ICRI Friction Modeling – ongoing activities

FRA Project:

Modeling the Effects of Friction Modifiers on Creep Forces in the Wheel-Rail Interface

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WebEx: 08-03-2018

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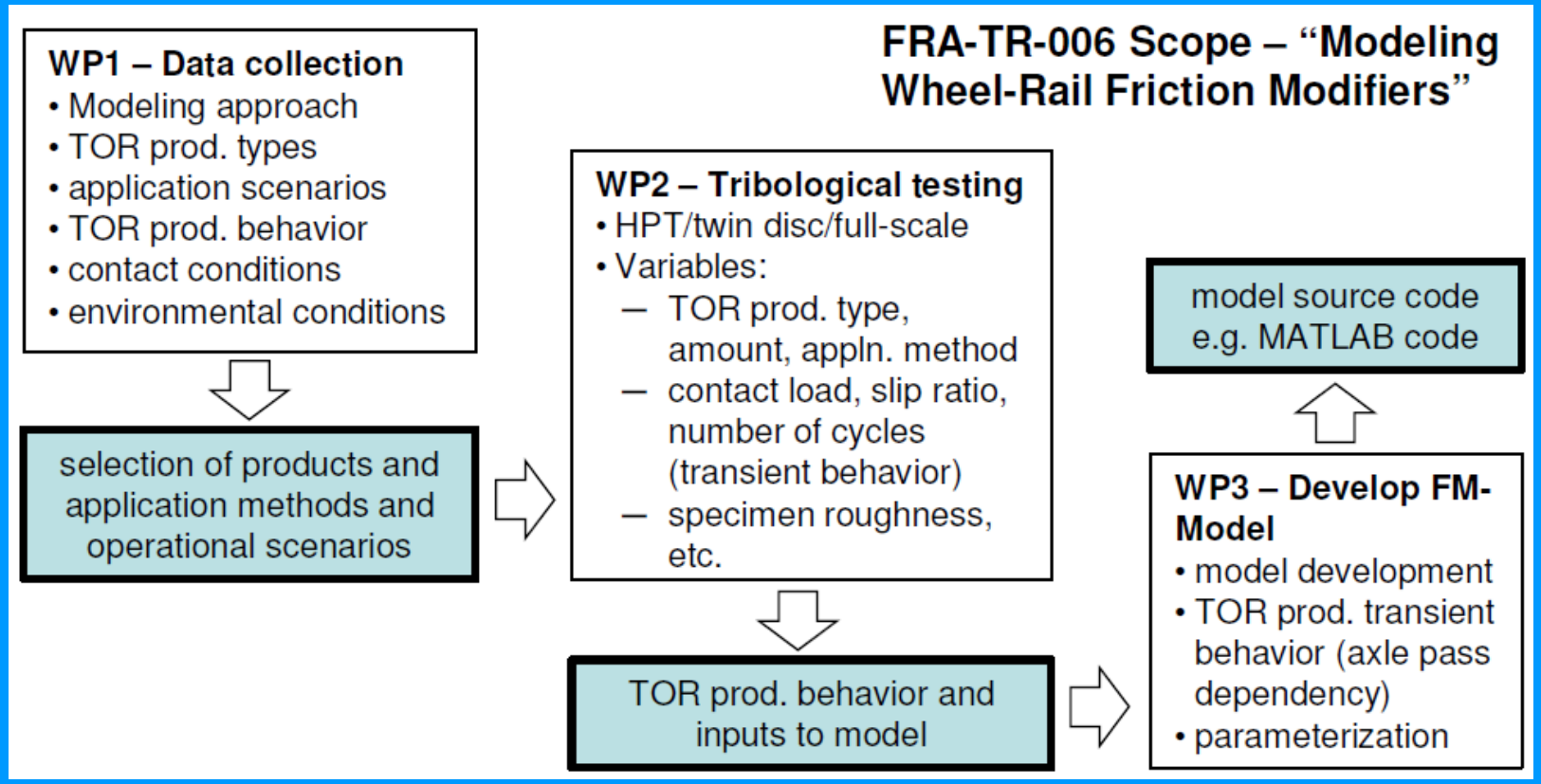
Project Overview

Aim: to develop a creep force model that takes account of the effects of third-body layers resulting from the effects of the application of a range of TOR materials



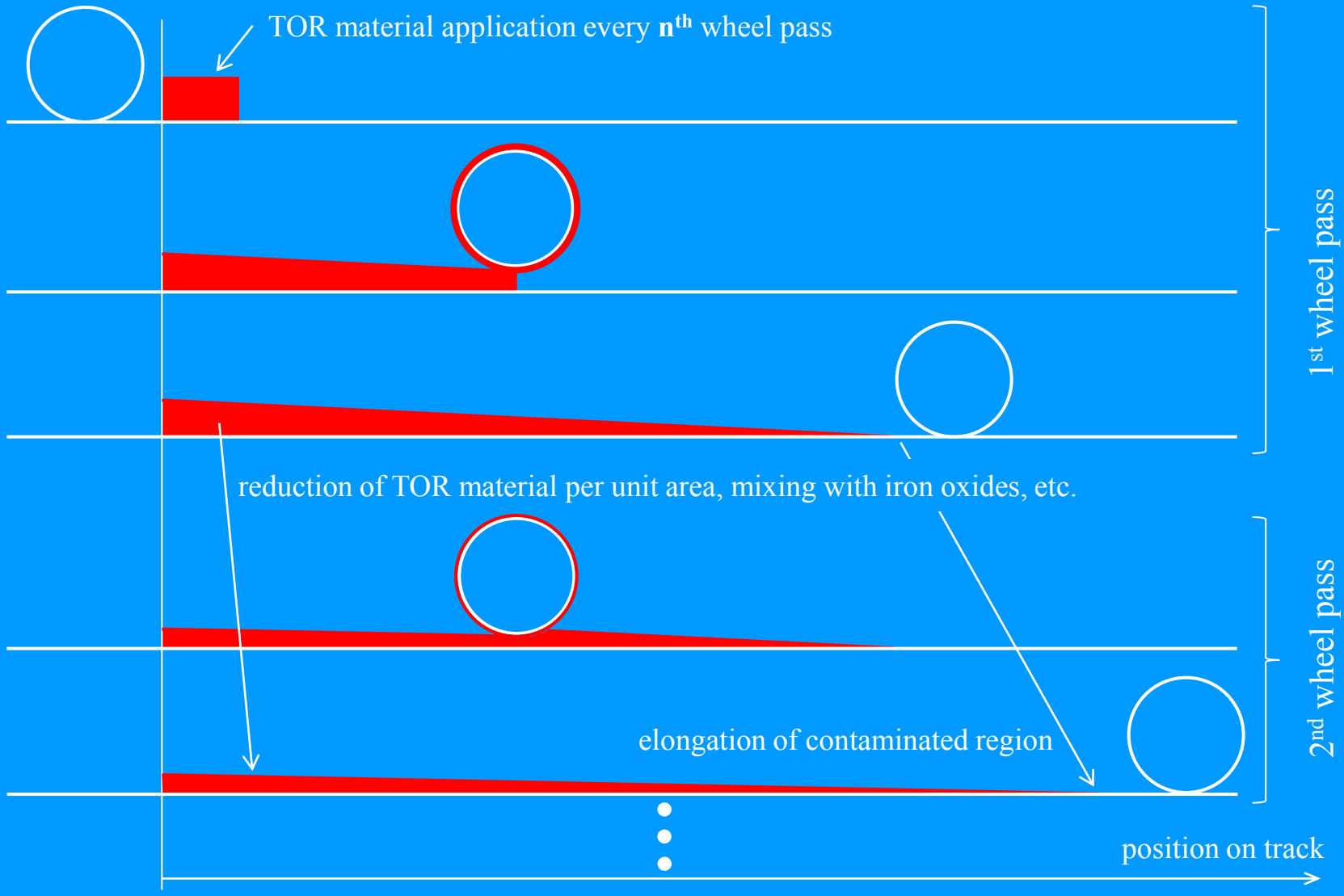
Project duration: 01-01-2018 to 31-12-2018

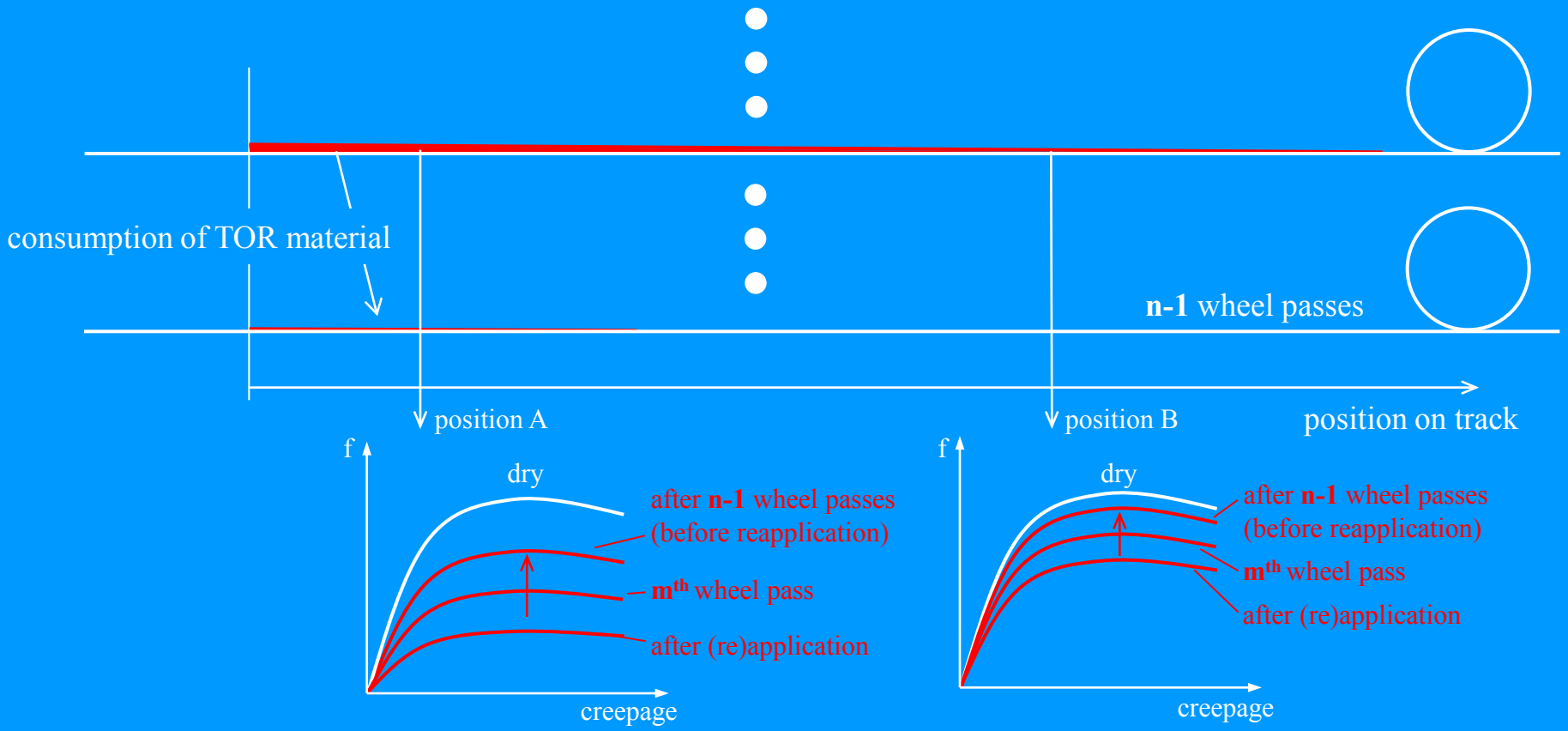
The University Of Sheffield.

virtual vehicle

LBFoster®

Problem Description – Way Side Application

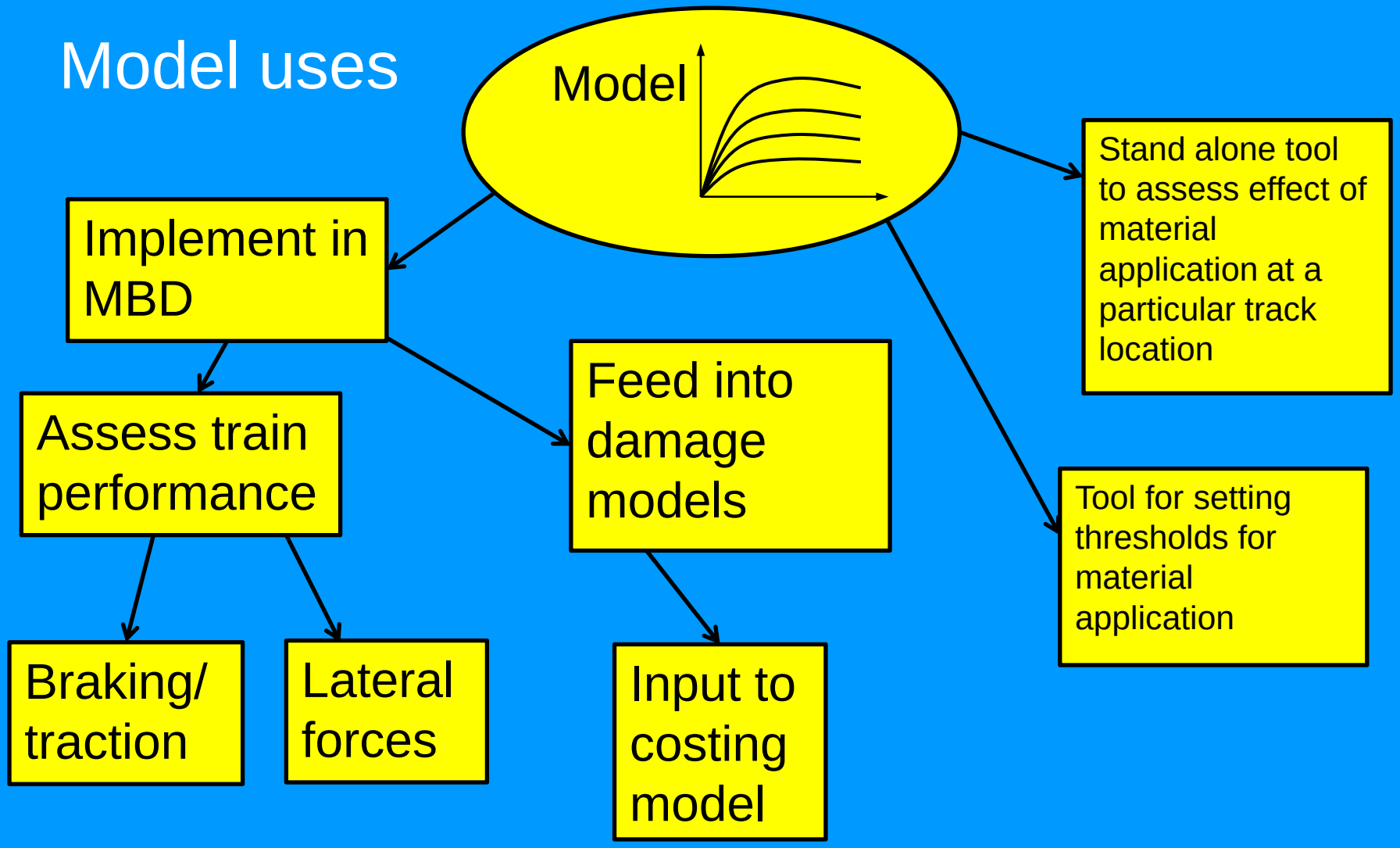




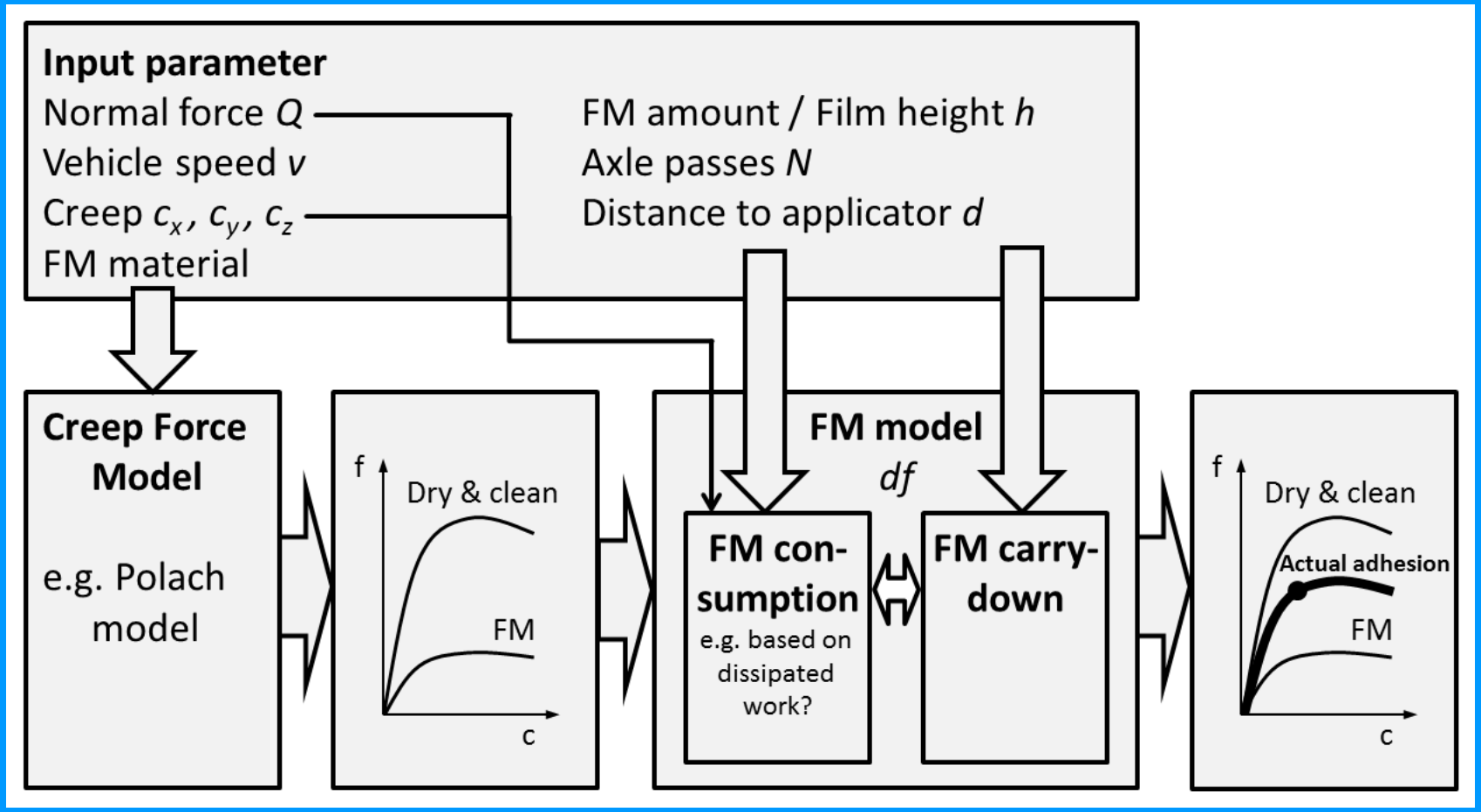
Goal: model predicting the development of the adhesion characteristic dependent on:

- TOR material product & amount of application
- position on track (→ how is it carried along the track?)
- number of wheel passes **m** (wheel load, speed, creepage → TOR material consumption ?)

Model uses

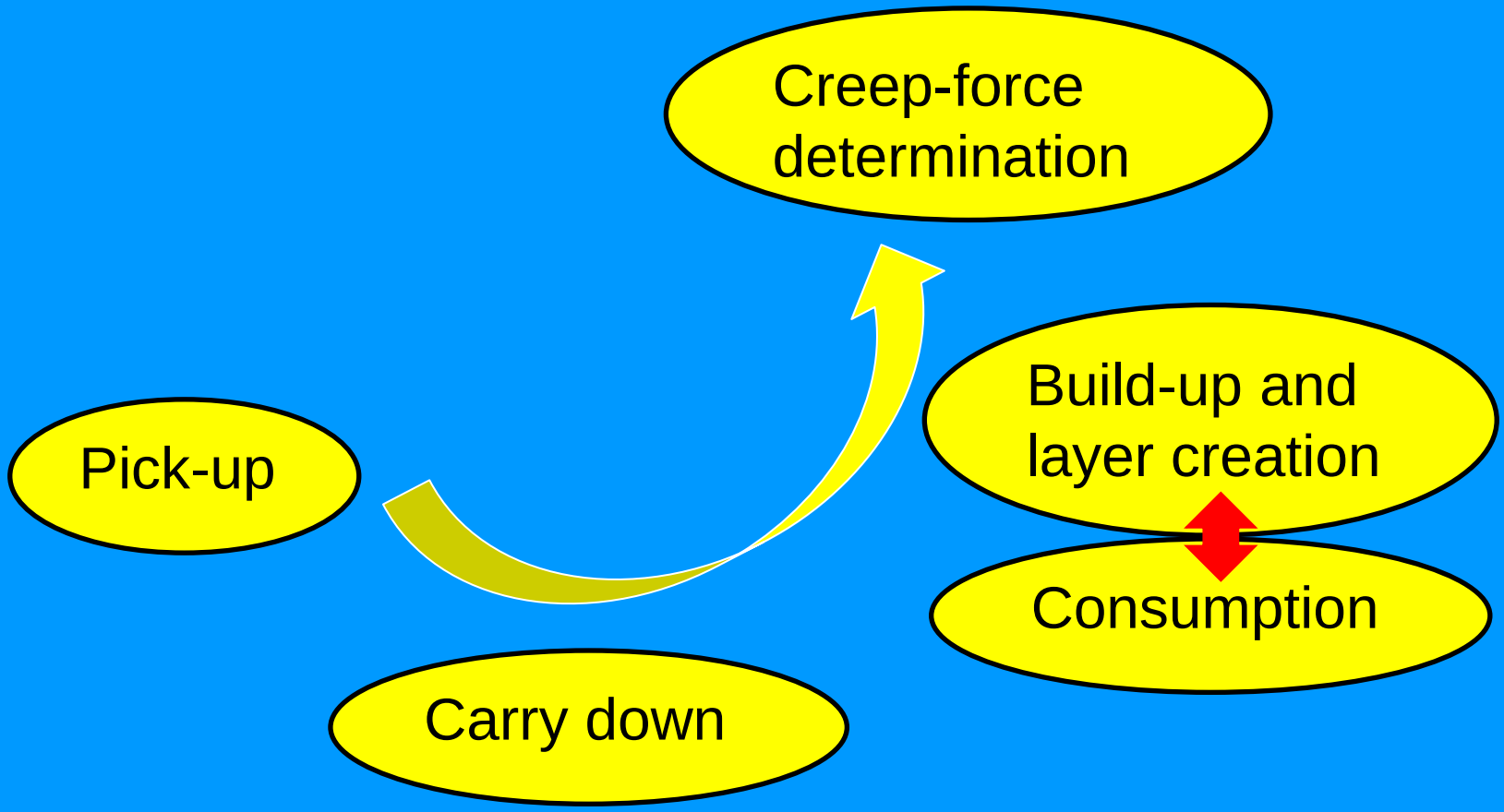

Model
Implement in MBD
Assess train performance
Braking/ traction
Lateral forces
Feed into damage models
Input to costing model
Stand alone tool to assess effect of material application at a particular track location
Tool for setting thresholds for material application

Modeling Approach

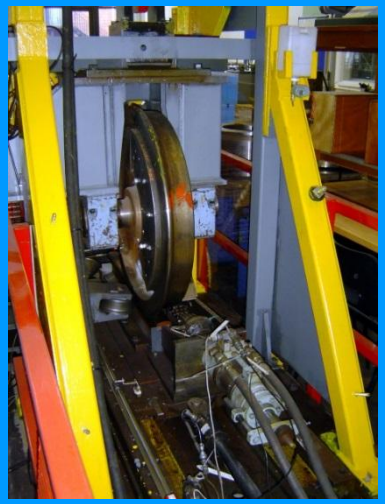


f ….. Wheel/rail adhesion
df … Adhesion change

Experimental Approach



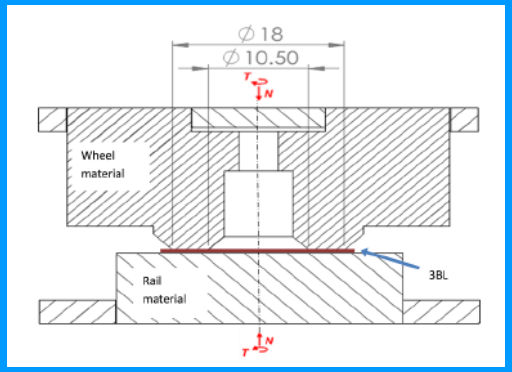
Test-Rigs



Full- scale wheel rail rig

Scaled wheel

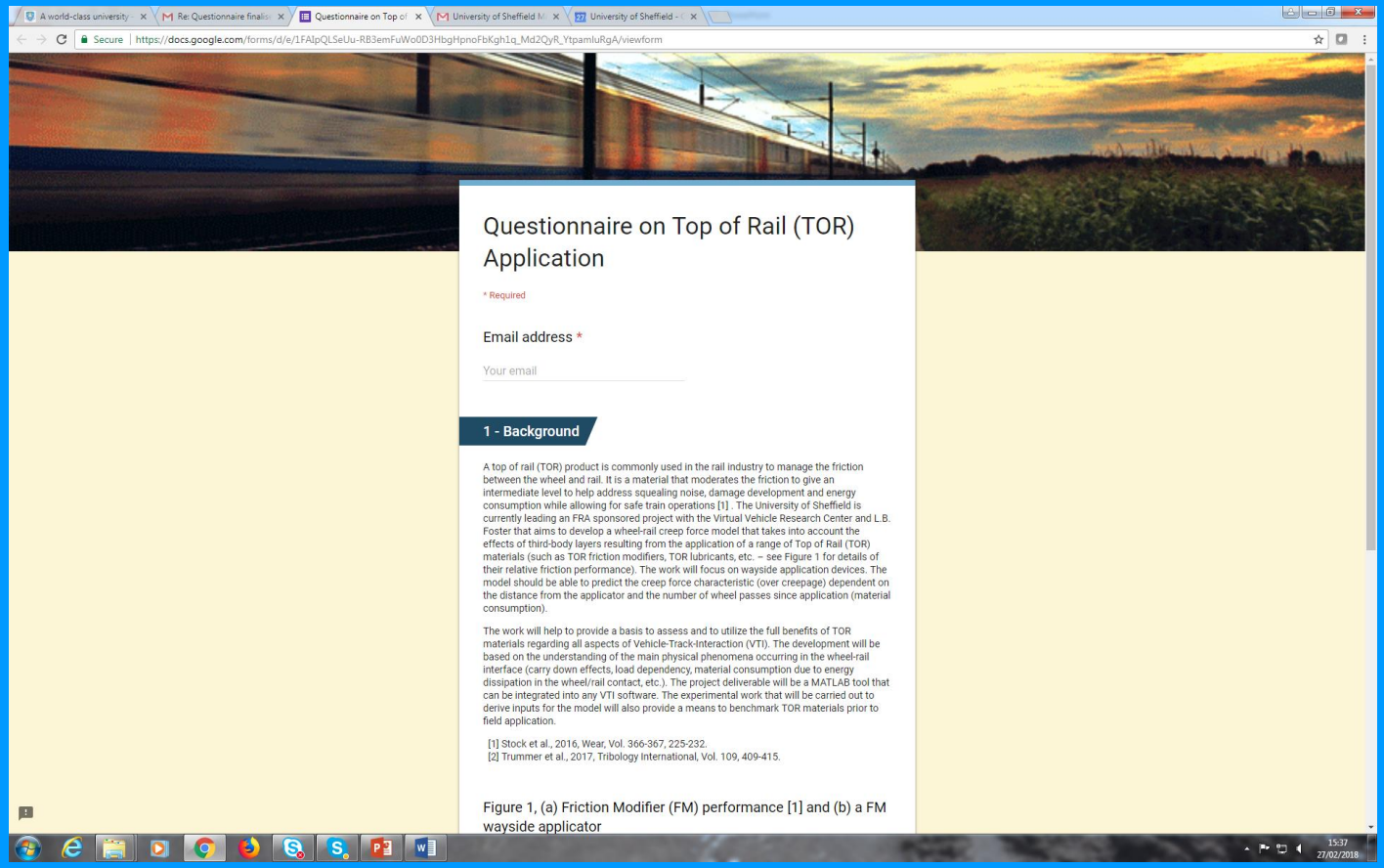
SUROS disc testing



HPT testing

Questionnaire

- Hard copy and online – sent out to stakeholders now and we will follow-up shortly.
- Will also be distributed at ARG and Autumn Review



Next Steps

- Finalise modeling strategy
- Finalise experimental approach
- Key is modeling build-up vs consumption

Question to ICRI group?

- Available Y force measurements in a curve with constant radius?
  - at different distances from the FM applicator

  →information regarding carry down effect

  →information regarding FM consumption
- Willing to fill out questionnaire?
- Email roger.lewis@sheffield.ac.uk and klaus.six@v2c2.at