additive manufacturing processes.

PUBLICATIONS

Publication

- DUBEC, Branislav, MAŇAS, Pavel, ŠTOLLER, Jiří, STONIŠ, Patrik. Experimental and numerical assessment of fibre reinforced concrete slab under blast load. In: Krivanek V. *ICMT 2019 - 7th International Conference on Military Technologies*, Proceedings. Brno: Institute of Electrical and Electronics Engineers Inc., 2019, p. 8870129. ISBN 978-1-7281-4593-8.
- SYKORA, Miroslav, KALINSKY, Michal, MAŇAS, Pavel, MARKOVA, Jana. Pilot investigation into design forces on vertical structural members due to a intentional truck impact. In: Krivanek V*. ICMT 2019 - 7th International Conference on Military Technologies,* Proceedings. Brno: Institute of Electrical and Electronics Engineers Inc., 2019, p. 855. ISBN 978-1-7281-4593-8.
- VRÁNA, Radek, ČERVÍNEK, Ondřej, MAŇAS, Pavel, KOUTNÝ, Daniel, PALOUŠEK, David. Dynamic loading of lattice structure made by selective laser melting-numerical model with substitution of geometrical imperfections. Materials, 2018, 11(11). ISSN 19961944.
- MAŇAS, Pavel. The Protection of Critical Infrastructure Objects - Technical Principles. In: *Durability of Critical Infrastructure, Monitoring and Testing*. Singapore: Springer Singapore, 2017, p. 239-248. ISBN 978-981-10-3246-2.

Scopus

OTHER ACTIVITIES, FUTURE PLANS

Cooperation with CTU, Prague

Member of Scientific board of Faculty of Biomedical Engineering (crisis responce and management)

Common research activities with Klokner Institute (bridges, protective structures)

Common research and education activities with Faculty of Civil Engineering (concrete and steel structures)

Cooperation with BUT

Common research activities with Faculty of Civil Engineering (concrete structures, protective structures)

SVS FEM, s.r.o.

Part-time job, Defence and Military Consultant

Military Research Institute

Common research activities with Division of Material Engineering (protective structures, ballistics)

EDA – Europe Defence Agency

National (Ministry of Defence) coordinator at Capability & Technology – CapTech Materials & Structures

DĚKUJI VÁM ZA POZORNOST

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