CSX New Rail Profile Templates Designed for Economics & Risk

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Agenda (11 Slides)

1. **Challenge:** Why CSX Needed New Rail Profiles (1)

2. **Opportunity:** New Approach to Design Rail Profiles (1)

3. **Case Study:** First Profile Test for Increased Wear/Costs (4)

4. **Case Study:** Second Profile Test Increased RCF/Risk (1)

5. **Case Study:** Third Profile Test Improved Wear, RCF, & Cost (2)

6. **Summary:** Key Take Aways, Next Steps, and Q&A (2)

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Challenge: Current CSX Profiles

- Rail profile challenges:
  - Gauge corner RCF
  - Requires removing excess metal
  - High rail GQI decreasing
  - "Fighting" wheel profiles
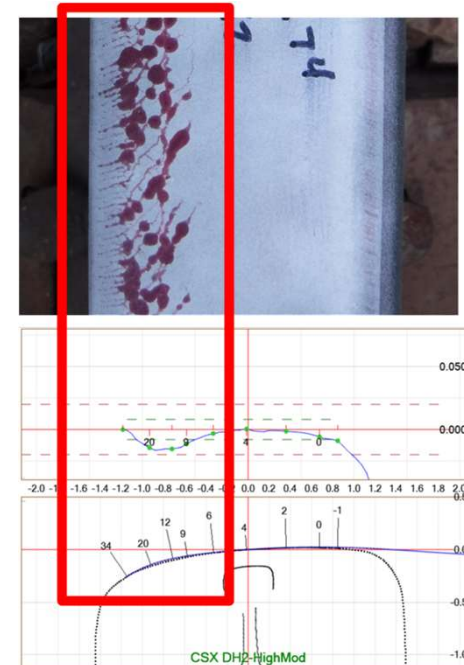
Opportunity: New Rail Profiles

- New profile design approach:
  - NRC-C to design profiles with dynamic pummeling analysis
    - Contact stress, conicity, RCF risk...

  - Sentient Science to test profiles with DigitalClone for Rail
    - Wear life, grinding, economics...
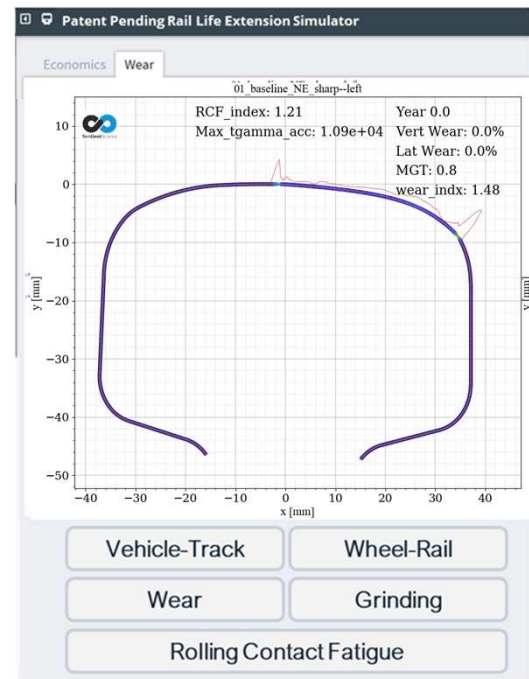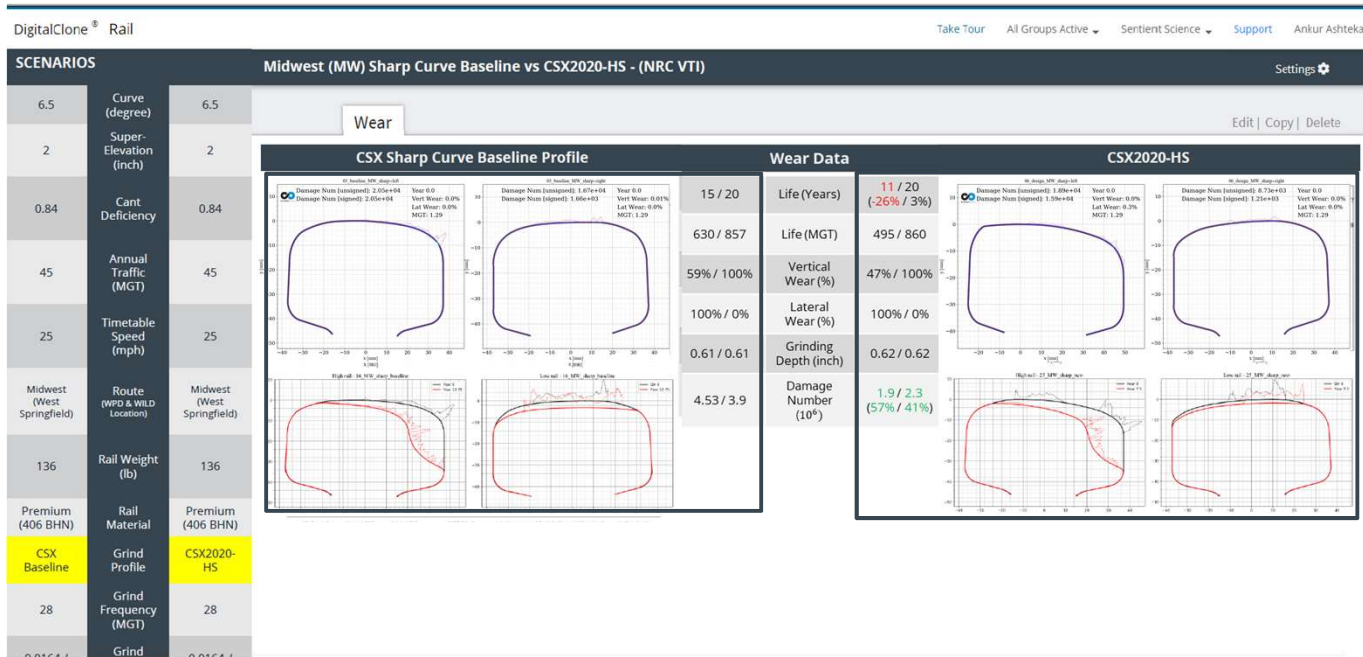
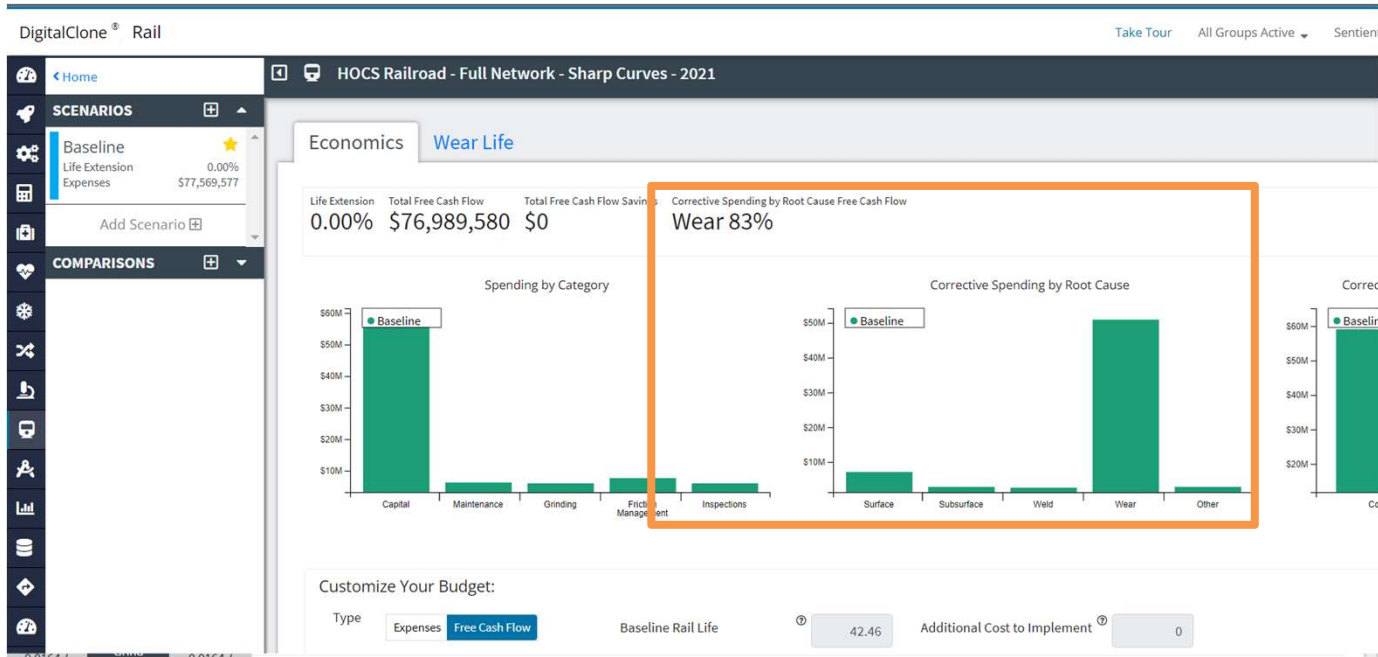**Case Study:** New Profile Design Iteration #1

41% - 57% Improved RCF, but **-26% to -42%** Wear Life

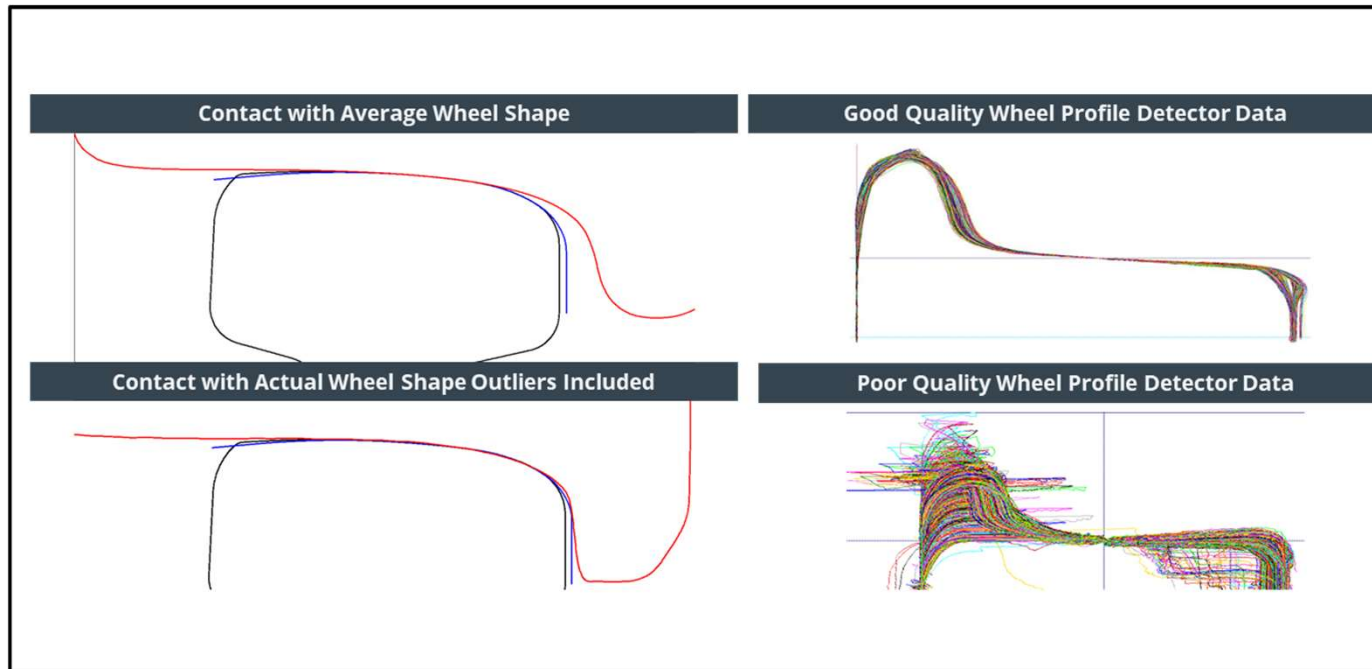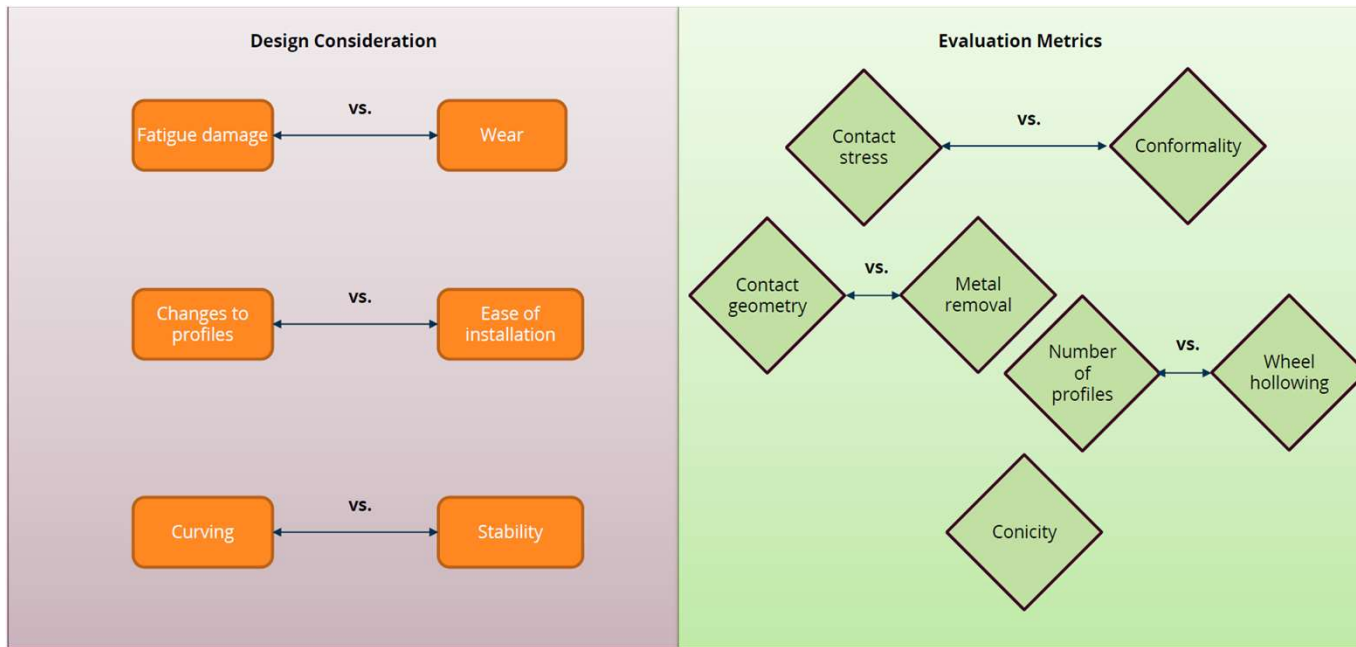**Case Study:** New Profile Design Iteration #1 - Economics

Wear Represents **80%+** of Sharp Curve Costs

Case Study: New Profile Design Iteration #1 – Root Cause

Outlier Wheel Gauge Contact and Wear

Case Study: New Profile Design Iteration #1 – Trade-Offs

ICRI Rail Profile Scoring Initiative – aashtekar@sentientscience.com
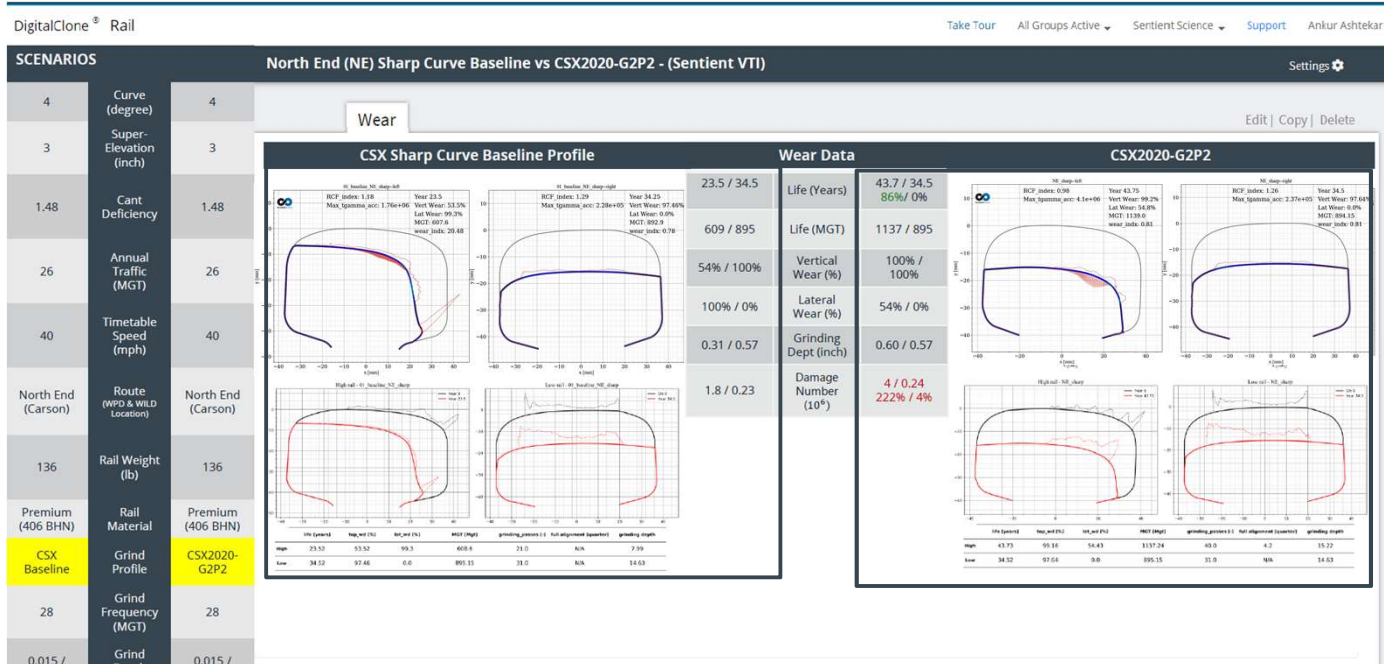
Case Study: New Profile Design Iteration #2

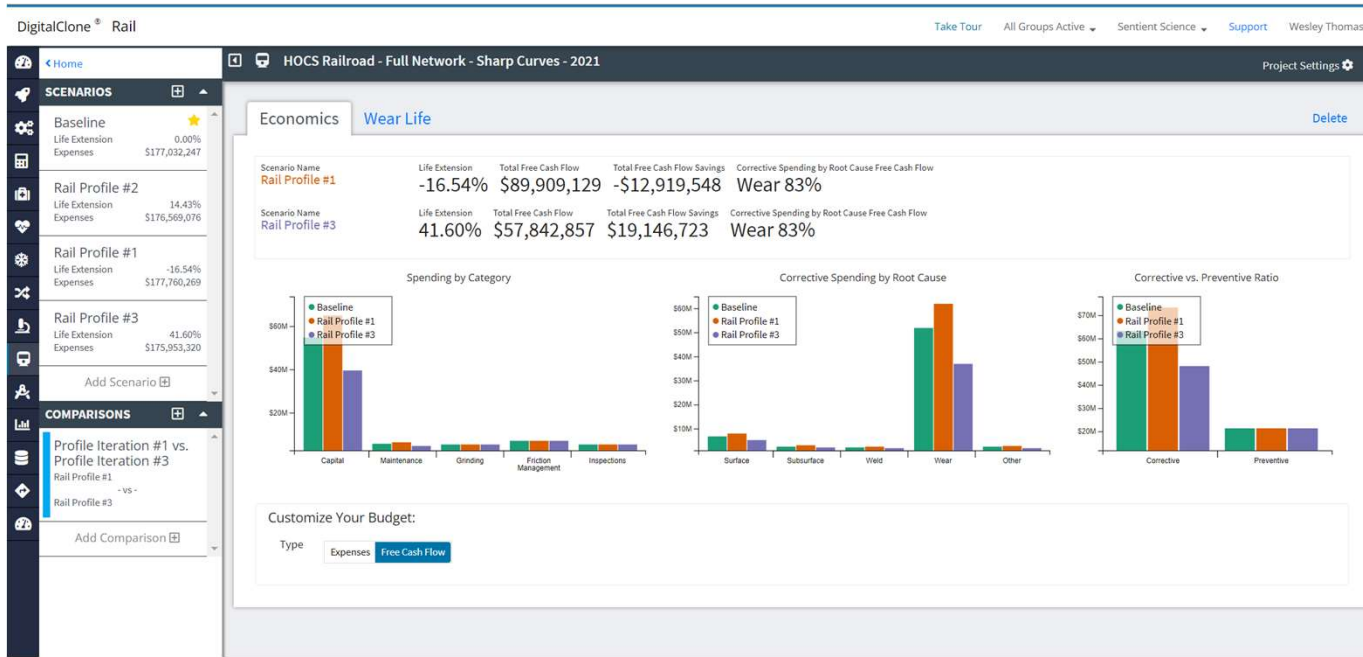**+86%** to **+133%** Wear Life, but **2x** to **5x** Higher RCF Risk
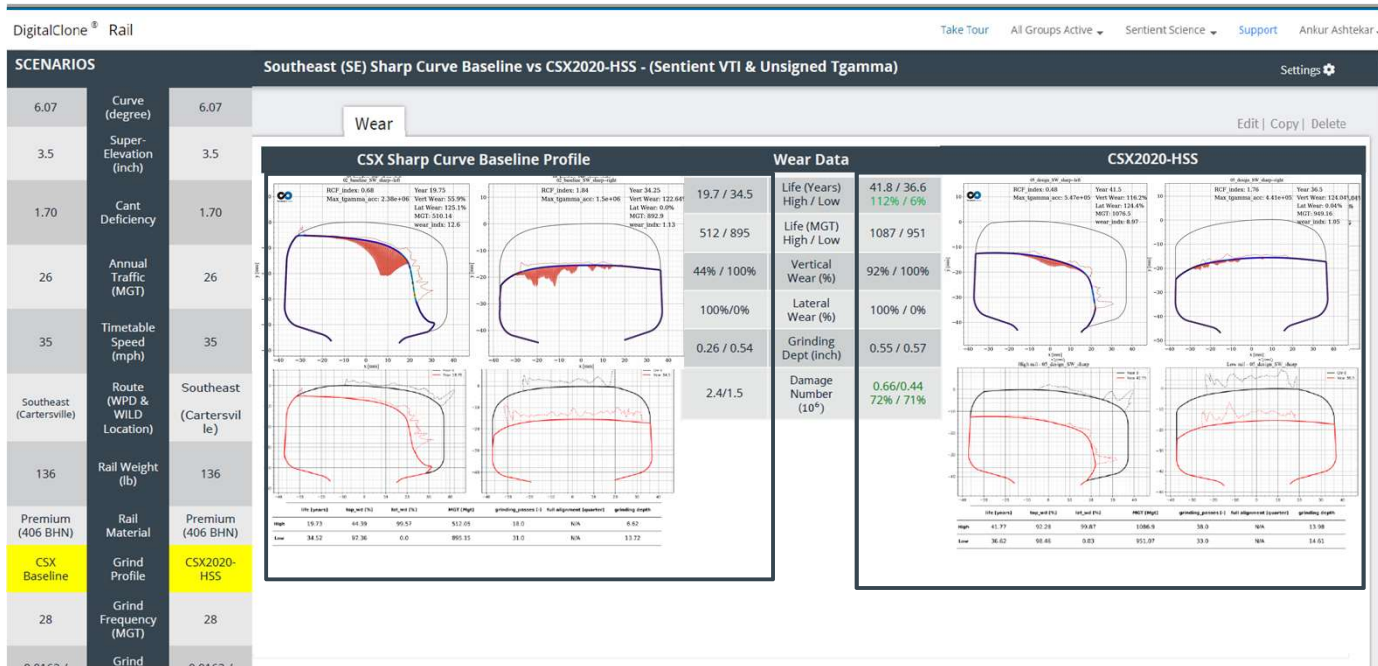
Case Study: New Profile Design Iteration #3

+40% to **+110%** Wear Life, **70%+** Lower RCF Risk

Case Study: New Profile Design Iteration #3 - Economics

$13M+ Annual Savings and Avoided **$2M+** Annual Loss

Key Take Aways & Next Steps

1. Test profiles with life extension and economics before field

2. "Scoring" metrics enable optimization + automation

   – ICRI Rail Profile Scoring Initiative

   – Curve groups -> condition group -> asset specific profiles

3. Measure field improvements & monitor triggers to change template:

   – Wheel Profiles, Traffic Speeds / Cant Deficiency, Track Geometry…

4. Optimizing system maintenance requires optimizing specific locations

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