

Request for Expressions of interest in RSSB research project R723 Extension of low adhesion model

RSSB are seeking to further enhance a recently developed model that considers the effects of small amounts of water on wheel/rail adhesion. Organisations with capabilities and experience in this area are invited to express their interest and experience in this activity in advance of the tender process.

Background

Work in RSSB research project T1042 *Investigation into the effects of moisture on rail adhesion* demonstrated that whilst industry employs very large resource to mitigate the problems of poor adhesion; there is an imbalance with industry's knowledge of the mechanisms within the contact patch by which normal wheel/rail adhesion is lost. As a consequence of this lack of knowledge of the root causes of low adhesion there is likely to be substantial inefficiency in the current deployment of resource to mitigate low adhesion problems.

Low adhesion caused by small amounts of water was investigated and modelled in RSSB project T1077 *Modelling and quantifying the influence of water on wheel/rail adhesion levels*. Through this project the Water Induced Low Adhesion Creep (WILAC) force model was developed based on detailed analysis, tribological testing and validation to reveal the effects on adhesion of small amounts of water.

An opportunity exists now to develop the model further to:

- take account of other low adhesion mechanisms and in particular those caused by leaves.

- consider time variant effects such as a drying rail or patchy wet-rail/leaf layers more representative of those found on the rail-head.

Scope of work

The envisaged scope of work can be summarised as:

Data Gathering – study of low adhesion incident reports, Autumn performance data, WSP data, engagement with stakeholders on representative low adhesion conditions

Experimental work - Small and full-scale laboratory tests will be carried out and the data analysed to extract the required input parameters for the models to allow predictions for different material types and amounts.

Development of Parameterised Extended Low Adhesion Model - The WILAC model will be extended to accommodate the different low adhesion mechanisms and time variant phenomena. A similar process will be followed as used in T1077 for parameterisation and development of the creep curves and extended to time variant phenomena. The GUI will be updated to incorporate new sliding scales for the new mechanisms.

The effect of vehicle speed, normal load, creepage and number of cycles (axle passes after application) will be also considered (for typical constant contact geometry).

Implementation in low adhesion braking model - In this work package the new low adhesion creep curves and the time variant behaviour effects will be implemented in a low adhesion braking model (such as the LABRADOR braking model – developed in RSSB/University of Huddersfield research project COF-UOH-012) across a number of braking and low adhesion scenarios. Different braking strategies will be examined to see if mitigation against the low adhesion can be achieved.

Requested information in response

We are inviting suppliers to provide us a short summary of their capabilities and experience in this subject area to help us deliver a successful project. Taking into account the envisaged scope of work summary we would be pleased to receive a summary response (around 4 pages) by **27 September 2017** setting out your potential interest.

Based on your experience, could you also give your view on how long the work could take, taking into account the need for reviews by a project steering group.

Your comments are also welcome on our current indicative budget for this work of around £100k to £200k.

Next steps

Please email your response to Shareditt@rssb.co.uk