



Znanstveno i stručno usavršavanje SNCF, Francuska

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veljača 2013.

SNCF

- Société National des Chemins de Fer Français upravlja željeznicom u Francuskoj i Monaku
 - Osnovano 1937. godine
 - 245 000 zaposlenih
 - 30 000 km željezničke mreže (54% elektrificirano)



SNCF

• Mreža pruga



Dessin
Doris
Chomenko



SNCF organizacija

- Organizacija SNCF-a

- Groupe: SNCF



- Branche: Infrastructure (INFRA)



- Direction: Ingénierie (IG)

- Département: Télécommunication (TL)



- Division: Réseau Support (RS)

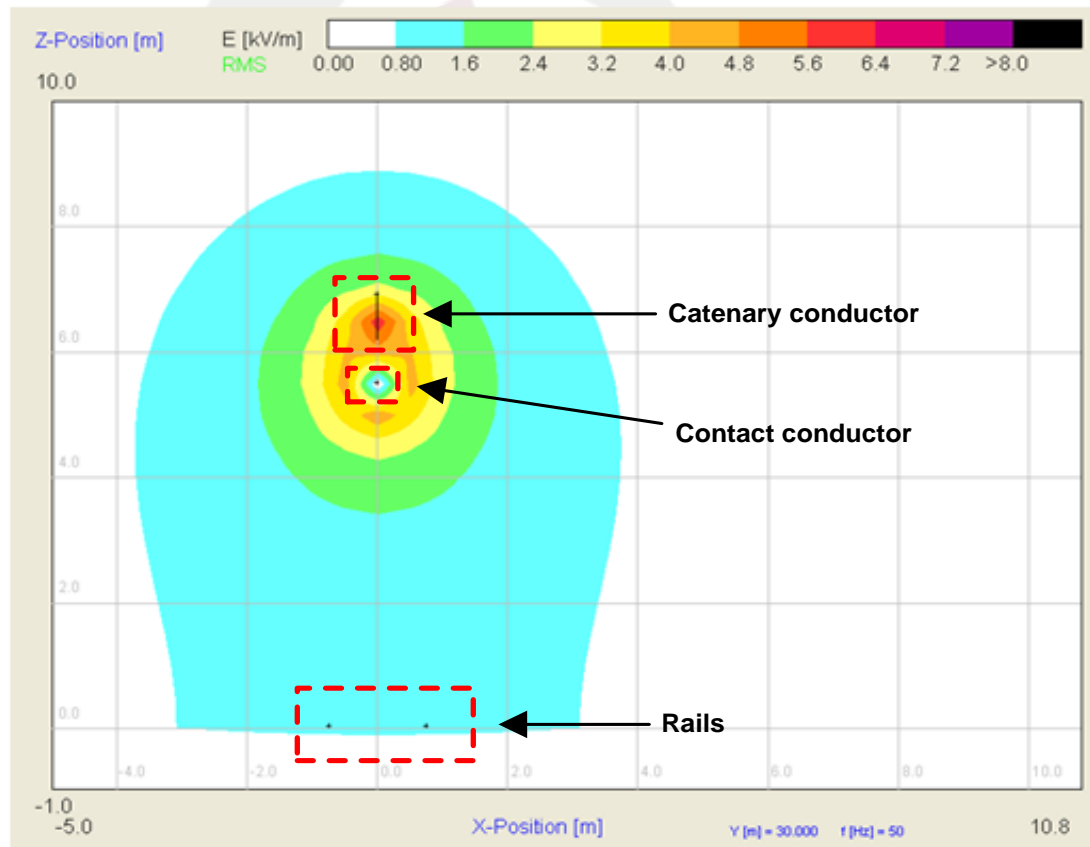
- Section: Etudes compatibilité électromagnétique (CM)

Područje rada

- Elektromagnetska kompatibilnost u željezničkim sustavima
- Proračuni električnog i magnetskog polja
- Utjecaj željezničkih sustava na
 - Komunikacijske sustave
 - Cjevovode
 - Elektroničku opremu
- Različiti sustavi elektrifikacije
 - 25 kV 50 Hz
 - 2x25 kV 50 Hz
 - 1.5 kV DC
 - 3 kV DC
 - 15 kV DC

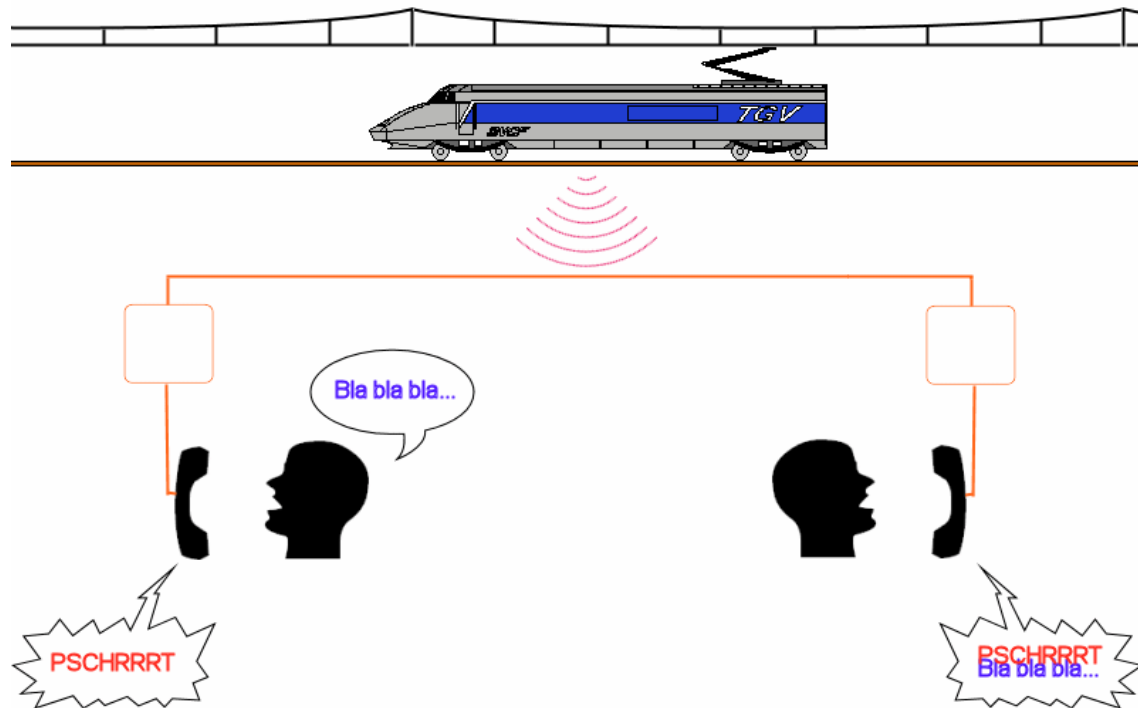
Područje rada

- Proračuni električnog i magnetskog polja



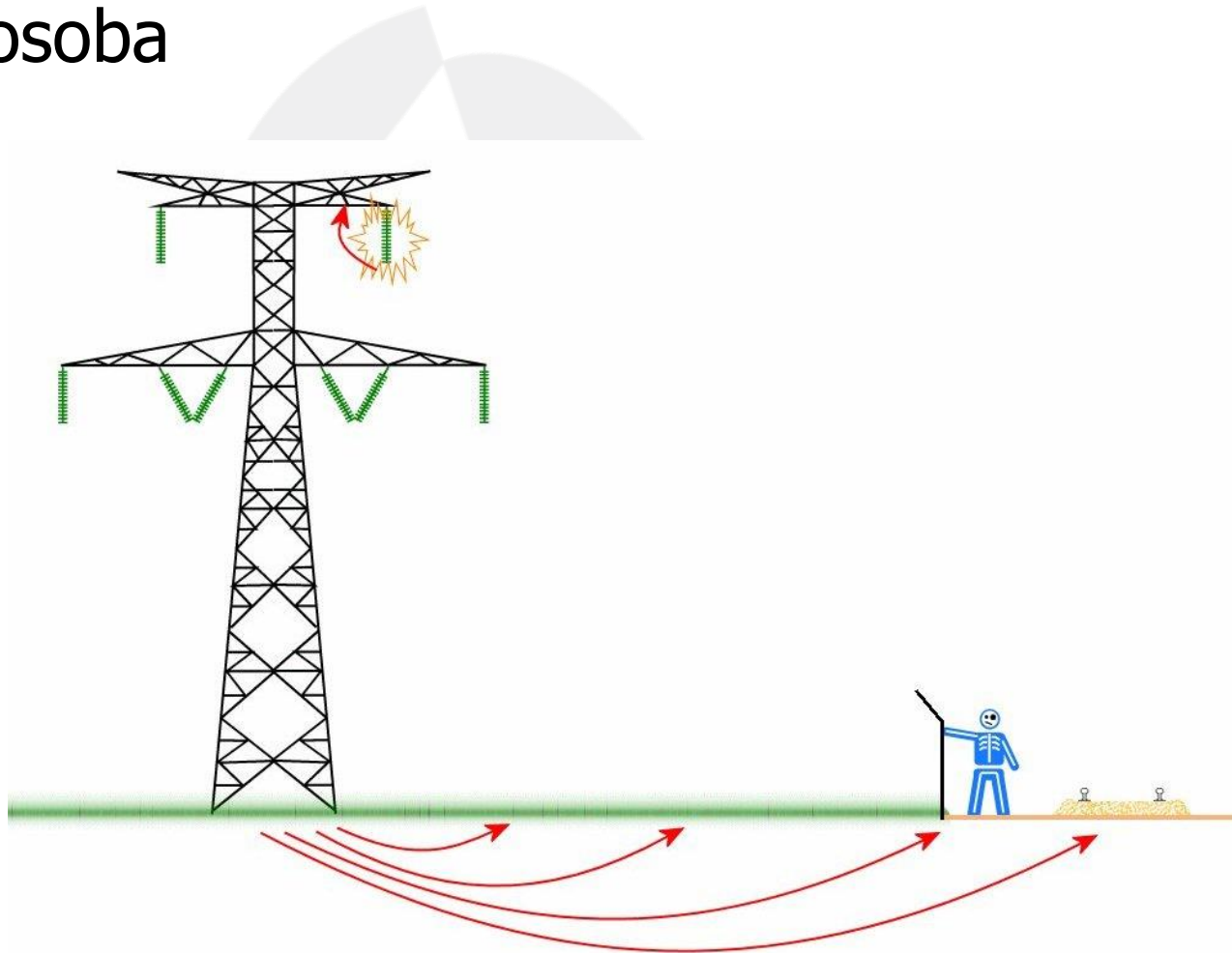
Područje rada

- Elektromagnetska kompatibilnost u željezničkim sustavima
 - Utjecaj na TK sustav



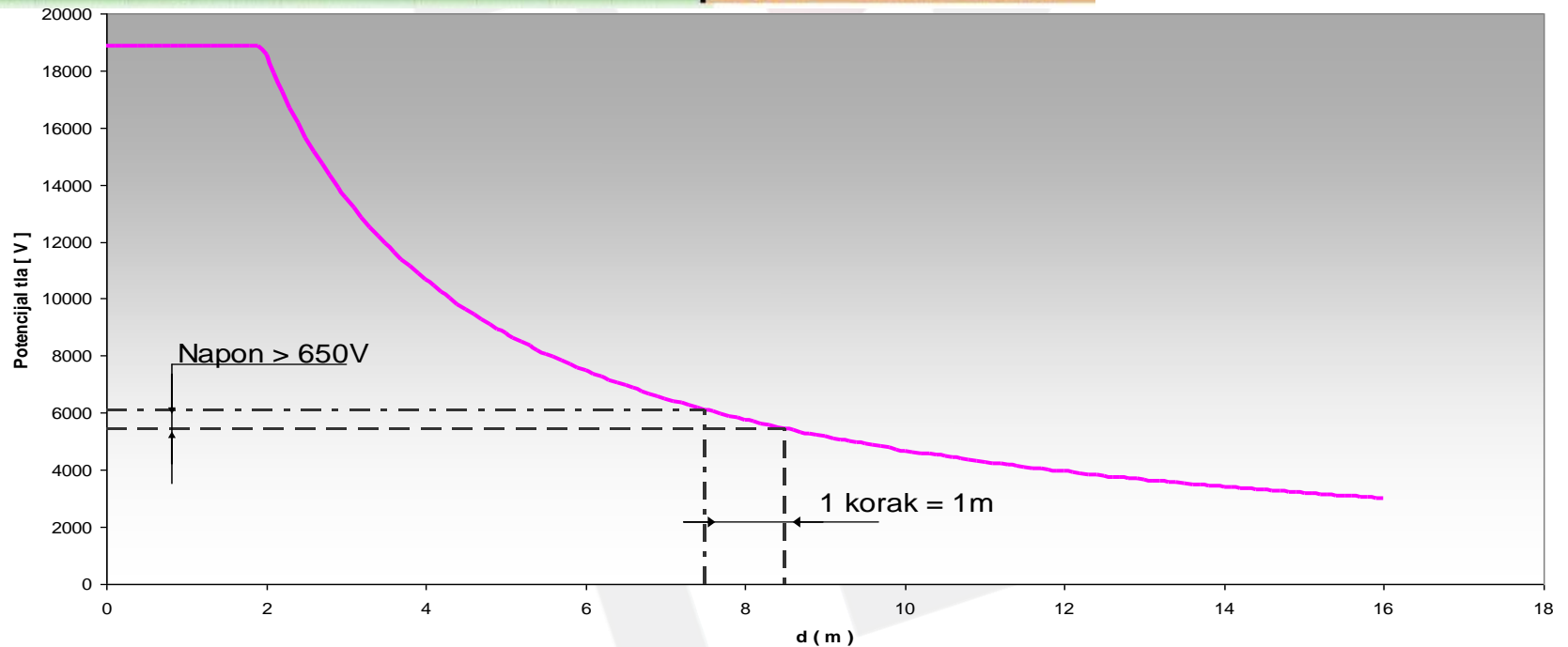
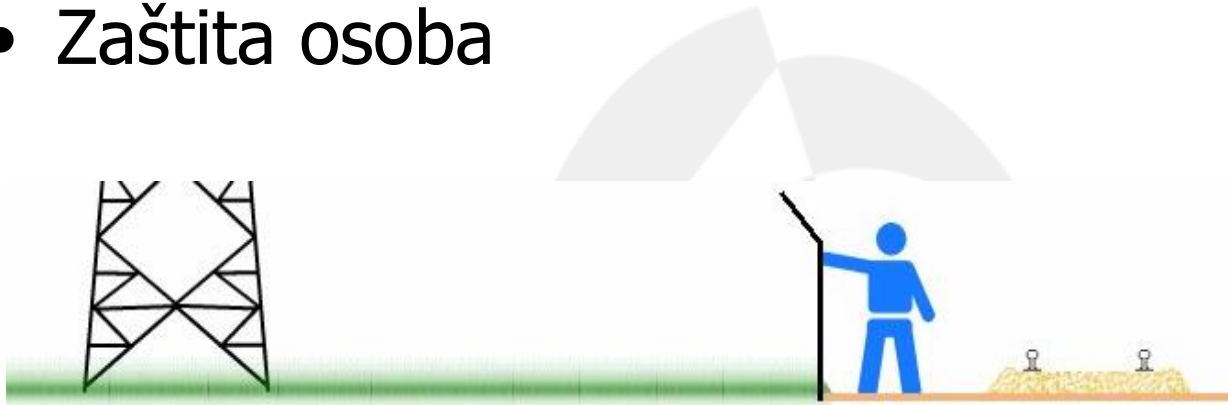
Područje rada

- Zaštita osoba



Područje rada

- Zaštita osoba

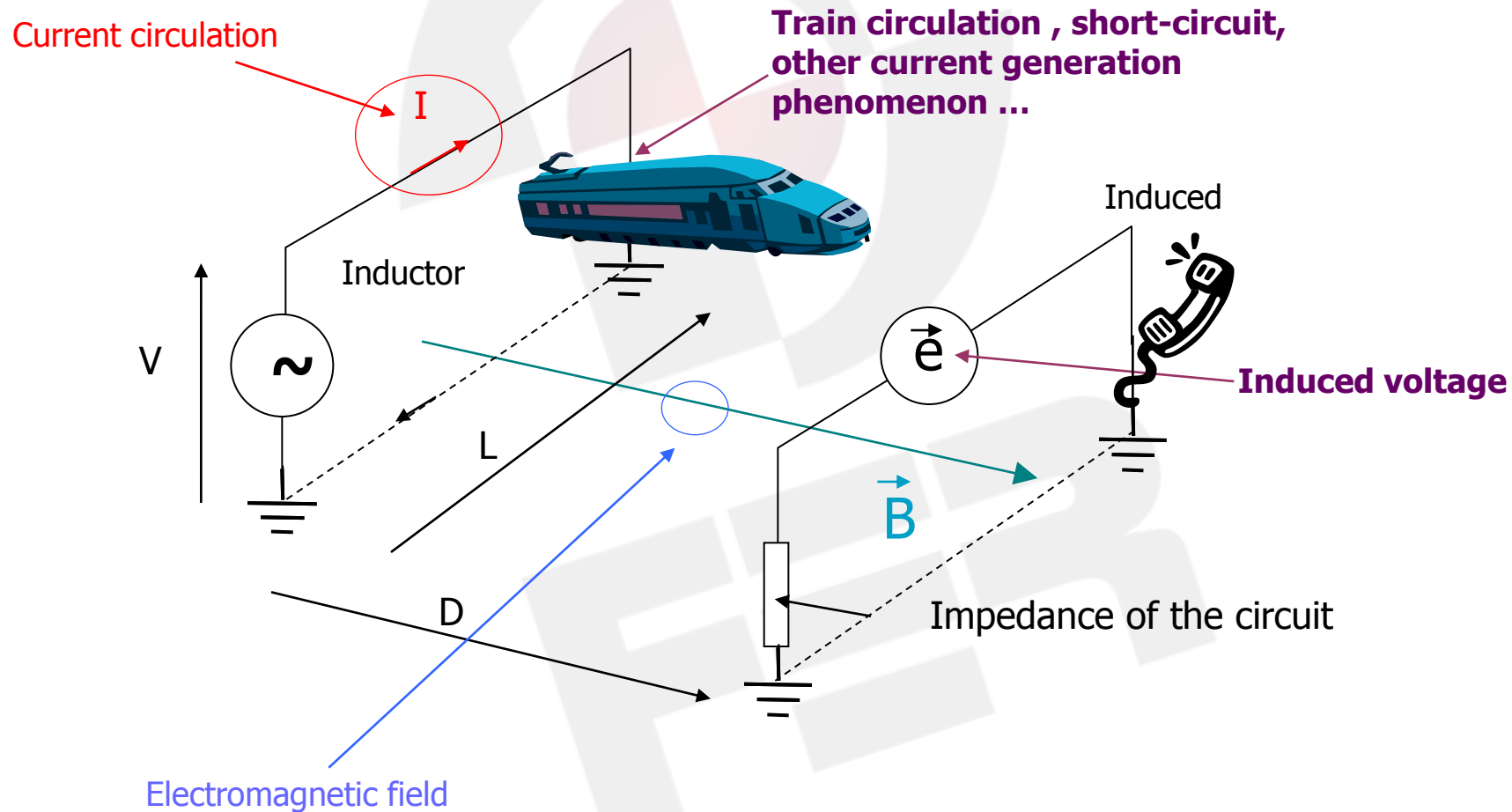


Alati

- **Champes**
 - Proračun električnog i magnetskog polja
- **Modalf**
 - Određivanje raspodjele struja u sustavu izvora smetnje i osjetljivom sustavu
- **MOD RGT**
 - Analiza signala dobivenih Modalf-om
- **Arc GIS**
 - Prostorno povezivanje sustava izvora smetnje i osjetljivog sustava
 - Određivanje induciranog napona pomoću programa CARIN

Alati

- Pojednostavljen prikaz interakcije željezničkog i telekomunikacijskog sustava

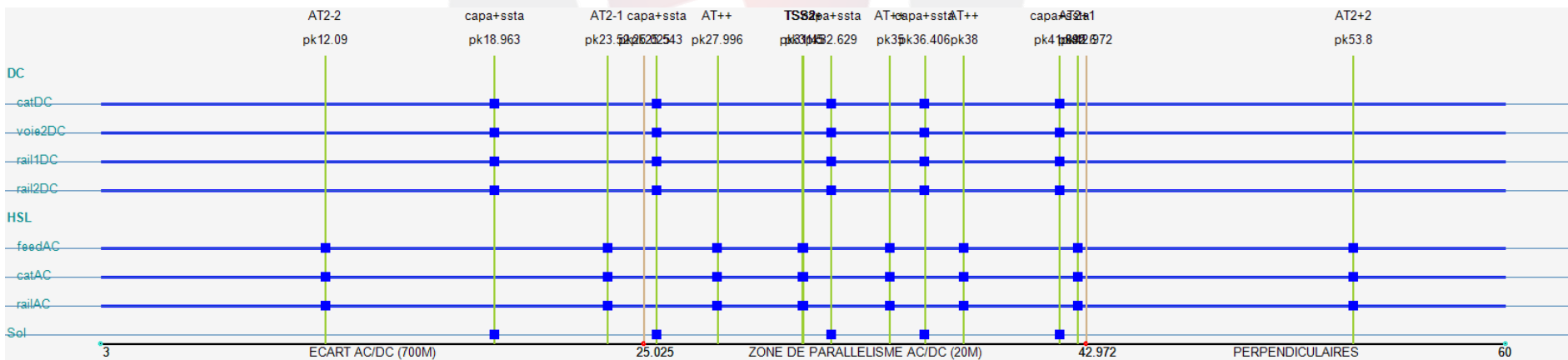


Alati

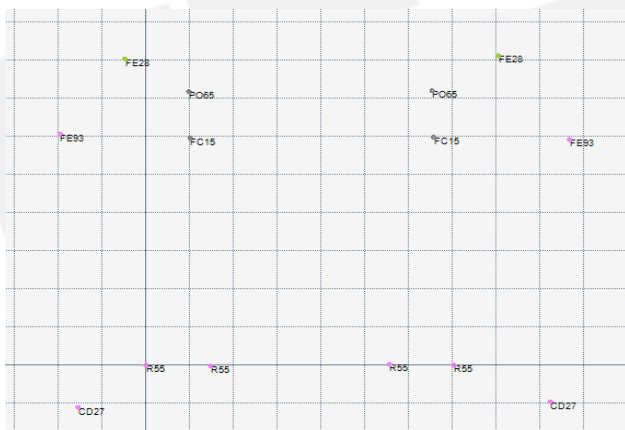
- Modalf

- Željeznički sustav
- Baza podataka o elementima (vodiči, tračnice, podstanice)

Définition longitudinale



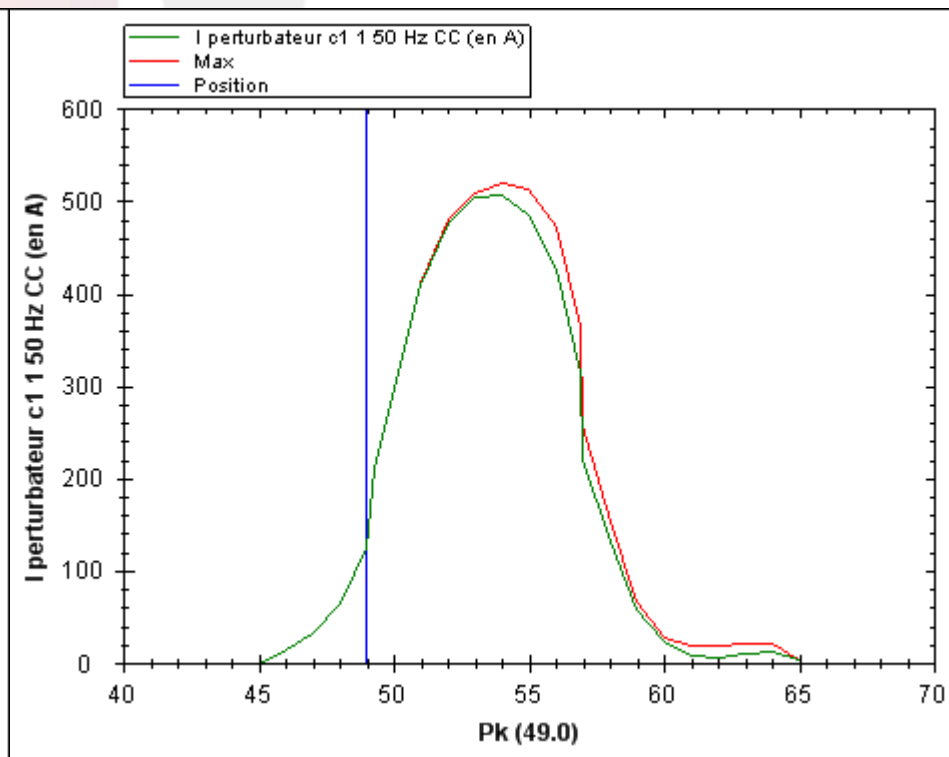
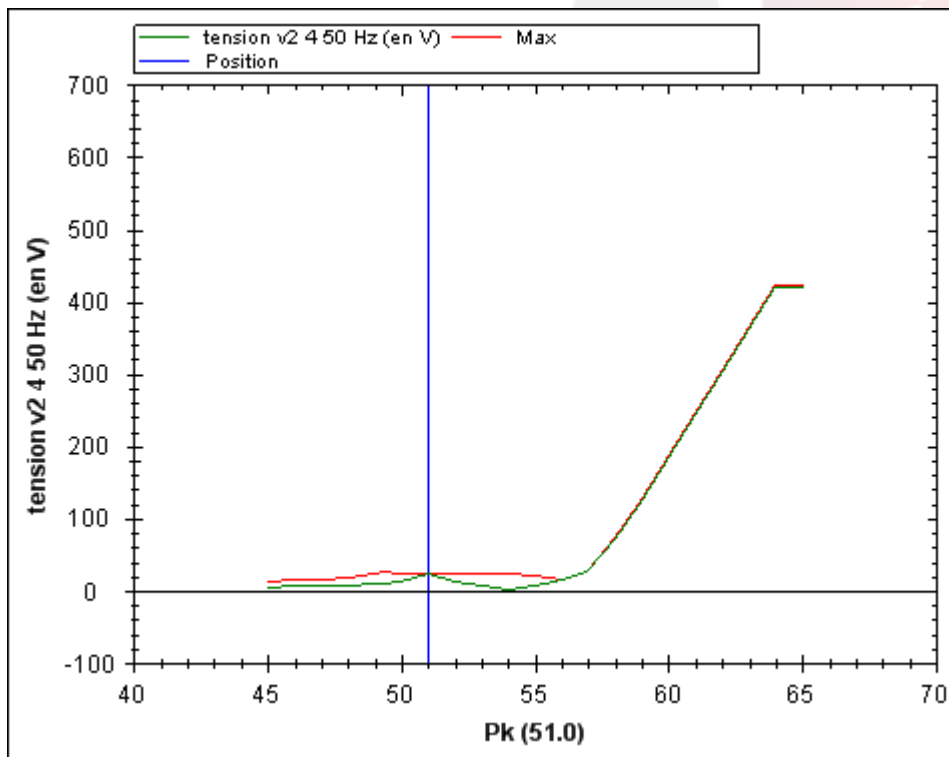
Définition transversale



Alati

- MOD RGT

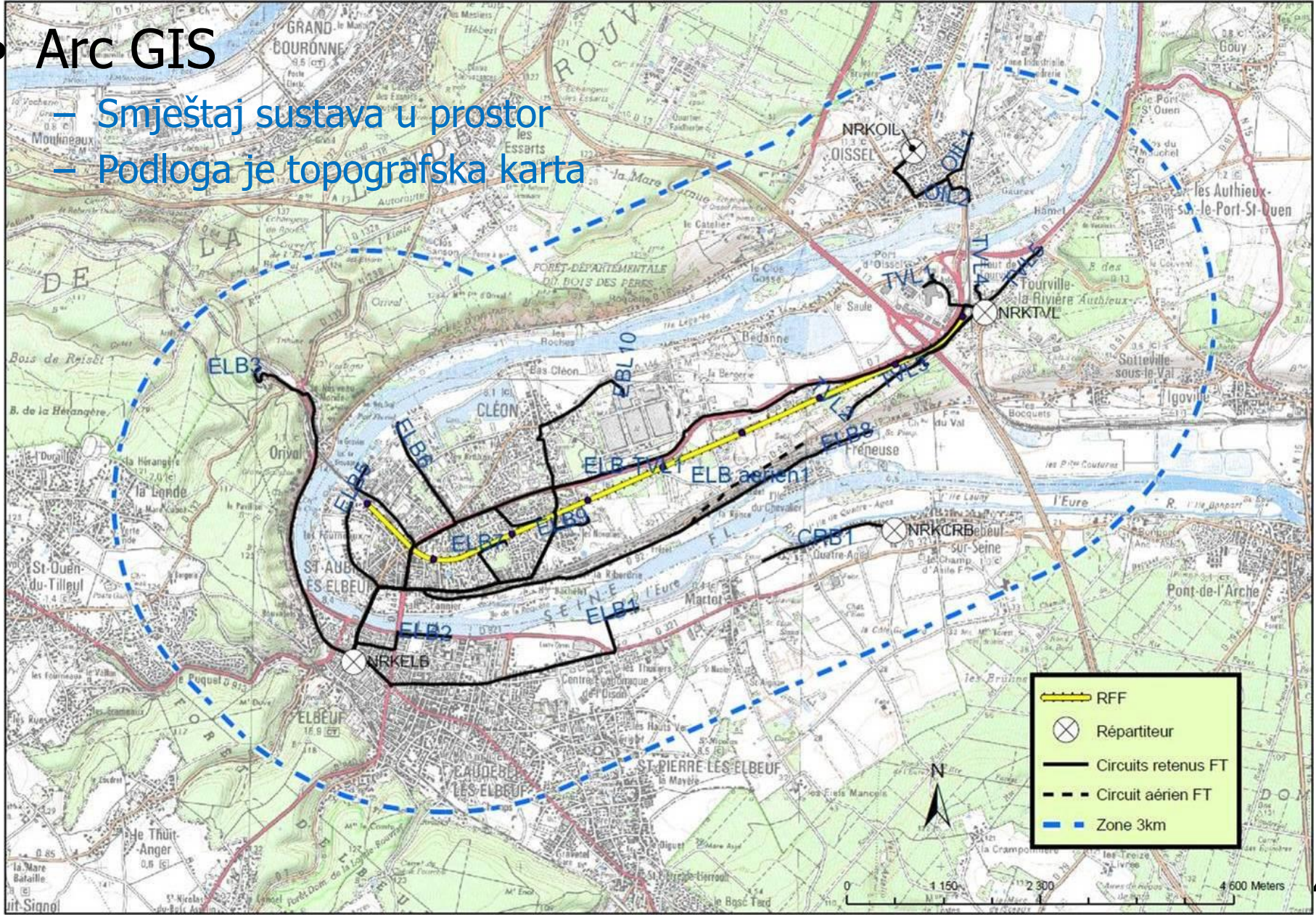
- Obrada signala napona i struja
- Proračun struje smetnje



Alati

- Arc GIS

- Smještaj sustava u prostor
- Podloga je topografska karta

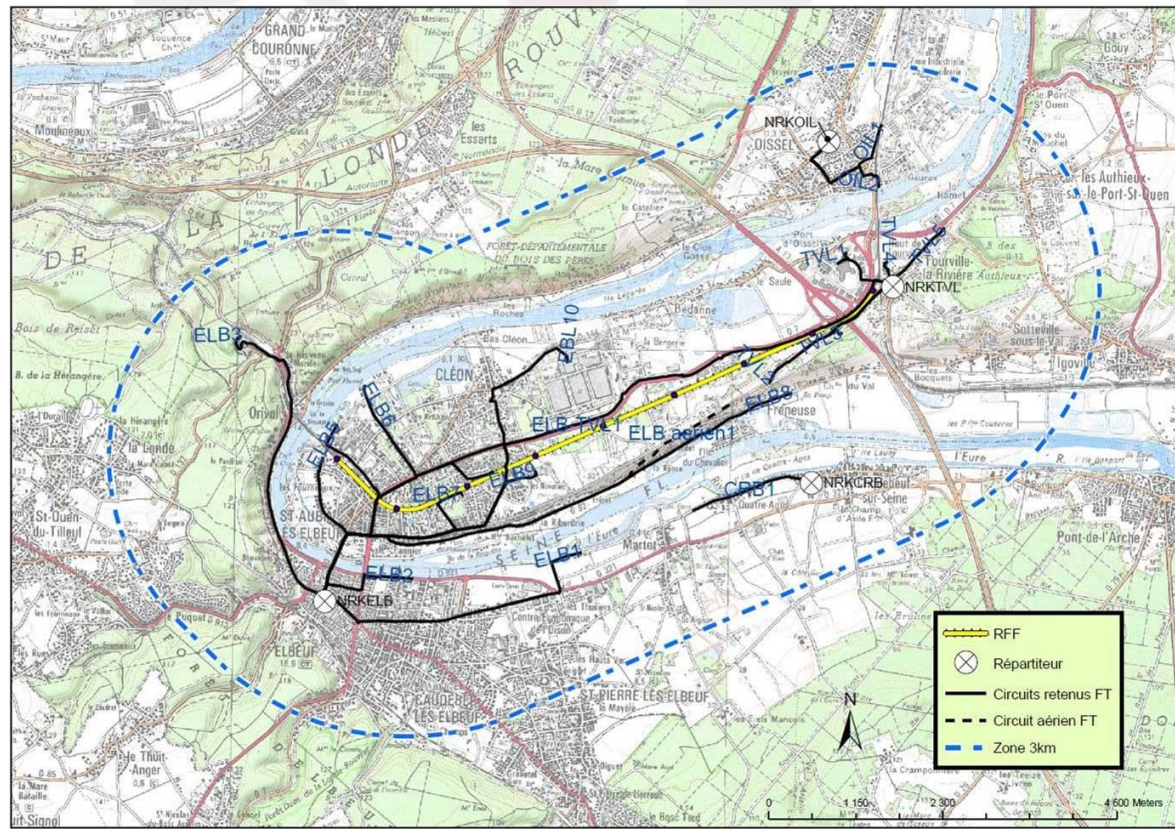


Alati

- Arc GIS

- Napon u točkama telekomunikacijske mreže ili mreže cjevovoda

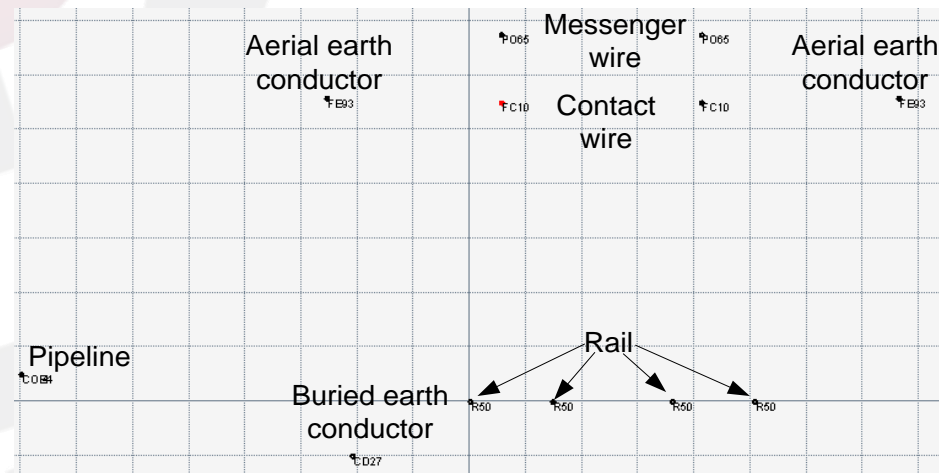
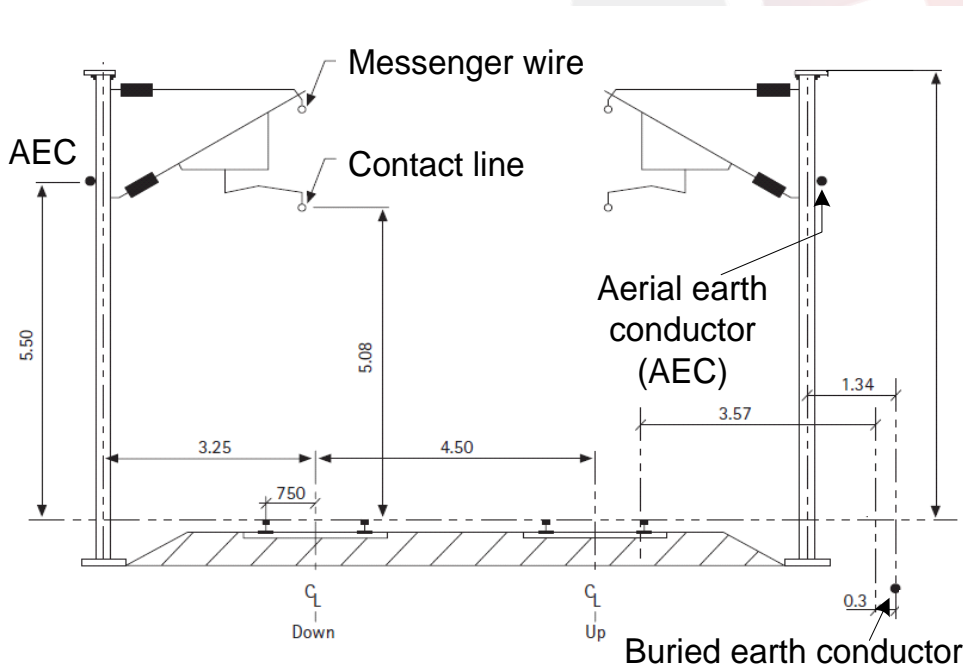
- Kratki spoj
- Redovni pogon
- Psofometrička smetnja



Moj doprinos

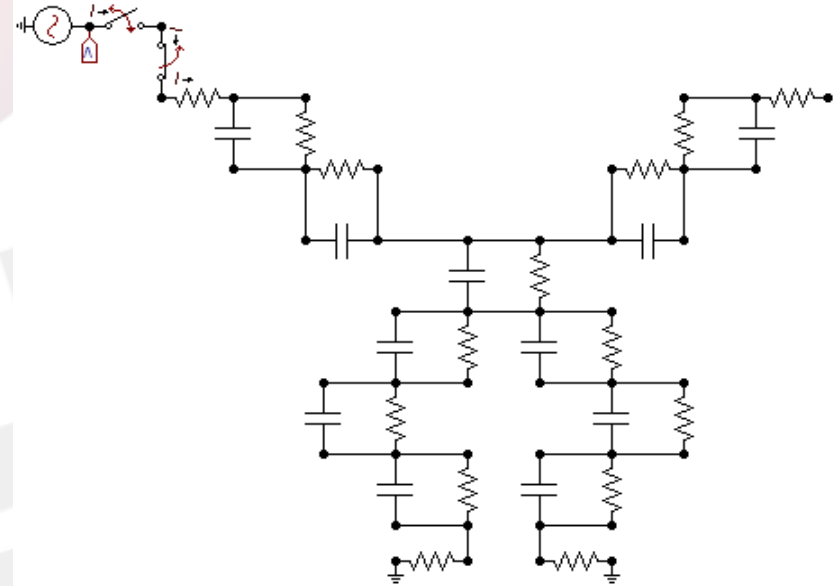
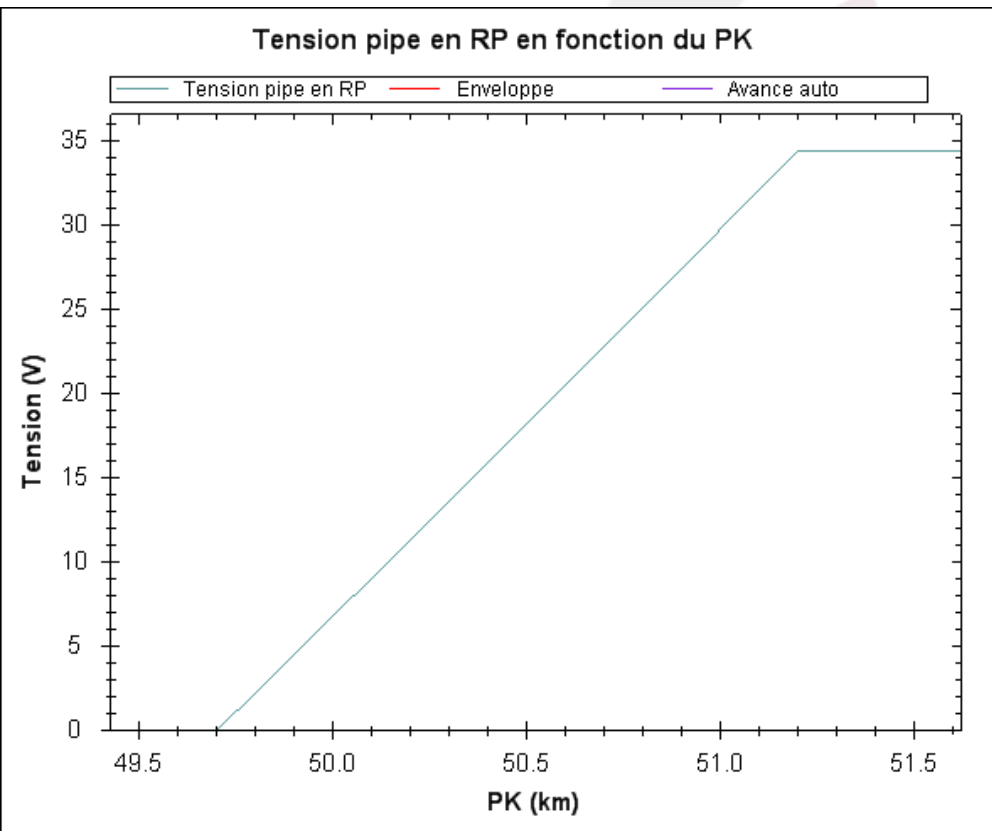
- SNCF

- Proračun induciranog napona na cjevovodu u mjestu Saint-Aubin-lès-Elbeuf (Gornja Normandija)



Moj doprinos

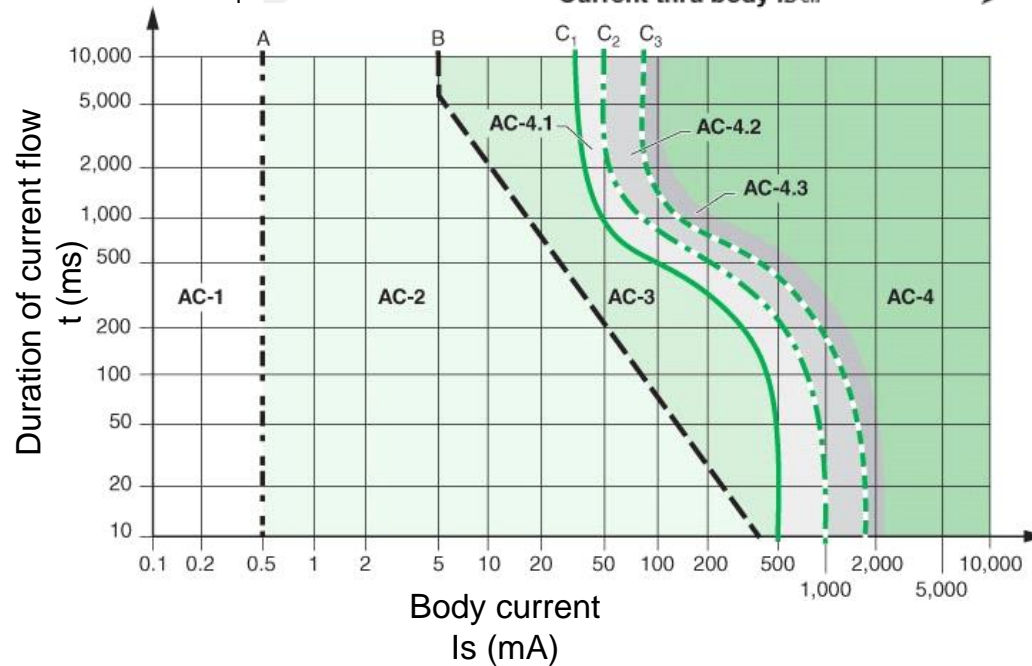
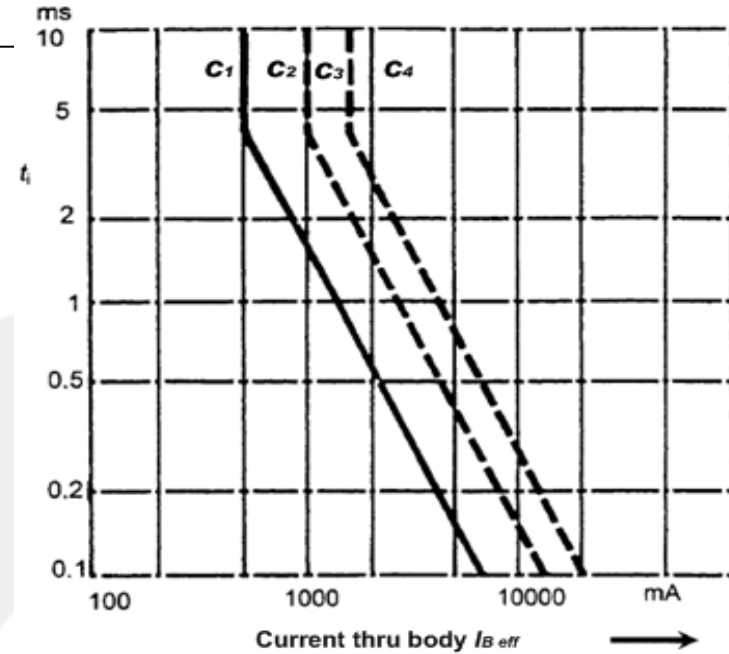
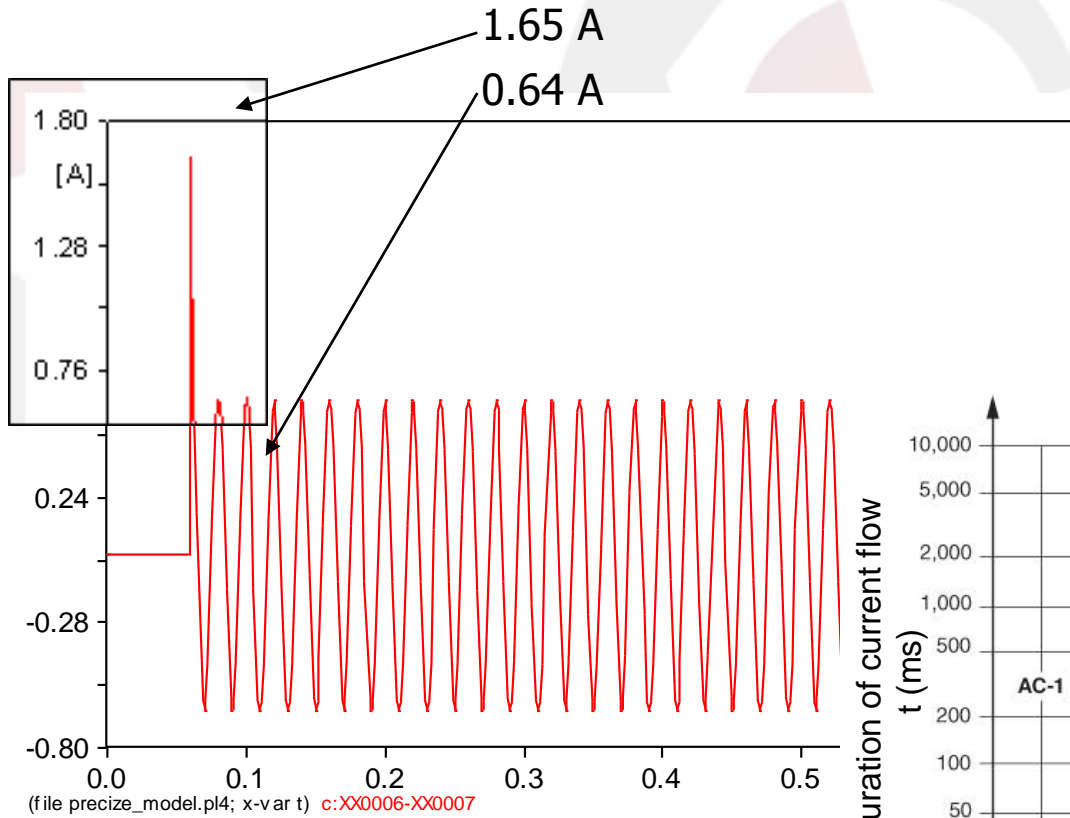
- SNCF
 - Određivanje rizika za osobe



Moj doprinos

- SNCF

- Određivanje rizika za osobe (650 V)



Poslijediplomski studij

- Induktivni utjecaj željezničkog sustava na telekomunikacijske vodove i cjevovode
- DIRECTIVES concerning the protection of telecommunication lines against harmful effect from electric power and electrified railway lines
 - Način prijenosa poremećaja
 - Međuimpedancija
 - Raspodjela povratnih struja
 - Određivanje redukcijskog faktora



- **EMC Europe 2013, Brugge, Belgium**
 - Estimation of Current thru Human Body in Case of Touch Pipeline on Potential Induced from Railway (B. Milesevic, N. Haddad)
 - Proračun induciranog napona na cjevovodu (Modalf)
 - Proračun struje kroz tijelo u slučaju izravnog dodira cjevovoda (ATP)
- **Journal of Energy and Power Engineering**
 - Electromagnetic Fields and Induced Voltages on Underground Pipeline in the Vicinity of AC Traction System (B. Milesevic, B. Filipovic-Grcic, T. Radosevic)
 - Proračun električnog i magnetskog polja u okolini elektrificirane pruge
 - Određivanje induciranog napona na cjevovodu složene trase (ATP)
 - Types of the National Markets of Ancillary Services and Balancing Energy (A. Horvat, N. Mandic, B. Milesevic)

Izvan posla



Izvan posla



Izvan posla



