TECHNICAL ASPECTS OF TREE RISK AND VEGETATION MANAGEMENT:

AN INTRODUCTION TO THE NEW INTERNATIONAL RAILWAY STANDARD

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WHO AM I?

- Consultant to UIC
- Special Advisor on Tree Risk Management to the UK’s Network Rail
- Internationally recognized authority on tree risk assessment
- Designer of numerous tree assessment systems, UK & overseas
- Author of THREATS tree risk management architecture
- UK High Court level Expert Witness
- Lead author of draft British Standard ‘Tree Safety Inspection’
- Technical editor for BS5837 ‘Trees in Relation to Construction’
- Review panel member BS3998 ‘Tree Work’
- Lead author on IRS ‘Tree Risk & Vegetation Management’
A BRIEF OVERVIEW
OF MY WORK FOR NETWORK RAIL
- 2009 onwards designing tree and vegetation management systems
- Lead accident investigator for tree/ train collisions
- 2012 new method for NR Scotland: *Storm Resilience Model*
  Designed to reduce network disruption from tree failure during severe weather events
- SRM is based on remote sensing technology (LiDAR) & automated data extraction & analysis (developed in partnership with Astrium, now Airbus Defence & Space)
- Substantial cost savings €millions and reduced network downtime

- 2014 developed new derailment risk reduction strategy *FAILSAFE* and related system architecture (e.g. *VIPER*)
- *FAILSAFE* and *VIPER* are also based on remote sensing by LiDAR

- 2015 designed POLESTORM to enhance UK rail network storm resilience: currently being rolled out nationwide

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July 2010
high risk of derailment at 155km/h and toppling down embankment
The new IRS is not:
- A manual: it does not tell railway vegetation managers what to do, or how to do it
- A rulebook: railway managers are free to ignore it!
- An encyclopaedia: it cannot cover everything in 45 pages!

So what is it?

The new IRS is intended to provide:
- A common framework for describing railway vegetation issues
- Guidance and recommendations regarding methods of assessment and management
- Examples of best and effective practice
- A structured way of considering tree risk and vegetation management issues and cost-effective solutions
- Up-to-date information

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Summary of Contents
The new IRS provides detailed information and advice on:

- The need for vegetation control
- Methods for recording and assessing vegetation
- Use of design and engineering to exclude vegetation
- Control by use of herbicides
- Mechanical management: comparison of methods
- Tree risk assessment and control
- Leaf-fall management
- Management and use of arisings
- Biodiversity action plan design for lineside habitat

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Following detailed desk-based research into vegetation management methods I reached the following conclusion:

*The majority of vegetation control within and adjacent to the operational corridor will continue to rely on herbicide for the foreseeable future*

The new IRS supports and promotes the ongoing use of herbicide, for which there is no currently viable alternative.
Guidance and recommendations on best practice in herbicide application including:

- A comparative assessment of the 24 chemical treatments known to be in use by worldwide railway operators
- A summary of:
  - Herbicide management systems
  - Environmental protection
  - Choice of agents
  - Means of application
  - Recording treatments and effectiveness monitoring
  - Corrective actions
  - Best practice model
  - Signpost to emerging technology

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Remote sensing for vegetation management
Research project for Network Rail

2010: stability criteria for trees on slopes

Slope and tree height found by airborne LiDAR survey

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POLESTORM:

- Uses site-related factors to identify the storm resilience of any given location
- Does not seek to model tree risk, so much as site risk: some locations are unsuitable for bearing tree cover
- Provides a framework for identifying these sites, which are located and mapped using airborne LiDAR

The LiDAR data is run through a computer programme to identify the high-risk sites for priority tree removal

FLAC operational JV partner Airbus Defence and Space
Derailment protection system, designed to avoid...
Taiwan, April 2011

Derailment of low speed, narrow gauge train: 5 dead, 107 injured
155km/h
900mm dia.
Remote sensing for tree health assessment:

The majority of trees that fall onto the railway are diseased, dying or dead

Airborne remote sensing using infra-red spectroscopy can be used to find them...

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Obviously dead tree – readily visible to the naked eye
The managed railway - schematic
Closing remarks on the new IRS

- A single source of cutting-edge information on all aspects of vegetation management
- Sound justification for the continued use of herbicide
- Detailed advice on herbicides and their use
- State of the art guidance on tree risk management

- Promotes preservation and enhancement of lineside biodiversity in the context of necessary and responsible vegetation control

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Thank you for listening