

BE WHAT YOU WANT TO BE

Development of Wayside Lubricator Placement Model for Heavy Haul Lines



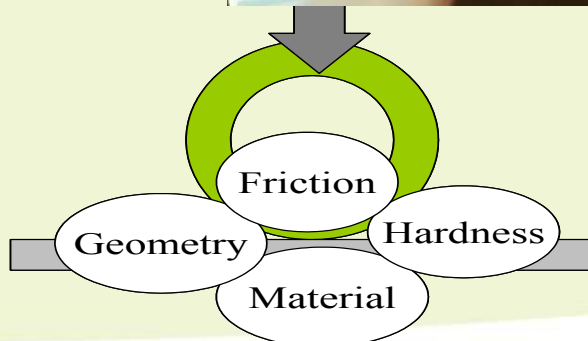
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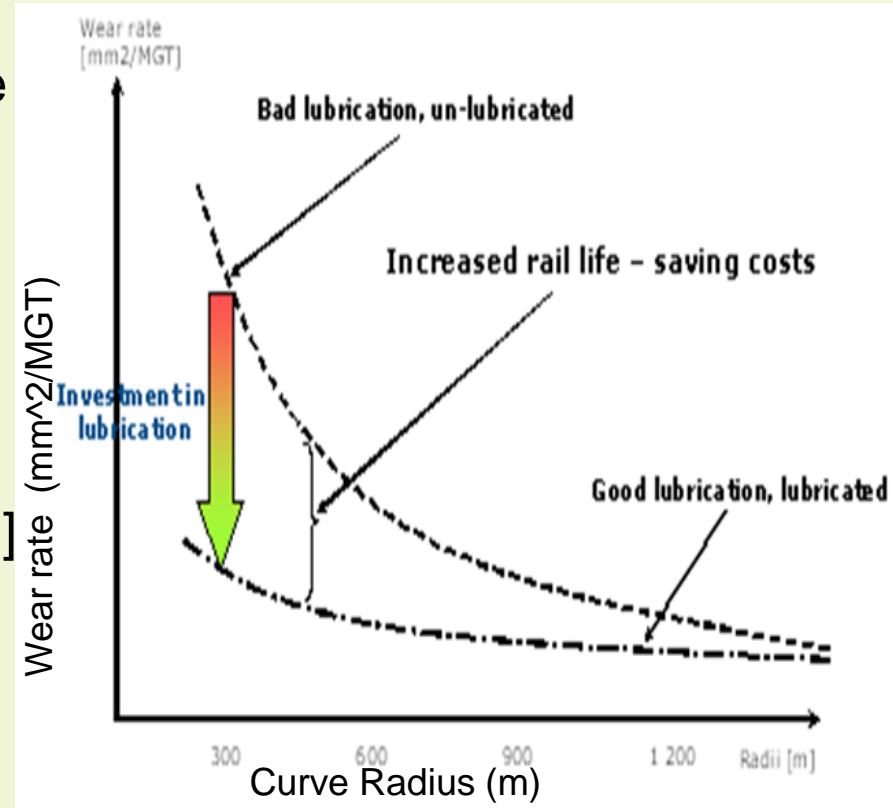


Why Rail Curve Lubrication?

- ❑ Controls friction at rail/wheel interface
 - ❑ Improves rail/wheel life
 - ❑ Reduces cost
 - ❑ Saves energy/fuel
 - ❑ Reduces Noise
-
- ❑ Ineffective lubrication costs American Railways in excess of US \$ 2 billion [1]



Rail Wheel Interface [3]



Wear Rate vs. Curve Radius [2]

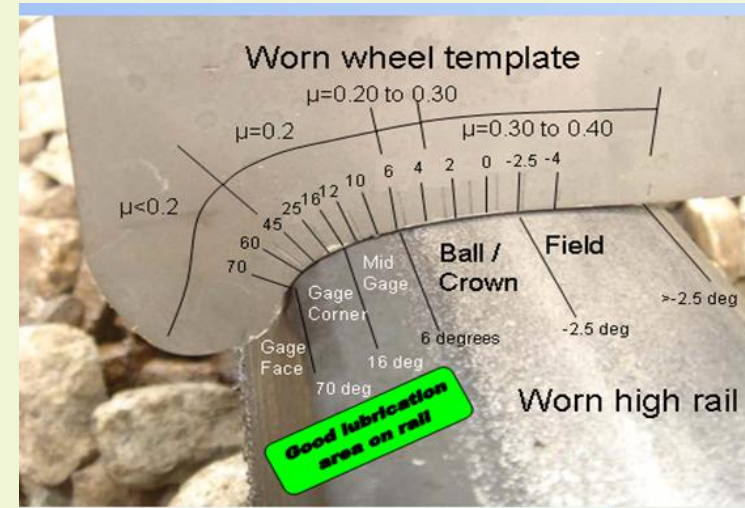
Consequences of Ineffective Lubrication !!!

- ❑ Wastage of dollars
- ❑ Wastage of time
- ❑ Top of Rail Contamination
- ❑ Wastage of Grease
- ❑ Dry/Unlubricated Rail
- ❑ Quick Grease Drop off

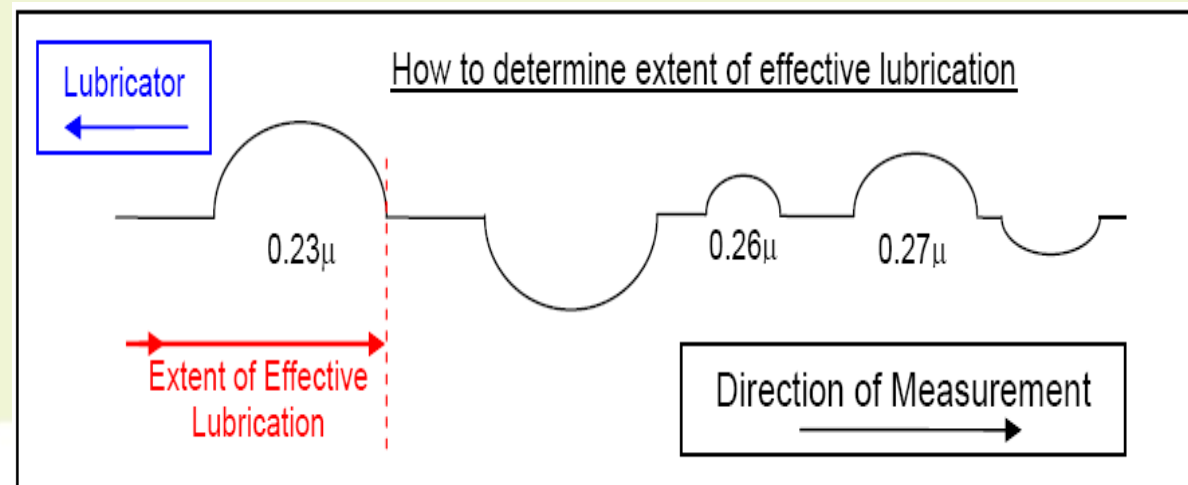


What is Effective Lubrication?

- ❑ Continuous presence of grease on rail
- ❑ Friction Management Guidelines-
 - AREMA Recommendations
 - CPR Recommendations
- ❑ Factors in Effective Lubrication



Target friction value & location [4]



Currently used Lubricator Technology-

❑ Mechanical, Hydraulic & Electric lubricators

Benefits of Electric lubricators-

❑ Highly reliable & efficient

❑ Precise control

❑ Minimise wastage

❑ Less maintenance

❑ RPM Inbuilt

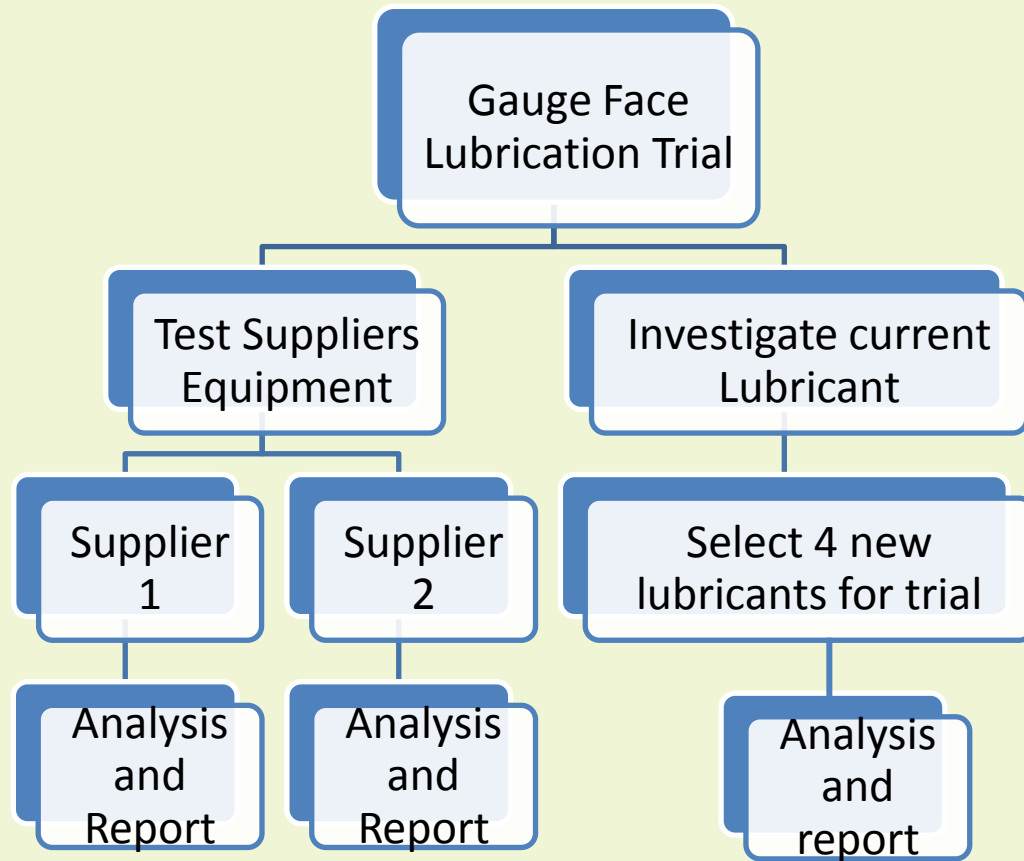
❑ Solar powered



Scope of Research

- ❑ Development of Wayside Lubricator Placement Model for Heavy Haul Lines
- ❑ Development of Framework for the best practice of rail curve lubrication in Australian heavy hauls
- ❑ Simulation model for evaluation of lubrication effectiveness and cost/benefit analysis for maintenance decisions

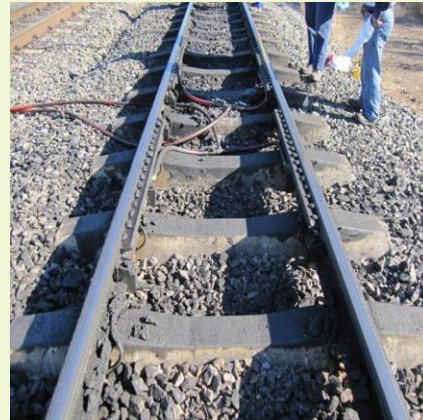
Project Field Trial and Data Analysis Plan



Investigation of Applicator Bars (Long Bars & Short Bars)

- ❑ Long bars placed on tangent track
- ❑ Short bars on spiral of curves
- ❑ Long bars are highly advantageous

Bars Combination	Grease	Achieved Carry Distance (km)
(2+2) Long Bars, Supplier X	C	4.623
2 Short Bars on High Rail, Supplier X	C	2.4



Investigation of Greases

- ❑ Grease properties
- ❑ Optimal Delivery Rate
- ❑ Splash Test
- ❑ Coeff. Of Friction μ Measurement
- ❑ Distance Travelled



Test Results- Combined Effect of Grease & Lubricator Configuration

Lubricator Configuration	Best Grease	Distance Travelled (km)
2 Long Bars on Both Rail	Grease A	0.33
2 Long Bars on Both Rail	Grease B	2.96
2 Long Bars on Both Rail	Grease C	1.6
2 Long Bars on Both Rail	Grease D	1.7
2 Long Bars on Both Rail	Grease E	4.6

Lubricator Configuration	Best Grease	Distance Travelled (km)
Lubricator 1	Grease E	Nil
Lubricator 2	Grease E	Nil
Lubricator 3	Grease E	1.7
Lubricator 4	Grease E	1.7
Lubricator 5	Grease E	4.6

Progress and Plan

Field Trials conducted

Development of models in progress:

- **Wayside Lubricator Placement Model**
- **Framework for best practice of curve lubrication**
- **Simulation model for cost/benefit of lubrication effectiveness**

Publications:

International conferences

- **ASOR2009**
- **CORE2010**
- **AusRAIL 2010**
- **Accepted for IHHA2011 and**
- **COMADEM2011**

Journal paper in Progress

Acknowledgement

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Thanks to

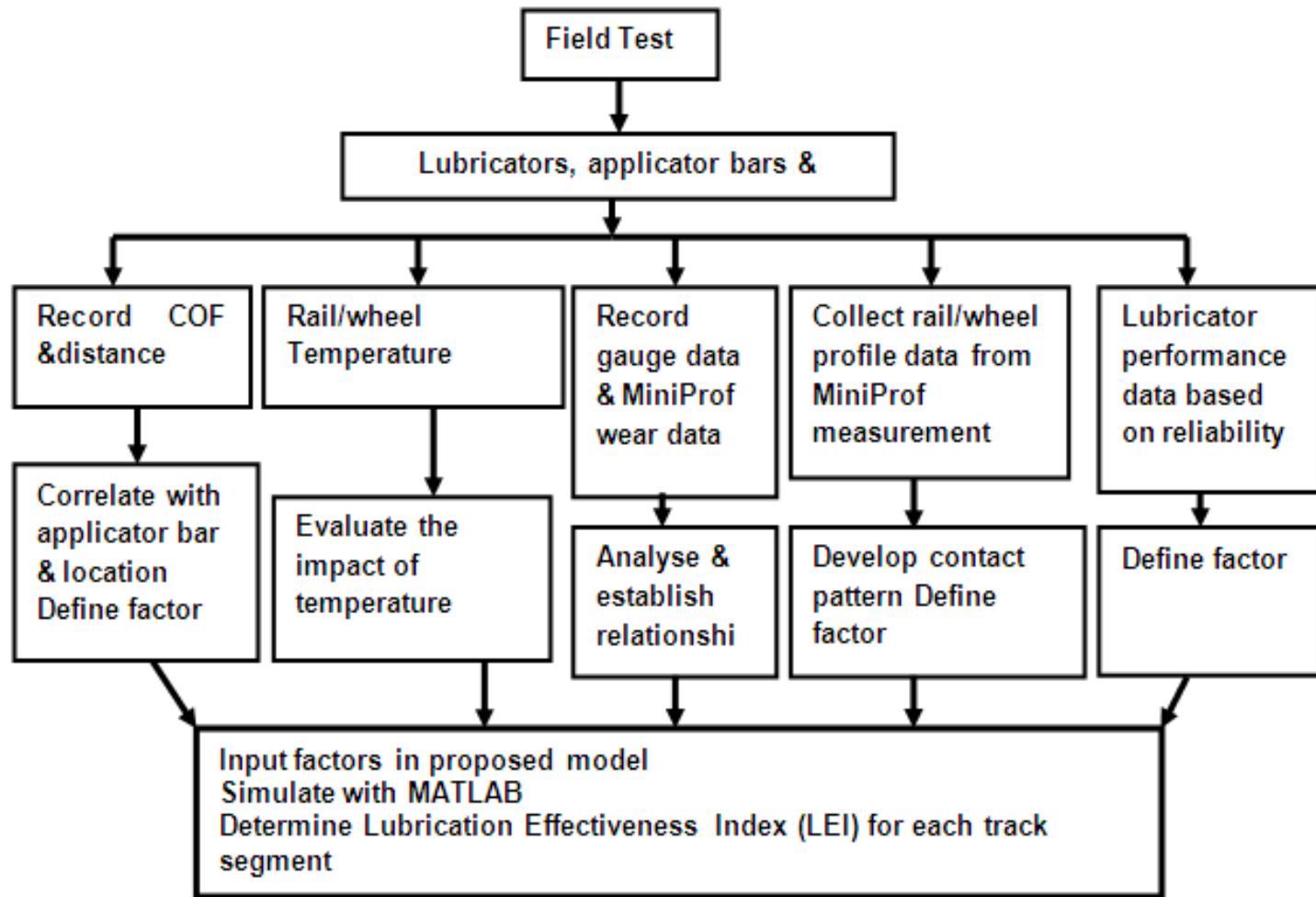
**Mr. Alex Howie and his team and Mr. Peter Sroba
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Thank You

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Lubrication Effectiveness Index (LEI)



Lubrication Effectiveness Index (LEI) Development