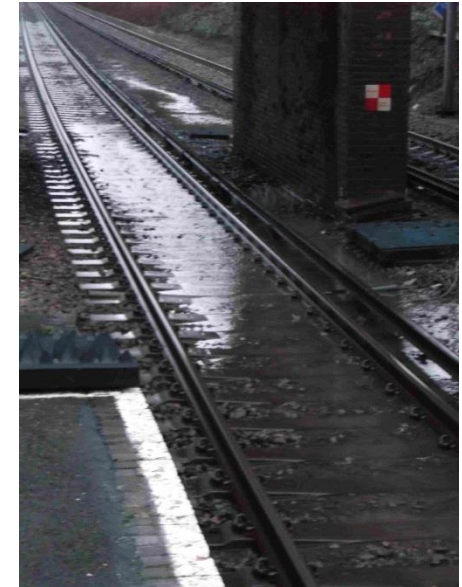


## Background

- Railway drainage plays a significant role in the safety and maintenance costs of the overall railway infrastructure; however, it has been given insufficient attention for decades.
- Undrained water remaining within the track is the root cause of some of the most severe railway track problems including accelerated track geometry degradation, ballast fouling, and wet-beds.

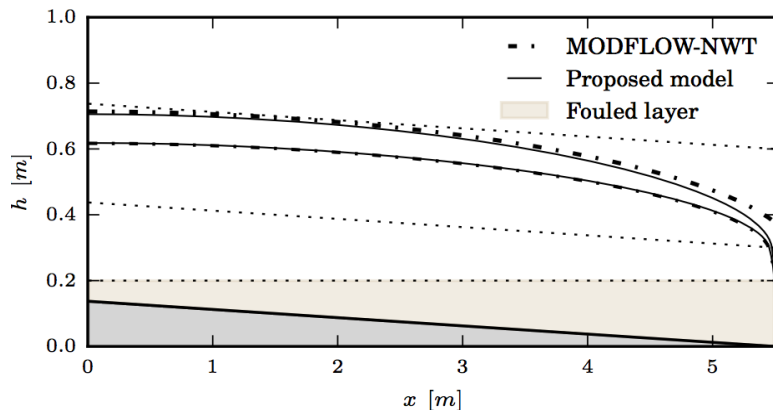


## Objective

- To predict the degradation and the maintenance requirements of the drainage asset.
- To develop a prognostics-based drainage asset management model

### Physical modelling

$$qx \cot \alpha_0 = -\frac{dh(x)}{ds} \left( \sum_{\ell=1}^{n-1} K_{\ell} t_{\ell}(x) + K_n \left( h(x) - \sum_{\ell=1}^n t_{\ell}(x) - (L_x - x) \tan \alpha_0 \right) \right)$$



### Prognostics-based asset management

