Railway Crew Rescheduling

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Felix Wagener
Ulrich W. Thonemann
Railway Crew Rescheduling

1. Motivation
2. Literature
3. Basic Idea
4. Results
Any plans for Friday?
Railway Crew Rescheduling

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4. Results
LITERATURE

Real-Time Rescheduling

- Walker, Snowdon, Ryan (2005)
- Rezanova & Ryan (2010)
- Abbink et al. (2010)
- Verhaegh (2017)
- ...

Tactical Rescheduling

- Huismann (2007)
Railway Crew Rescheduling

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BASIC IDEA

Rough planning of duties

Disruptions

Scheduling + publish duties

≈1 week

Planning Period

Month 1

Month 2

Month 3

Company

- Rough planning of duties
- Unknown demand
- Short term constructions

Train driver

- Not able to plan more 1 week ahead
- No information about upcoming duty
- Bad work conditions
BASIC IDEA

Rough planning of duties + publish frames

Disruptions

Rescheduling

≈1 week

Planning Period

Month 1

Month 2

Month 3

Company

Rough planning of duties

Publish of start and end times

Rescheduling to keep duty frames

Update detailed duty information

Train driver

Start and end times are published weeks ahead

Able to schedule private lives

Disruptions≈1 week

Planning Period
**BASIC IDEA**

- **Initial optimization**
- **Extract and publish start and end times**
- **Rescheduling**

**Disruptions**
- New
- Shifted
Railway Crew Rescheduling

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RESULTS

Cover ratio vs. Penalty cost

- Base Case
- Rescheduling (0)

- +5%
- +6%

Normalized operating costs vs. Penalty cost

- Base Case
- Rescheduling (0)
RESULTS

![Graphs showing the results of different scenarios.]

- **Cover ratio**
  - **Base Case**
  - **Rescheduling (0)**
  - **Rescheduling (60)**

- **Normalized operating costs**
  - **Base Case**
  - **Rescheduling (0)**
  - **Rescheduling (60)**

- **Penalty cost**
  - Values: 0, 25, 50, 75, 100, 125, 150, 175, 200

- **Results**
  - +21%
  - +30%
How to **inform train drivers earlier** about their duties, to improve **work conditions** for employees?

**Duty frame generation**

Move publishing of information **4 weeks ahead**

**Duty frames to improve work conditions** by slightly increasing cost
Thank You!