DEVELOPMENT OF A METAL DAMPER RAIL PAD FOR MODERN RAILWAY FASTENINGS PDIC COMPETENCES COMPLIANCE - EIDEIC 2018



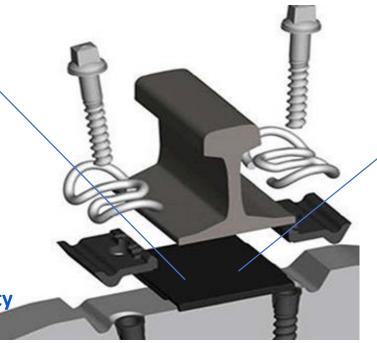
ALEJANDRO PÉREZ NÚÑEZ Industrial Engineer R+D(+I) MANAGER - TEJASA TC S.L. POSTGRADUATE PHD PROGRAM (GRUPO LADICIM) – UNIVERSIDAD DE CANTABRIA



PROJECT AIMS

RUBBER (ELASTOMERIC) RAIL PADS FOCUS Vibration Isolation Shock Absorbing Sleepers protection

WORKING LIMITATIONS True life cycle: ~5 years uV radiation Chemical environment vulnerability





METAL CUSHION DAMPERS SUBSTITUTION

True life cycle: ~<u>continuous</u>

uV radiation proof

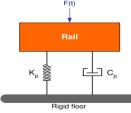
Chemical environment proof

Ale ADVANCED TRANSVERSAL TRAINING COURSE FOR DOCTORAL STUDENTS OCTOBER 2017, from 16nd to 27th EDUC What's about the future for us - the Doctorates?

- -R+D+i National Program: foremost guidelines
 -Application within National & European funding programs
 -Companies + University collaborative association
- -Undertaking: knowledge based entrepreneurs
- -Post-doc contracts
- -Knowledge transfer processes: patenting, intellectual property

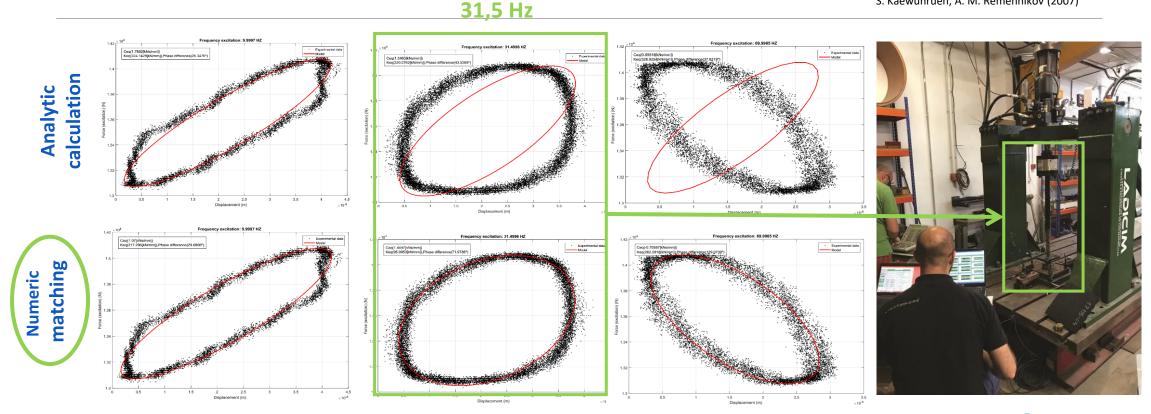
Alternative careers, apart from the University





KV MODEL CHARACTERIZATION

S. Kaewunruen, A. M. Remennikov (2007)



Tools:

Astillero (Cantat

S.

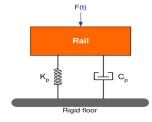
Tejasa

Proprietary algorithm (Matlab) ANSYS, LabView

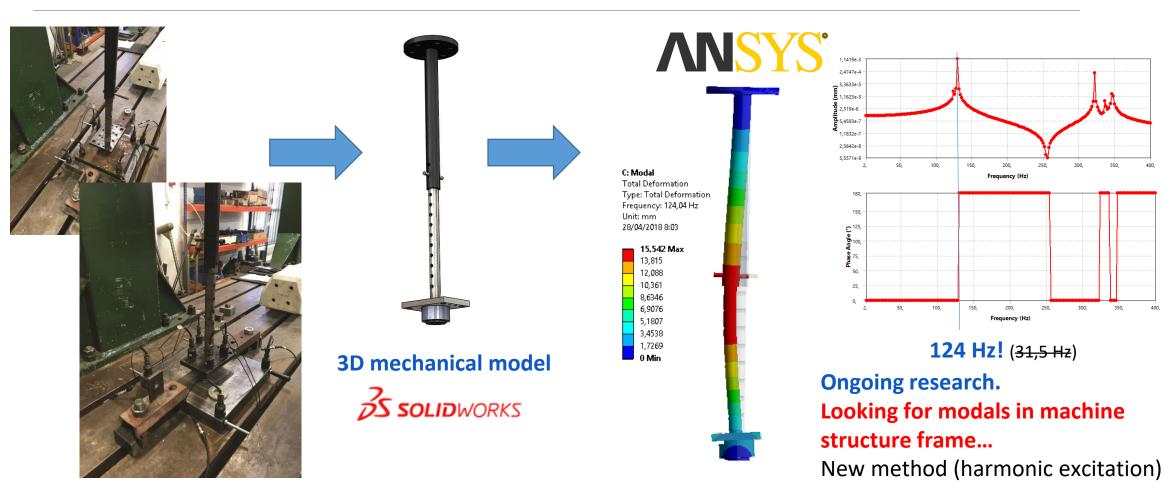
Facilities:

Hydraulic actuator in Frequency Datalogger LMS + accelerometers **Collaborations: DE DE CATALLANYA** LEAM - Laboratorio de Ingeniería Acústica y Mecánica (UPC)

Alejandro P. (R+D⁺ⁱ Tejasa TC S.L.)



S. Kaewunruen, A. M. Remennikov (2007)



KV MODEL CHARACTERIZATION

Astillero (Cantabı Ċ Industrial Tirso González. Nave 21 y 22-6.

Tejasa

DESIGN MODEL: STANDARD STIFFNESS



Tools:

Proprietary algorithm (Matlab) UNE-EN Guidelines

Facilities:

Instron 8800 servo-hydraulic machine Datalogger LMS + accelerometers

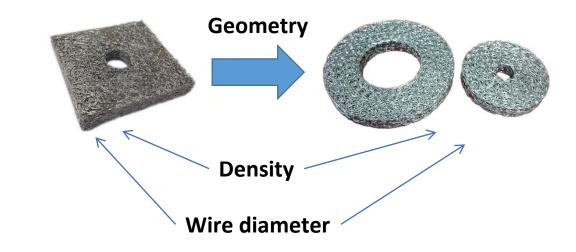
OUTPUTS

IMPUTS

(UNE-EN 13146-9) $k_e = \frac{F_{SP2} - F_{SP1}}{d_{SP}}$

Static Stiffness

Dynamic Stiffness
(UNE-EN 13146-9+A1)
$$k_{d(5/10/20 Hz)} = \frac{F_{LFP2} - F_{LFP1}}{d_{LFP}}$$





DESIGN MODEL: STANDARD STIFFNESS

R

800 1600 -0 - P $- \odot - \mathbf{P}$ 700 1400 -⊡ – Q Ω 🔺 — R 600 1200 kd [kN/mm] ke [kN/mm] 500 1000 400 800 300 600 200 400 2 5 2 5 3 Density [g/cm3] Density [g/cm3]

LINEAR DEPENDENCE WITH DENSITY

Ring-shaped metal cushion implies an increasing of stiffness respect to squared-shaped pads

Dynamic hardening is influenced by shape factor

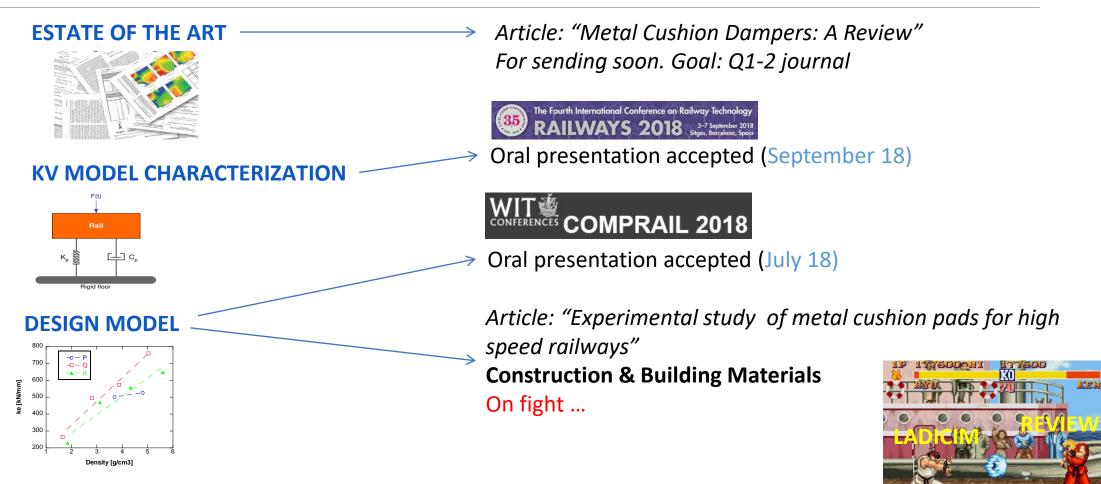


A decreasing in wire diameter causes an increase in the rigidity

6

Calle

DISSEMINATION OF RESULTS



BASIC SKILLS

39610-El Astillero (Cantabria)

C.P.

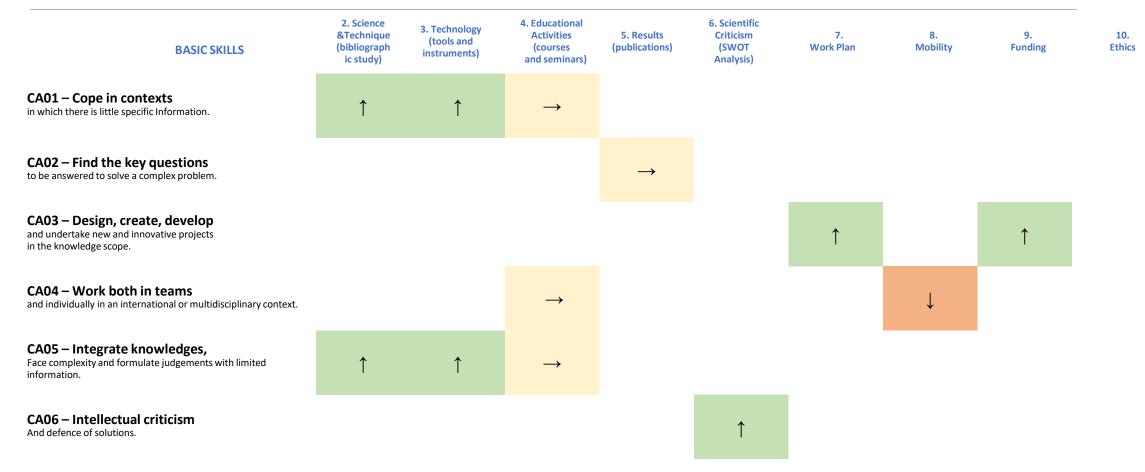
Nave 21 y 22-6.

istrial Tirso González.

Tejasa TC S.L. Calle de la Industria, N77. Parque

BASIC SKILLS	2. Science &Technique (bibliograph ic study)	3. Technology (tools and instruments)	4. Educational Activities (courses and seminars)	5. Results (publications)	6. Scientific Criticism (SWOT Analysis)	7. Work Plan	8. Mobility	9. Funding	10. Ethics
CB11 – Systematic understanding of a field of study and command of the skills and research methods related to the field.	ſ	¢	\rightarrow						
CB12 – Skill to conceive, design or create , implement and adopt a substantial process of research or creation.				\rightarrow		ſ	Ļ		
CB13 – Skill to contribute to the enlargement of the knowledge limits through an original research.				\rightarrow					
CB14 -Skill to carry out a critical analysis And assessment and synthesis of new and complex ideas.					¢				
CB15 – Skill to communicate with the academic and scientific community and with society In general about the scope of knowledge in the ways and languages of common use in the international scientific community.				\rightarrow			Ļ		
CB16 – Skill to encourage in academic and professional contexts, the scientific, technological, social, artistic or cultural progress in a society based on knowledge.				\rightarrow					Ţ

CAPACITIES AND PERSONAL ABILITIES



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S.L