



CSF

CENTRO DE SABER
DA FERROVIA

CENTRE OF COMPETENCE IN RAILWAYS

WWW.FE.UP.PT/CSF

U. PORTO

FEUP FACULDADE DE ENGENHARIA
UNIVERSIDADE DO PORTO

CENTRE OF COMPETENCE IN RAILWAYS

UNIVERSITY OF PORTO

University of Porto (U.Porto) is a benchmark institution for Higher Education and Scientific Research in Portugal and one of the top 200 European Universities according to the most relevant international ranking systems. U.Porto is the most international of Portugal's universities thanks to its active cooperation with hundreds of higher education institutions worldwide.

www.up.pt

FACULTY OF ENGINEERING

Faculty of Engineering of the University of Porto (FEUP) is the largest of the 14 faculties that constitute the University of Porto. With its origins in the Polytechnic Academy, created in 1837, FEUP is a leading institution of international repute, whose achievements in research and teaching have led to its current position at the forefront of engineering schools.

www.fe.up.pt

PORTO INNOVATION DISTRICT

FEUP is located in the Asprela Pole of the University of Porto, an area designated as the Porto Innovation District. With 50,000 talented people working here, it is primarily a technology hub, where the strong presence of engineering technologies, health sciences and entrepreneurship lend considerable impetus to the process of innovation.

SCIENCE AND TECHNOLOGY PARK (UPTEC)

The Porto Innovation District is also where the core of the University of Porto's Science and Technology Park (UPTEC) is located. UPTEC is a structure which brings together over two hundred projects, including startups, innovation centres, anchor companies and entrepreneurial projects. In 2013, UPTEC was recognized with the Regio Stars Award in the category "Smart Growth", organized by the European Commission - the first time a Portuguese university had received an award for regional development projects at European level.

www.uptec.up.pt

CENTRE OF COMPETENCE IN RAILWAYS

FEUP has a Centre of Competence in Railways (CSF - Centro de Saber da Ferrovia) associating the competences of individual researchers, R&D units and interface institutes in the field of railways. The Centre of Competence in Railways strongly cooperates with the main national railway actors and multiple international partners.



www.fe.up.pt/csf



IRAIL - INNOVATION IN RAILWAY SYSTEMS AND TECHNOLOGIES

FEUP is coordinating the PhD programme - iRail - Innovation in railway systems and technologies - associating the University of Porto and the University of Minho, from Portugal, and the University of São Paulo, from Brazil.

www.fe.up.pt/irail



SHIFT2RAIL

UPORTO is member of the consortium Swittrack'EN, associated member of Shift2Rail, the first European Rail Joint Undertaking (JU) aiming to foster research and innovation in rail products and solutions

www.shift2rail.org

COMPETENCES

Train-infrastructure
dynamic interaction

Noise and vibration

Track buckling analysis

Fatigue analysis

Railway condition monitoring

Wayside and on-board systems

Holistic energy management

Traction and on-board energy
storage systems

Manufacture in composite materials,
metals and hybrid solutions

Design for manufacturing,
assembly and control

Artificial intelligence

Real time embedded electronics

Data gathering, processing
and communications

Railways digital twin, simulation
& virtualization

Smart asset management

Network management planning

Smart Integration for
door-to-door mobility

Environmental footprint tools
and circular economy

Socio-economic assessment



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RESEARCH PROJECTS

MAXBE

Interoperable Monitoring, diagnosis and maintenance strategies for AXle Bearings

PARTNERS:

UPORTO (COORDINATOR), EMEF, EVOLEO, I-MOSS NV, IST, KRESTOS, MERMEC, NEM SOLUTIONS, REFER, SKF, TUBS, UOB, UCC

PEDDIR

Weighing in motion and wheel defect detection system

PARTNERS:

EVOLEO, FEUP

CAPACITY4RAIL

Increasing Capacity 4 Rail networks through enhanced infrastructure and optimised operations

PARTNERS:

ACCIONA, ADEVICE, ADIF, ASTS, CEMOSA, CHALMERS, DB, EFRTC, IFF, NETWORK RAIL, OG, REFER, SYSTRA, TCCD, TRAFIKVERKET, UIC, UOB, UPORTO, UU

LIGHTRAIN

Aluminum deck for passenger carriages

PARTNERS:

ALSTOM, INEGI, FEUP, ISQ, QUANTAL

IN2RAIL

Innovative Intelligent Rail

PARTNERS:

ANSALDO STS, BOMBARDIER, DLR, EVOLEO, LTU, MERMEC, NETWORK RAIL, RFI, SIEMENS AG, STRUKTON, SYGNITY, TRAFIKVERKET, UNIGE, UOB, UPORTO, VIF

IN2STEMPO

Innovative Solutions in Future Stations,
Energy Metering and Power Supply

PARTNERS:

ALSTOM, ANSALDO STS, CAF,
DEUTSCHE BAHN, FTA, IP, IZT, NETWORK RAIL,
ÖBB, PKP, RAILENIU, SIEMENS AG, SNCF, SZ,
THALES, TRAFIKVERKET, UMINHO, UPORTO

INTRACK2

Research into enhanced track and
switch and crossing system 2

PARTNERS:

NETWORK RAIL, ACCIONA, AC2T, ANSALDO
STS, CEMOSA, DEUTSCHE BAHN, UPORTO, FCP,
GETZNER, IP, KIRCHDORFER, VIF, MCL, ÖBB,
PLASSER & THEURER, PRORAIL, RAILENIU, SZ,
SNCF, TATA STEEL, TRAFIKVERKET, TCDD, UPV/EHU,
UMINHO, VOESTALPINE, VOSSLOH, WIENER LINIEN
GMBH & CO KG,

ID TRACTION

Plug&Play

Technological solution for upgrading
the power traction converter
of high speed trains

PARTNERS:

NOMADTECH, FEUP

INBRAIL

Innovative NOISE BARRIERS for RAILways

PARTNERS:

MOTA-ENGIL, FEUP, FCTUC

IPBRAIL

Innovative Precast Bridges
for RAILways

PARTNERS:

MOTA-ENGIL, FEUP

H2RAIL

Decarbonisation of rail
passenger transport

PARTNERS:

CAETANOBUS, CP, NOMADTECH,
FEUP, AP2H2

RISEN

Rail Infrastructure Systems
Engineering Network

PARTNERS:

UOB (UK), BOT (USA), BRNO (CZECH REPUBLIC),
EVOLEO (PORTUGAL), KTH (SWEDEN), MIT (USA),
MERMEC (FRANCE), NTNU (NORWAY), PMIL (ITALY),
ROADSCANNERS (FINLAND), SWJTU (CHINA), TUT
(FINLAND), TUDELFT (NETHERLANDS), UPORTO
(PORTUGAL), UPV (SPAIN), UOW (AUSTRALIA)

IN2TRACK3

Research into enhanced track and switch
and crossing system 3

PARTNERS:

TRAFIKVERKET, ACCIONA, AC2T, CEMOSA,
FCP, VAYLAVIRASTO, GETZNER, HITACHI RAIL,
IP, KIRCHDORFER, MCL, NETWORK RAIL,
ÖBB, PLASSER & THEURER, PRORAIL BV,
RAILENIUM, SNCF, SFR, TCDD, UPV/EHU,
UMINHO, UPORTO, VIF, VOESTALPINE, VOSSLOH,
WIENER LINIEN GMBH & CO KG

RAILWAYS 4.0

PARTNERS:

EFACEC, ALMADESIGN, EVOLEO,
INEGI, IP, INOVAMAI, ITECONS, ISQ,
IPP, ISEL, IST, ISEP, IT, LNEC, MCG,
MOTA-ENGIL, NOMADTECH, PFP, SOLVIT,
UC, UMINHO, UPORTO



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CONSULTING SERVICES

Advice on public transport
mobile payment systems
CLIENT: Transportes Intermodais
do Porto, ACE

Analysis of longitudinal deformation
of Box Culvert structures in railway
embankments
CLIENT: Mota-Engil

Analysis of the abnormal wear behaviour
of the breaking-wheel assembly of the
locomotives in service at Sintra line
CLIENT: EMEF

Assessment of the train running safety
on the new high-speed railway bridge
across the Volga river
CLIENT: OJSC Institute Giprostroy most,
Russia

Development of methodology for
assessing the remaining useful life
on railway bridges
CLIENT: Infraestruturas de Portugal

Dynamic analysis of high-speed
track-ground systems in order to
access its critical speed
CLIENT: Mott-MacDonald, UK

Dynamic behaviour of the
UME'S 3150/ 3250
CLIENT: EMEF

Evaluation of the possibility of introducing
new vehicles with 12.5 t/axle in the Porto
light rail network
CLIENT: Metro do Porto

Evaluation study of the alternative
lines for the expansion of the Porto
light rail network
CLIENT: Metro do Porto

Prediction of traffic-induced vibrations
in the vicinity of the circular line and
extension of the yellow line of the Porto
light rail network
CLIENT: Metro do Porto

Technical analysis of abnormal
wear on CPA 4000 fleet wheels
CLIENT: EMEF

Technical analysis of the failure
of the CPA 4005 wheel No. 4
CLIENT: EMEF

Technical evaluation of the light
metro system schedule in the
Porto metropolitan area
CLIENT: ViaPorto



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