

Rolling Contact Fatigue (RCF) of Rails & Wheels

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Contents

- Rail break by Rolling Contact Fatigue (RCF)
 - Head checks (HC)
 - Squats
- Research questions
- Summary

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Rail break due to RCF

- **RCF**
 - Hatfield, UK
 - Oct., 2000
 - 4 killed
 - > 70 injured
 - Planned for replacement
 - Too late to do
 - Network paralysed
- **Many other types**

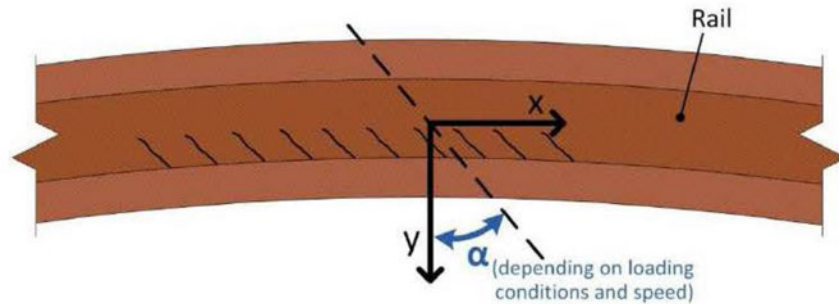


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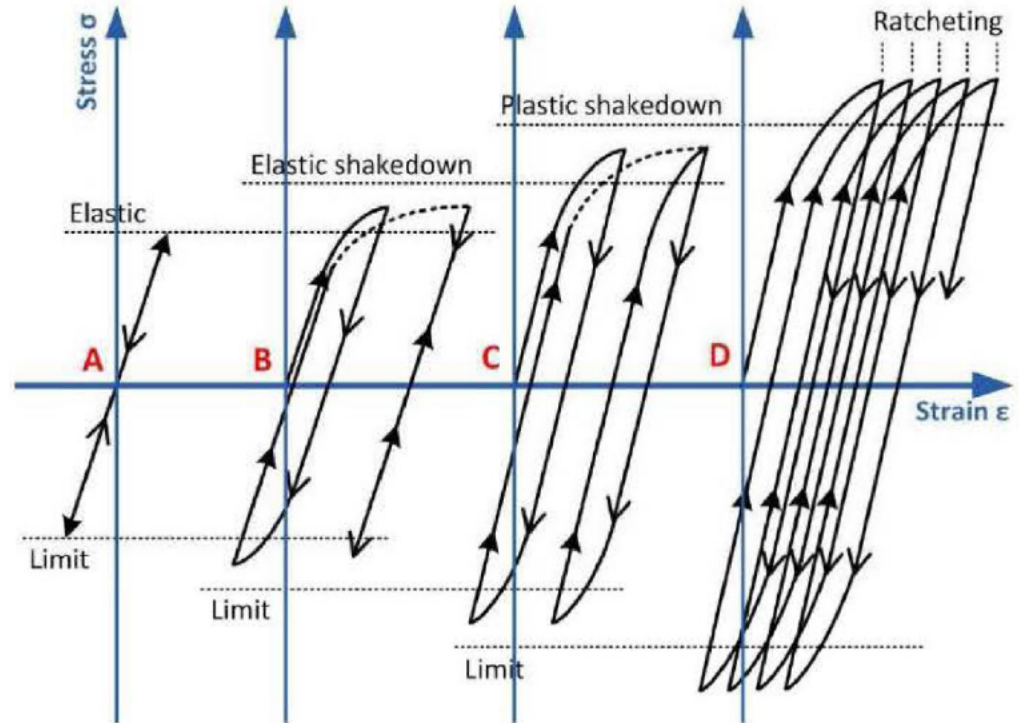
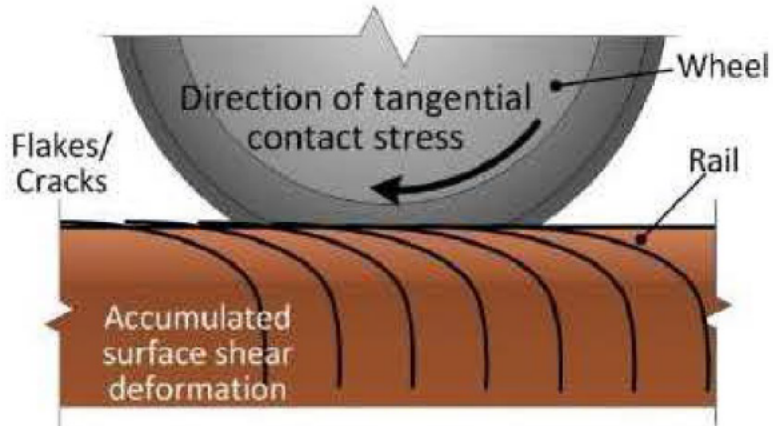
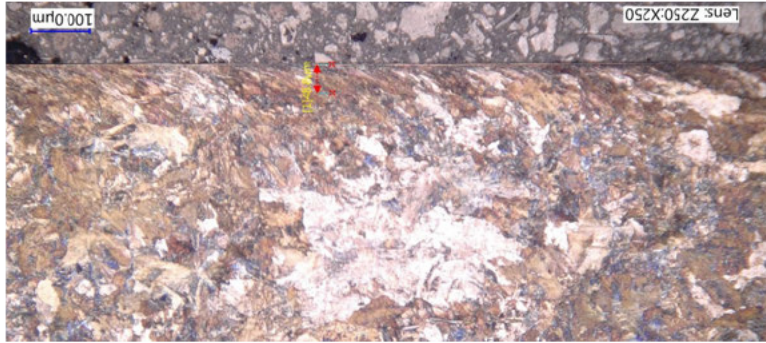
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Head checks (HC)

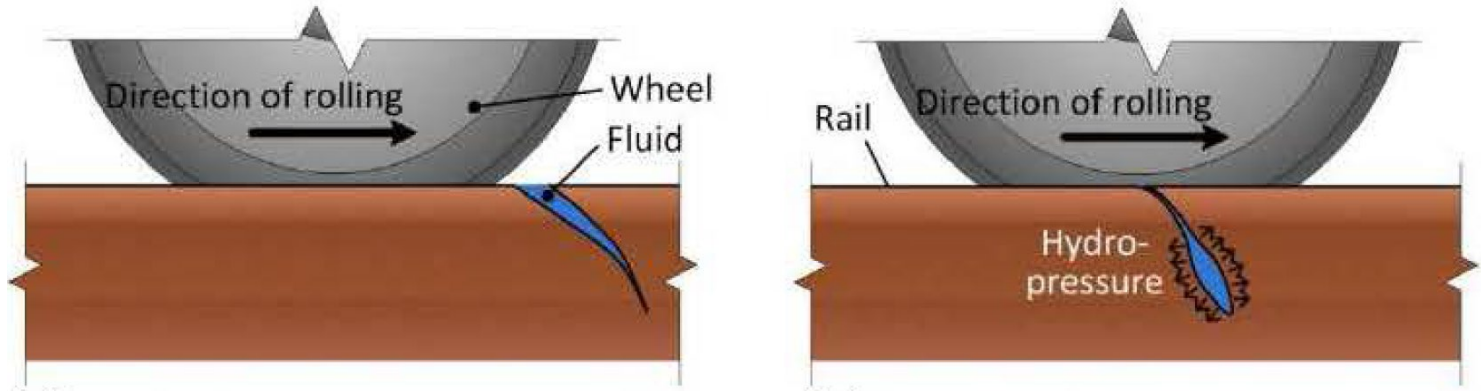
- In curved track
- Regular
- Quasi-static



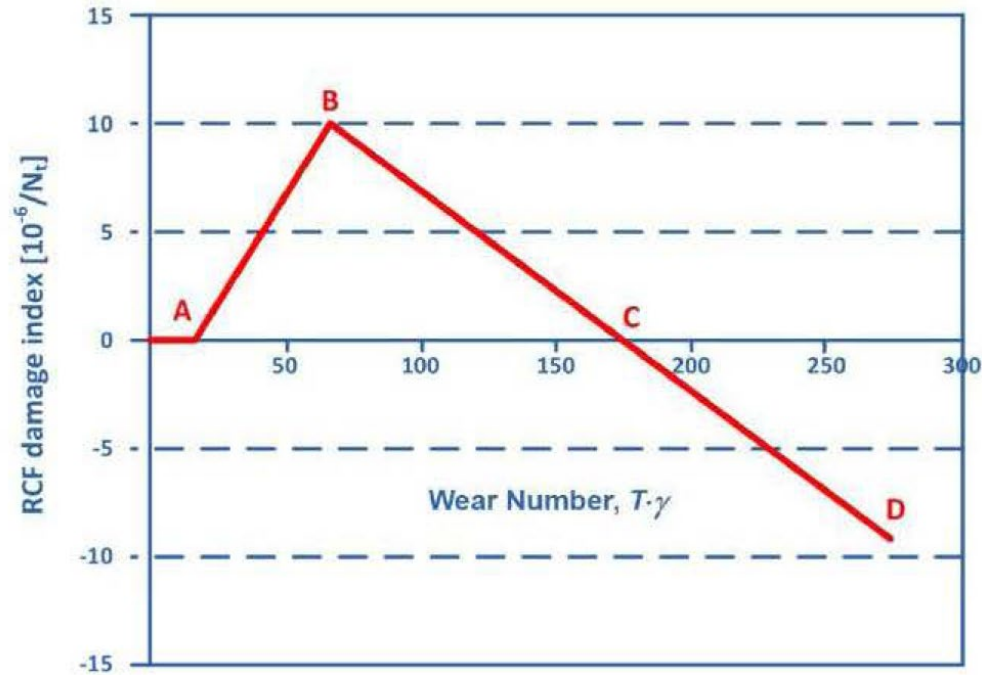
HC - Ratcheting



HC – Liquid pressurization



HC – Competition with Wear



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Squats

- Straight track
- Often random
- Impact

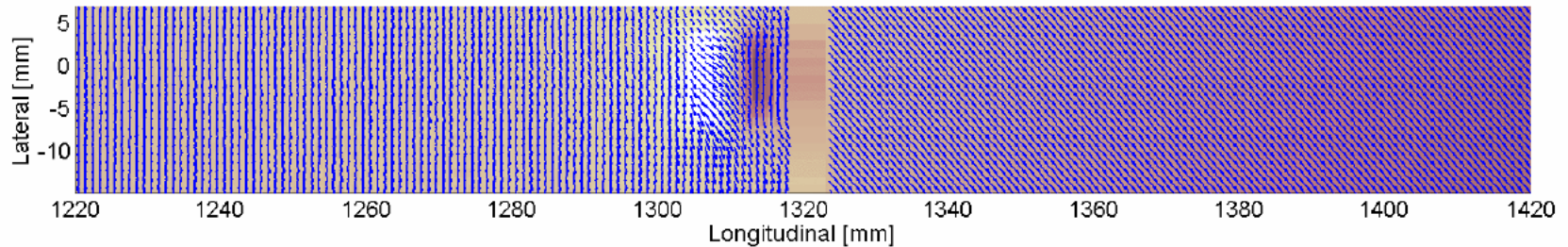


Loading – dynamics

- Impact & waves



$V \rightarrow$

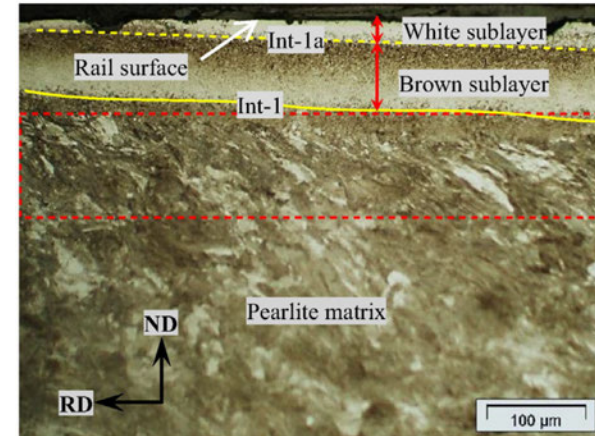
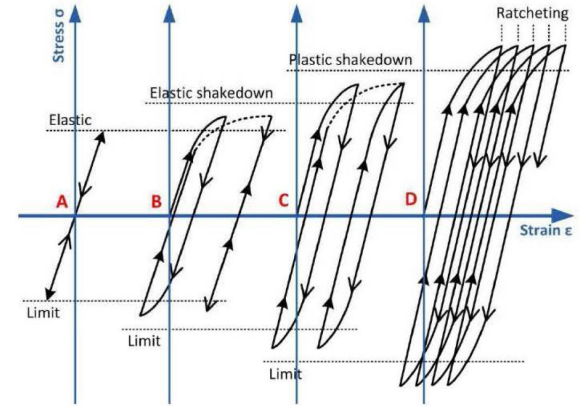


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Research Questions

- Role of white etching layer
- Squats crack initiation mechanism
- How to control wear balance
- Micro-structure design & control

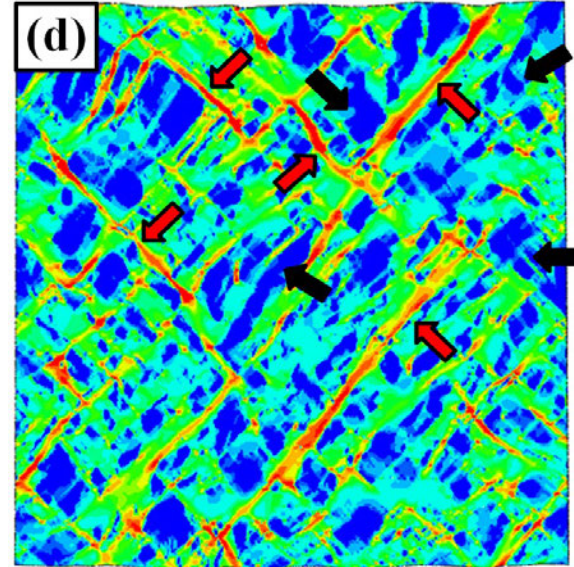


Materials - Micro

- Loading - fatigue



Step: Uniaxial Frame: 0
Total Time: 0.000000



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