# Modelling Integration

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TRACK 21
Railway Track for the 21st Century

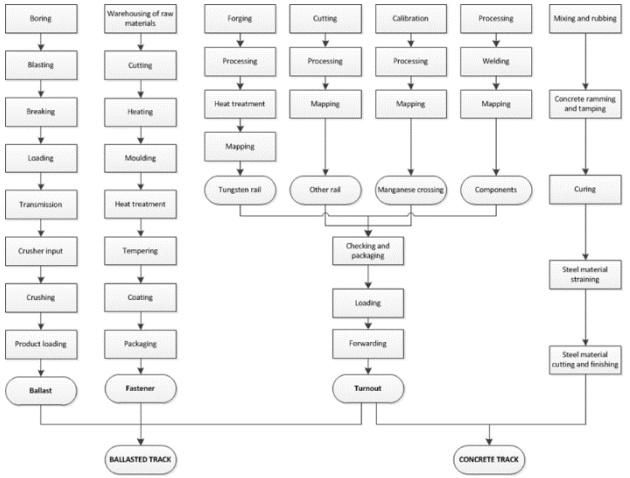
# What we promised

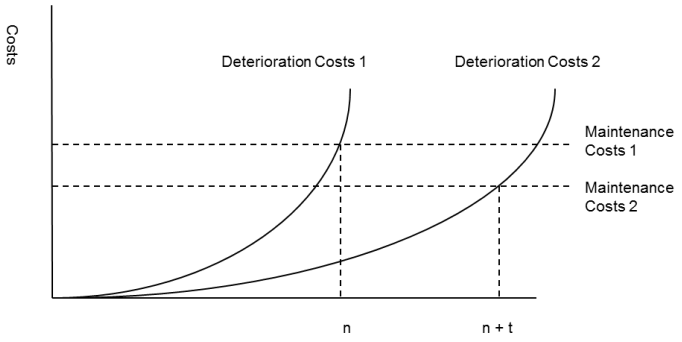
Initial objectives:

- To develop a model that will link the effects of the sub-base, ballast and track system to vehicle ride quality and dynamic loading.
- To determine the comparative whole-life financial and social costs and benefits (including carbon) of the sub-base, ballast and track systems proposed

# Where we are

- Meta-analysis of valuations of noise, vibration, reliability, journey time and ride quality
- Review of life-cycle cost and carbon analysis procedures
- Identification of relevant data sources
- Assessment of existing modelling tools (VTISM and Track-Ex)



# Tasks for Year 5

- Whole-life cost modelling of ballast and sleeper interventions
  - Using VTISM to model impact based on results from WA2
    - Different ballast gradations
    - Different sleeper types
    - Under-sleeper pads
  - Validation/extension of RSSB Project T807
  - Going beyond VTISM to consider other impacts
    - Noise and vibration levels
    - Passenger comfort
    - Maintenance-associated train delays
    - Rolling stock damage
- Whole-life carbon modelling of the same interventions
  - Building on initial work by Mason (2013)

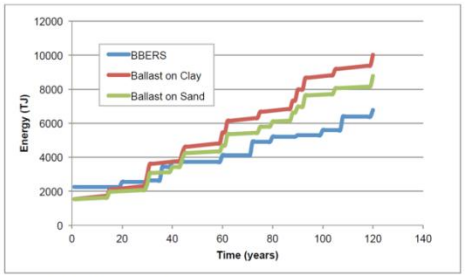
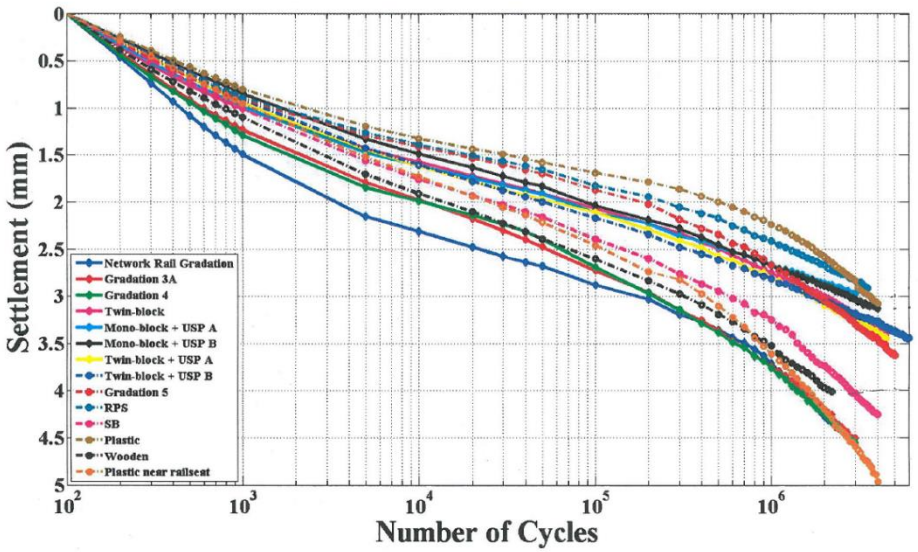


Figure 6.1: LCA of different forms of railway track with minimum steel EE

# Interdependencies

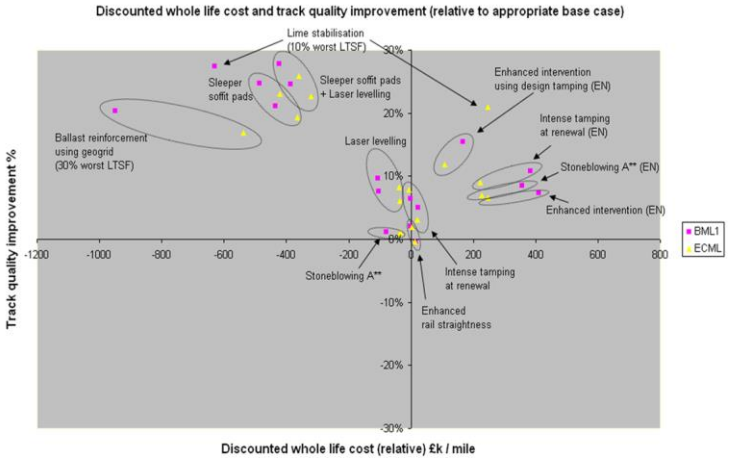
- Key interdependency with WA2
  - Results from WA2 tests form key input
- Potential interdependencies with industry stakeholders
  - Supply/availability of suitable data



# Site selection and data

Sites:

- Baseline – ECML
  - Repeat of RSSB (2012) analysis
  - Link to Alnmouth case study site
- Additional evidence – Sussex Coast
  - Link to Fishbourne/ Black Boy Lane




Data:

- Combine…
  - Field integration data (including UoB IMU data)
  - Secondary data from NR (NMT, ACTRAFF, LADS/GEOGIS etc)
  - Meteorological data?

# Modelling Strategy

1. Run baseline VTISM with USPs
2. Run baseline VTISM with different parameters to reflect results from lab tests
3. Run VTISM with range of alternative treatments (eg random fibre reinforcements)
   - Will need whole life cost data for new treatments
4. Add in modules to estimate:
   - Whole life carbon emissions
   - Noise and vibration cost impacts
   - Ride quality cost impacts
   - Impact of speed and reliability on cost
5. Undertake runs for line sections with LTSFs similar to treatment sites

# Planning

- Applicants for researcher post interviewed on Mon 28th July
  - Post now under offer with proposed start date of 1st September
- Once researcher in post will determine tasks on week by week basis
- Need to determine dissemination strategy
  - Target paper(s) in JRRT in first instance
- Link to MRes of Yusuke Miyazaki who is adjusting Japan Track Design Code to take into account ballast condition

# Thank you!

Any questions?

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