NeTIRail-INFRA

WP3

Consortium Meeting, Ljubljana– 24th May 2018

Dr. Rahi Rahbari

The University Of Sheffield.

T3.4 & 3.5 description (USFD)

T3.4 Controllable factors for existing overhead lines: Maintaining performance at lowest life cycle cost (M4-M27)

- Lead partner: USFD.
- Partners: ADS, AFER, TCDD, SZ

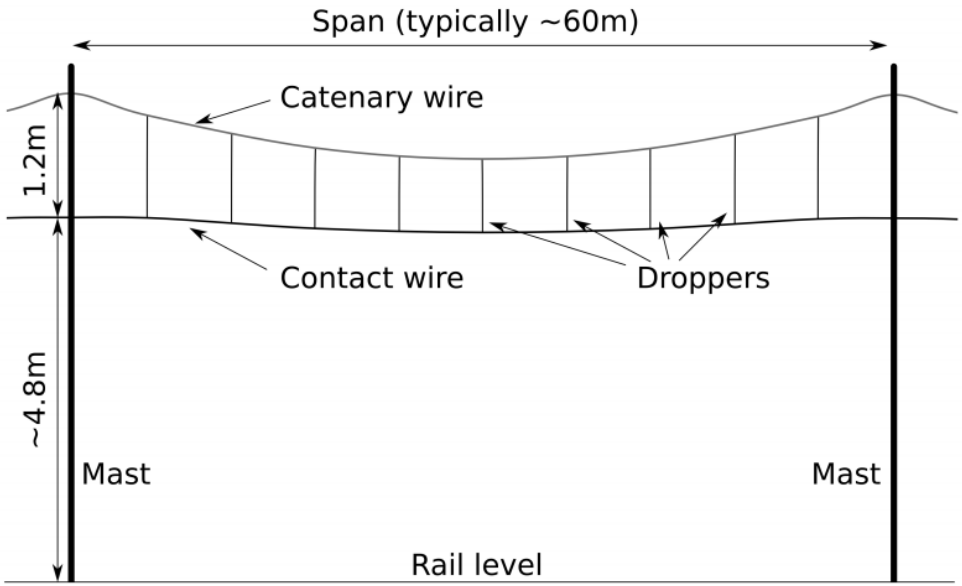
USFD will extend existing finite element models of contact wire deflection under load for investigation of how this is related to catenary design, wire tension, and dynamic pantograph upload. This will be extended to the systems of interest in NeTIRail-INFRA.

T3.5 Validation and evaluation of power supply solutions (M13-M33)

- Lead partner: AFER.
- Partners: TCDD, USFD, AD

USFD has lab facilities for high speed wear testing of pantograph and overhead line and will undertake fatigue testing of overhead line components building on a current programme testing a new design of overhead line ‘neutral section’ for improved resistance to fatigue failure.

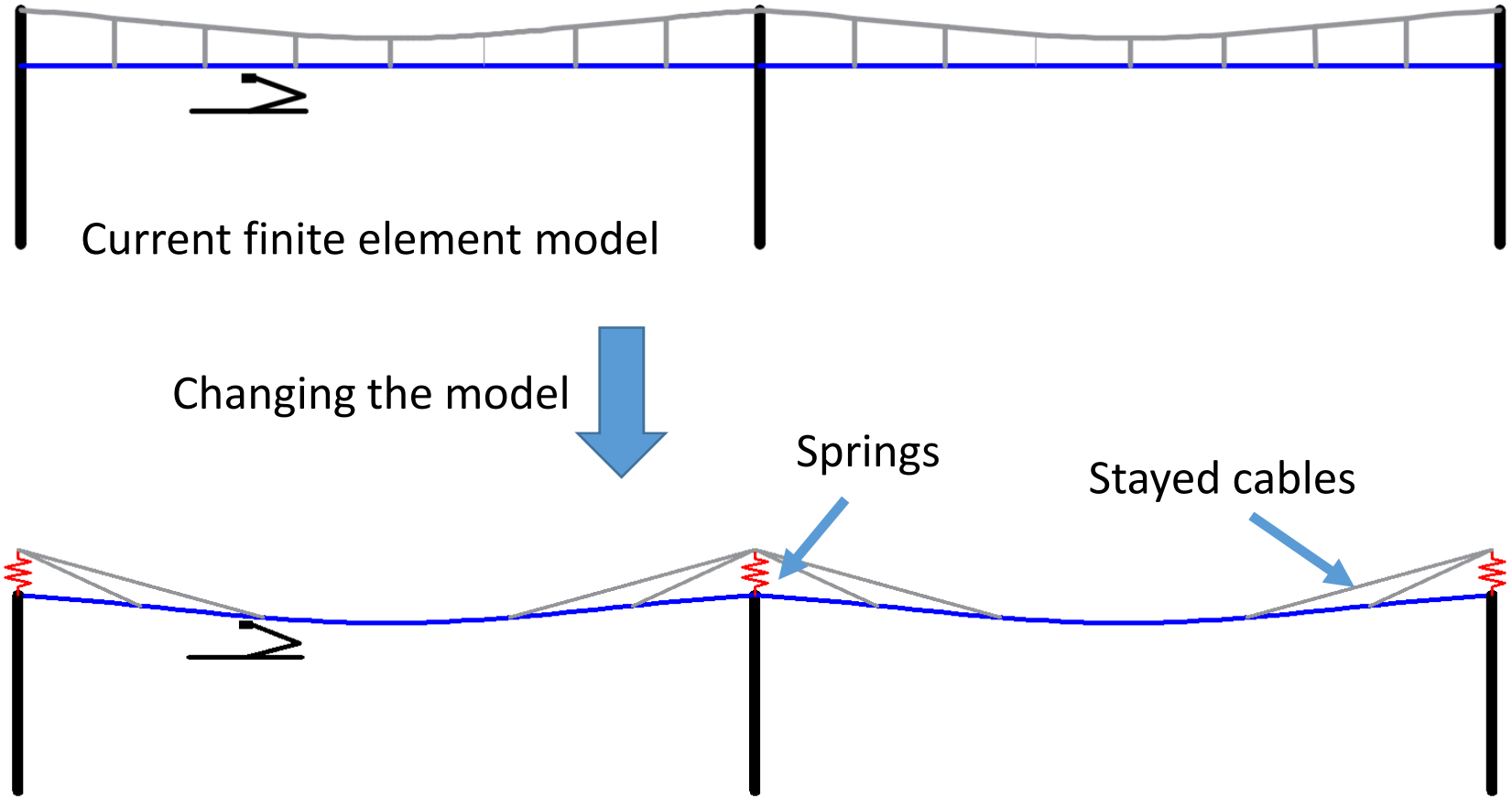
Dimensions of exciting model



overview of a typical span of rail overhead power line. A tensioned contact wire is suspended, approximately parallel to the track beneath, from a catenary wire that is itself tensioned and supported by fixed masts. Electric trains are fitted with a pantograph that runs along the contact wire and current is drawn across the sliding contact between the two.

In terms of mileage, just over a quarter of the UK rail network is currently electrified using 25kV AC OLE [1] with third rail DC electrification systems covering around 13%. Together, these account for almost 50% of train miles operated.

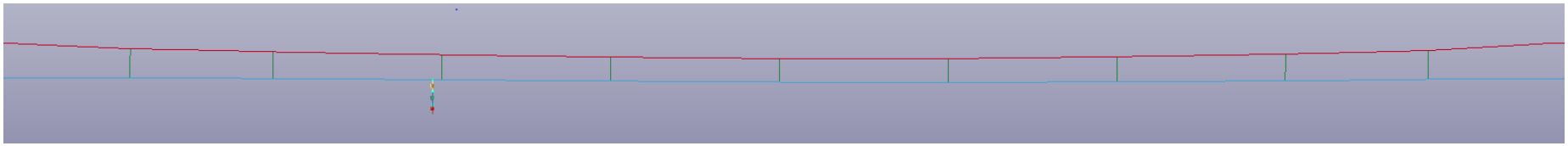
Trolley wire model



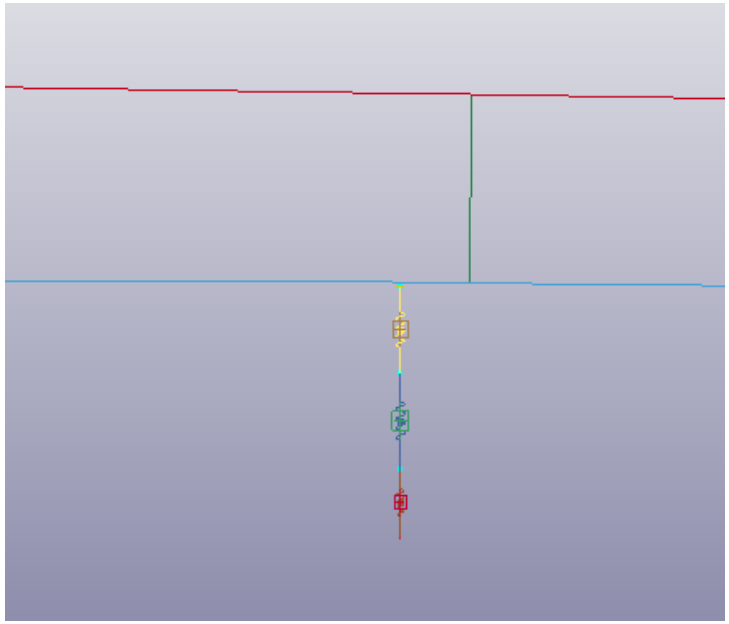
Trolley wire used in finite element model

New converted Ls-Dyna model

The Over Headline model which is running smoothly and at the validation stage, Train speed up to 60m/s



Pantograph Passing at one span, Total length is half a mile



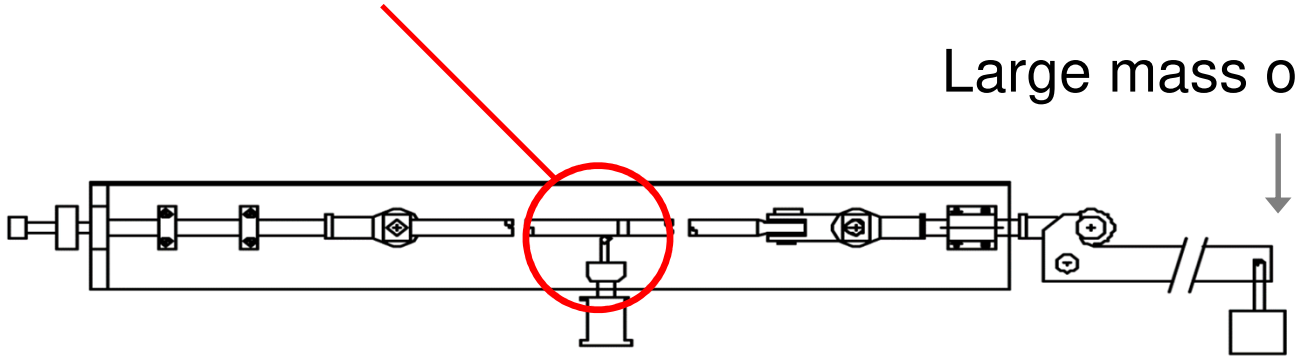
OLD RIG

Line tension is important here – how to create 11kN tension load, while cyclically bending the rod laterally

OLD RIG

Line tension is important here – how to create 11kN tension load, while cyclically bending the rod laterally

Large mass on lever arm



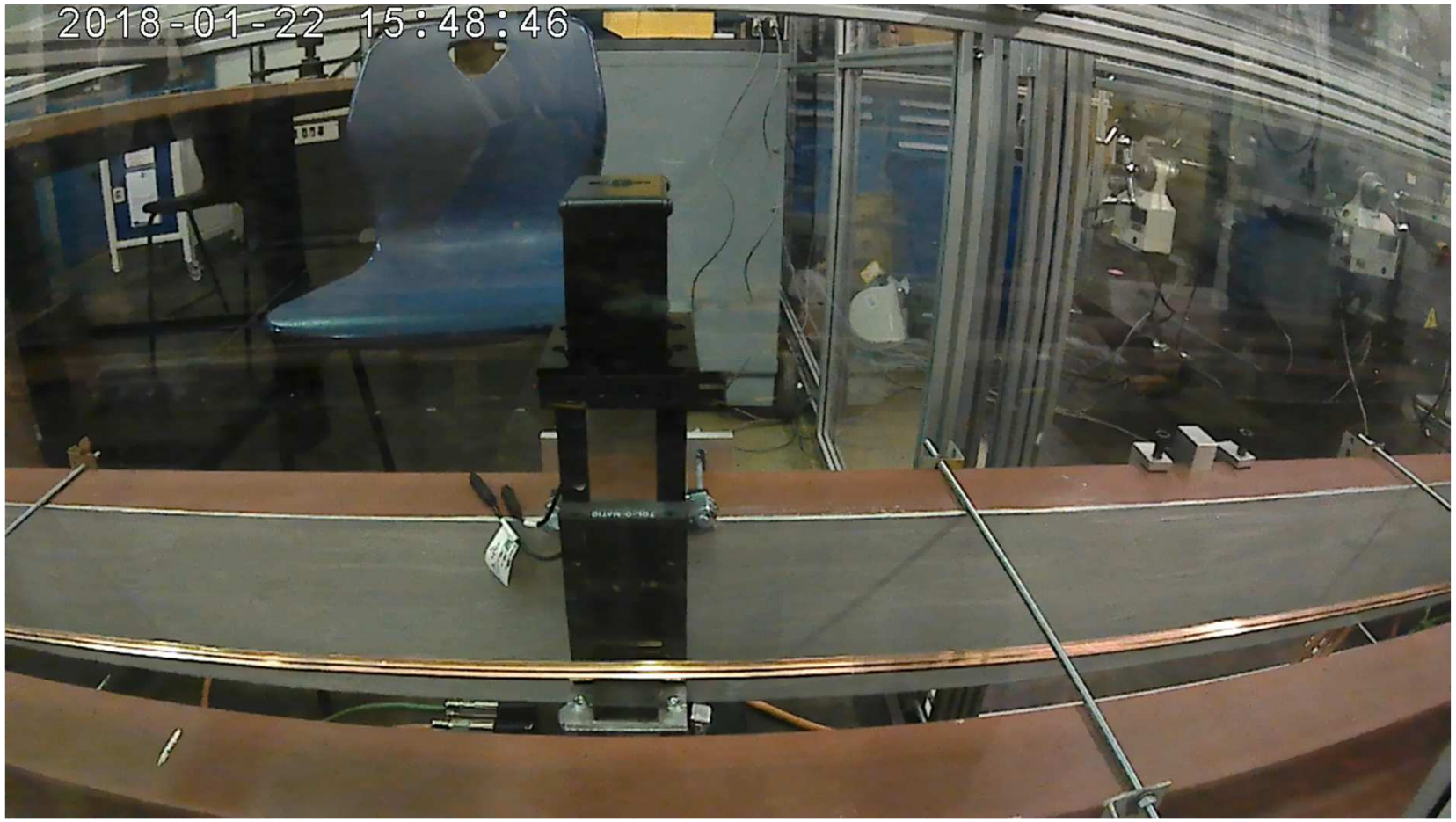
ACTUATOR

Tolomatic MXB belt style linear actuator
- Max Acceleration 30.48 m/s^2
- Max velocity 5.08 m/s
- Repeatability +/-0.051mm

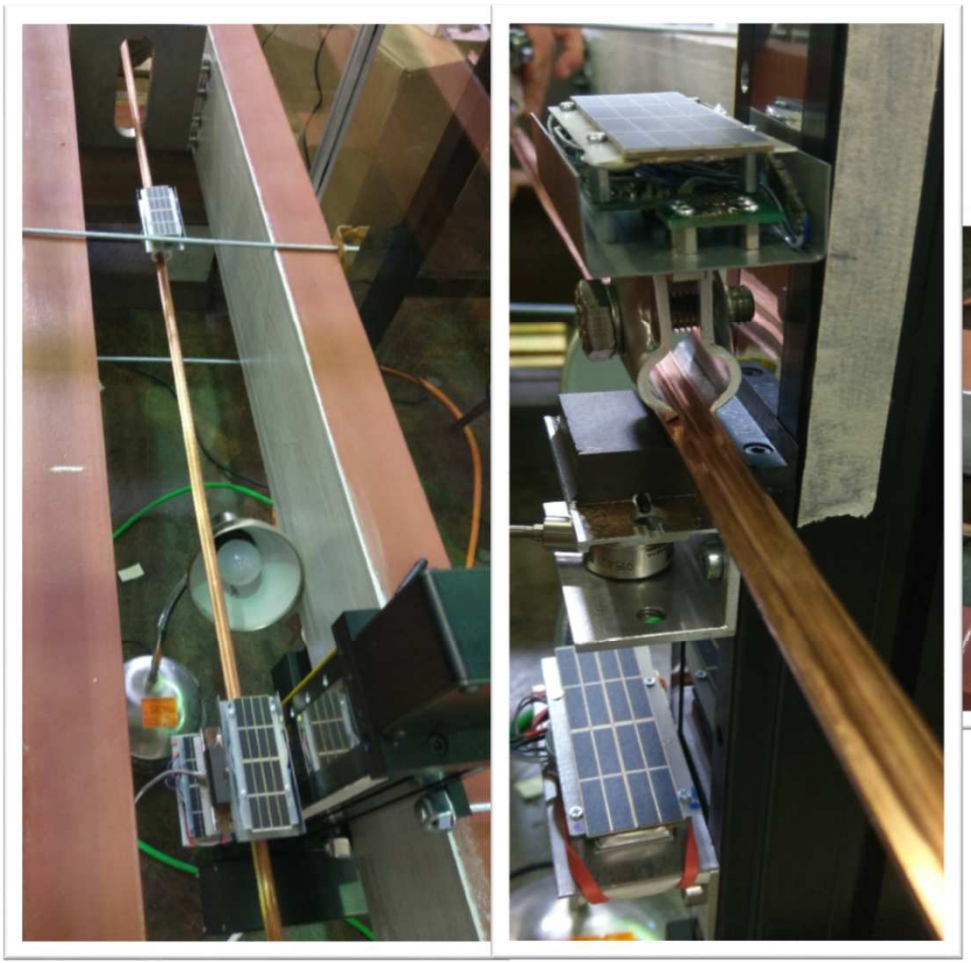
Parker SMH Servo

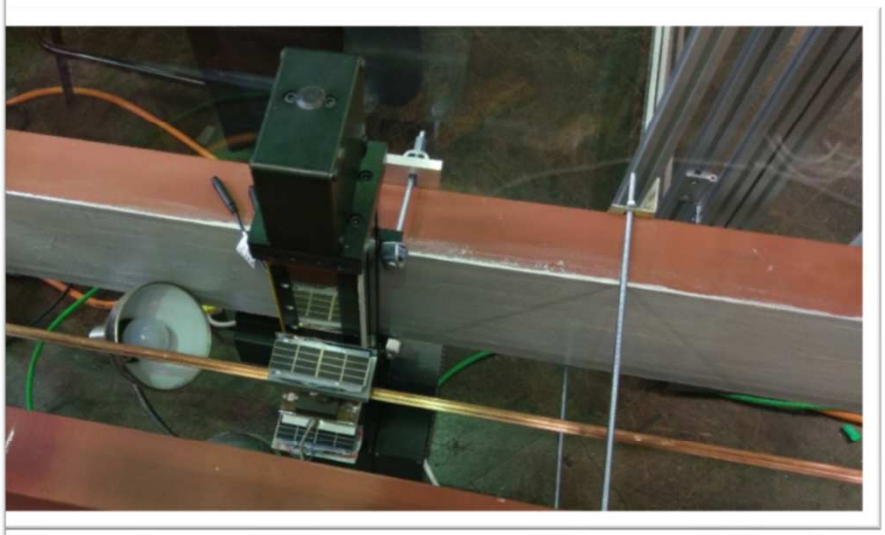
To be supplied within a sub assembly, mounted onto the Tolomatic actuator
- Provides highly dynamic control with accurate closed loop feedback
- 3phase, 400VAC suppl

RIG IN ACTION

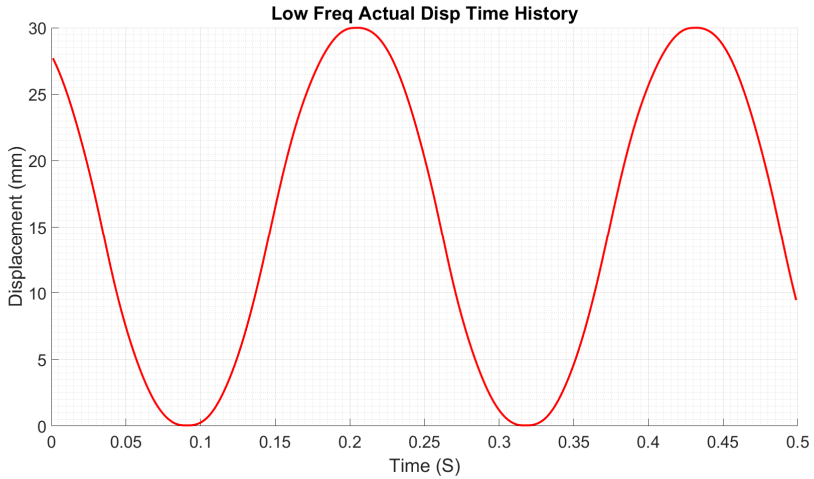


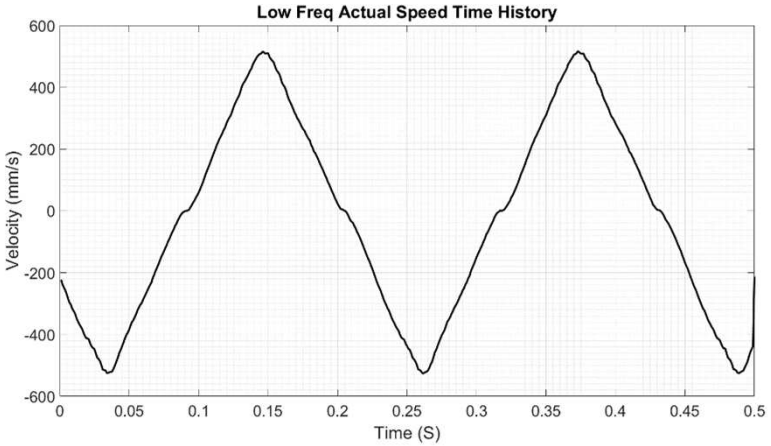
RIG IN ACTION PLUS THE SENSORS

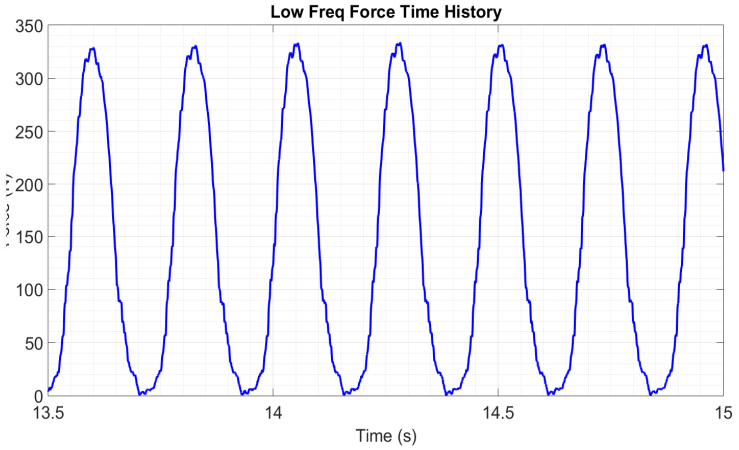




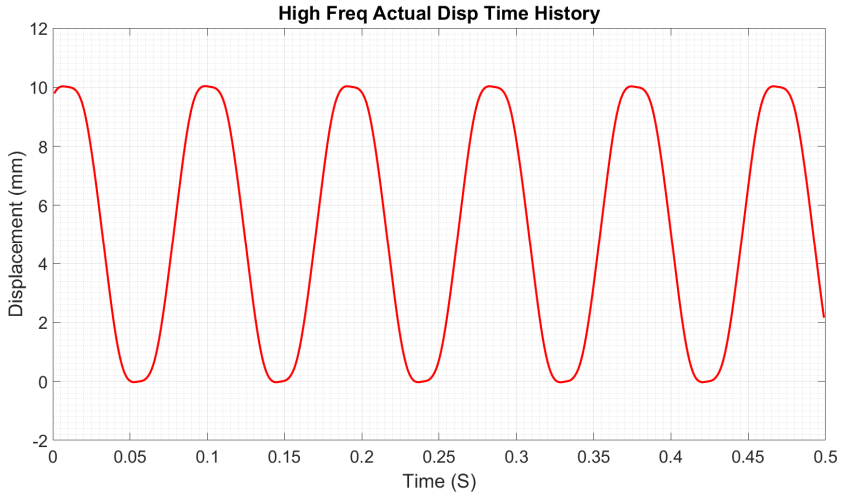
RIG IN ACTION PLUS THE SENSORS

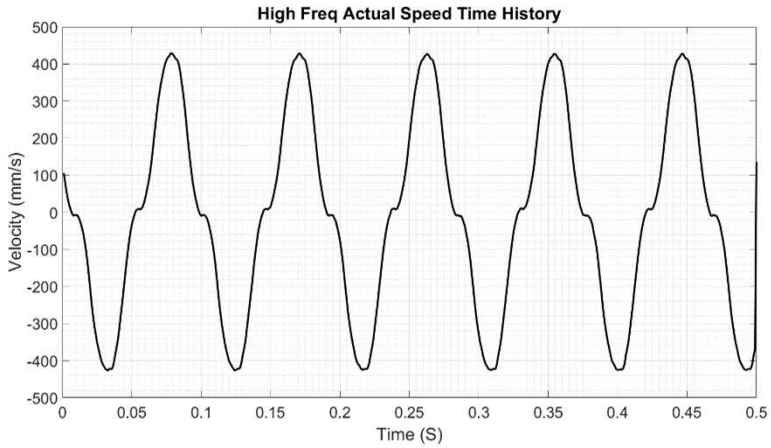


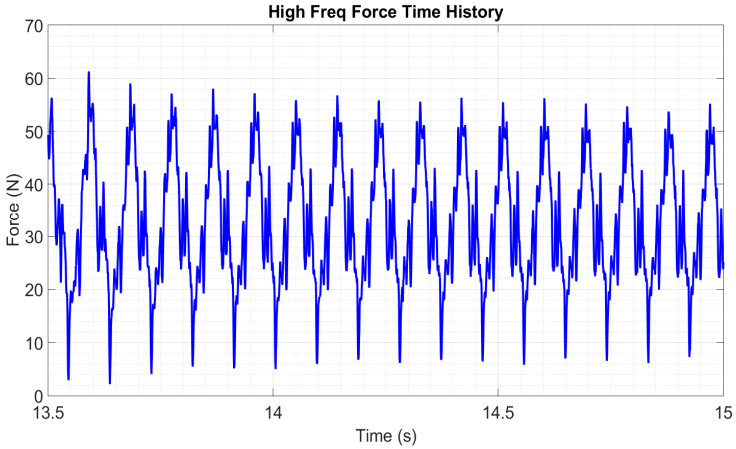




RIG IN ACTION PLUS THE SENSORS







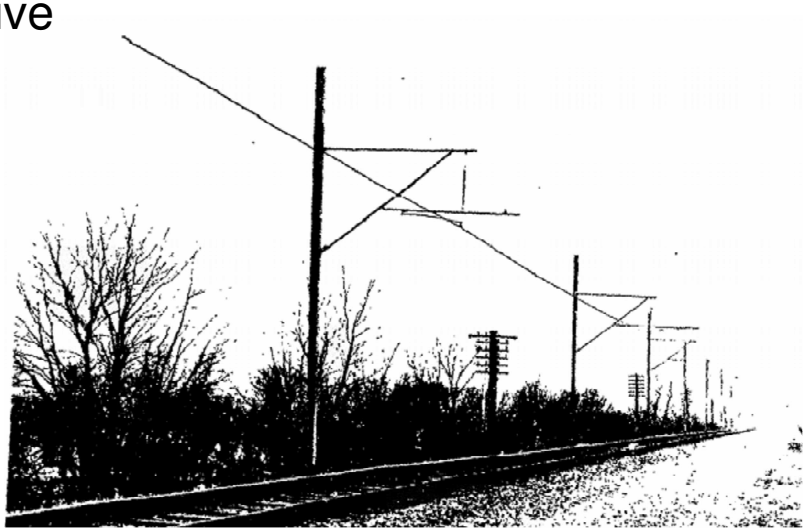
RIG IN ACTION PLUS THE SENSORS

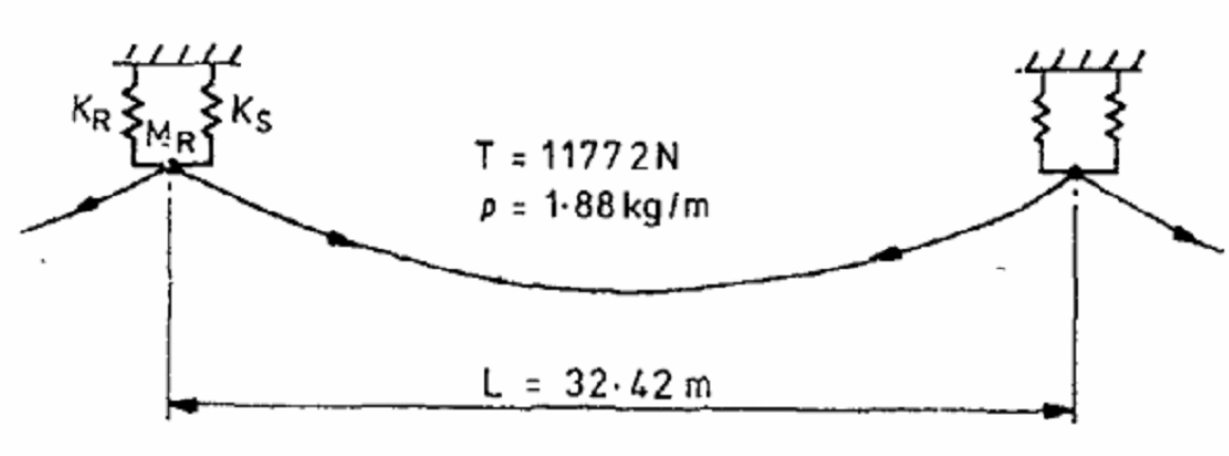
Sensors results in
ADS presentation

Q & A

Dimensions of Trolley model

Trolley Wire method can be an innovative solution to have less maintenance and have a more reliable system





New converted Ls-Dyna model

The Trolley model which is running smoothly and at the validation stage, Train speed up to 60m/s

Pantograph Passing at one span, Total length is half a mile