OpenPowerNet

The Power Supply and Engine Simulation Program

Calculation of
Magnetic Flux Density

Beijing Starbamboo Tech.

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Calculation of magnetic flux density

1. Simulation with OpenTrack and OpenPowerNet.
2. Determination of maximum sum catenary current at given position.
3. Calculation of magnetic flux density at the time of maximum sum catenary current.
4. Additional analysis of maximum magnetic flux density at specified point.

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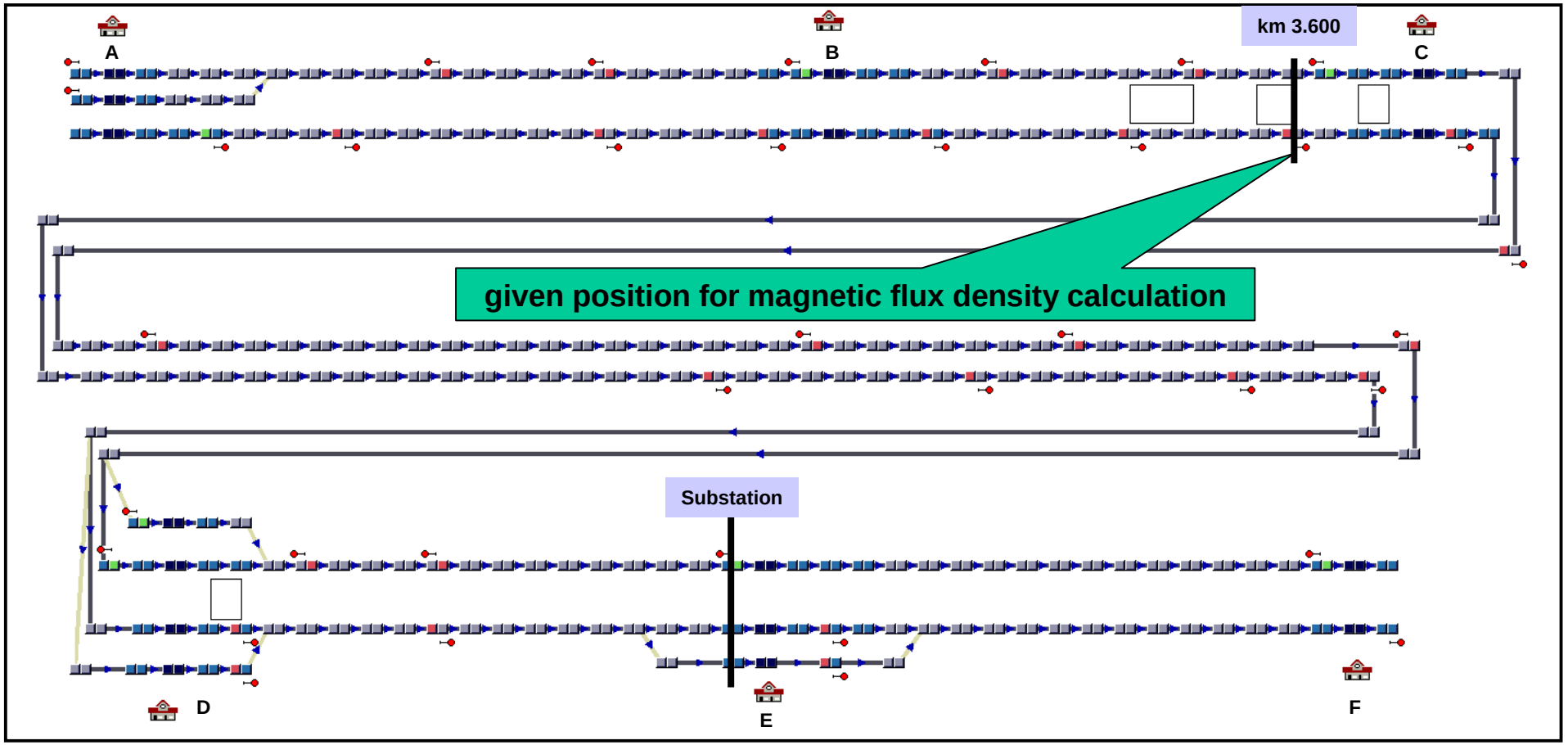

OpenTrack infrastructure

1. Simulation with OpenTrack and OpenPowerNet

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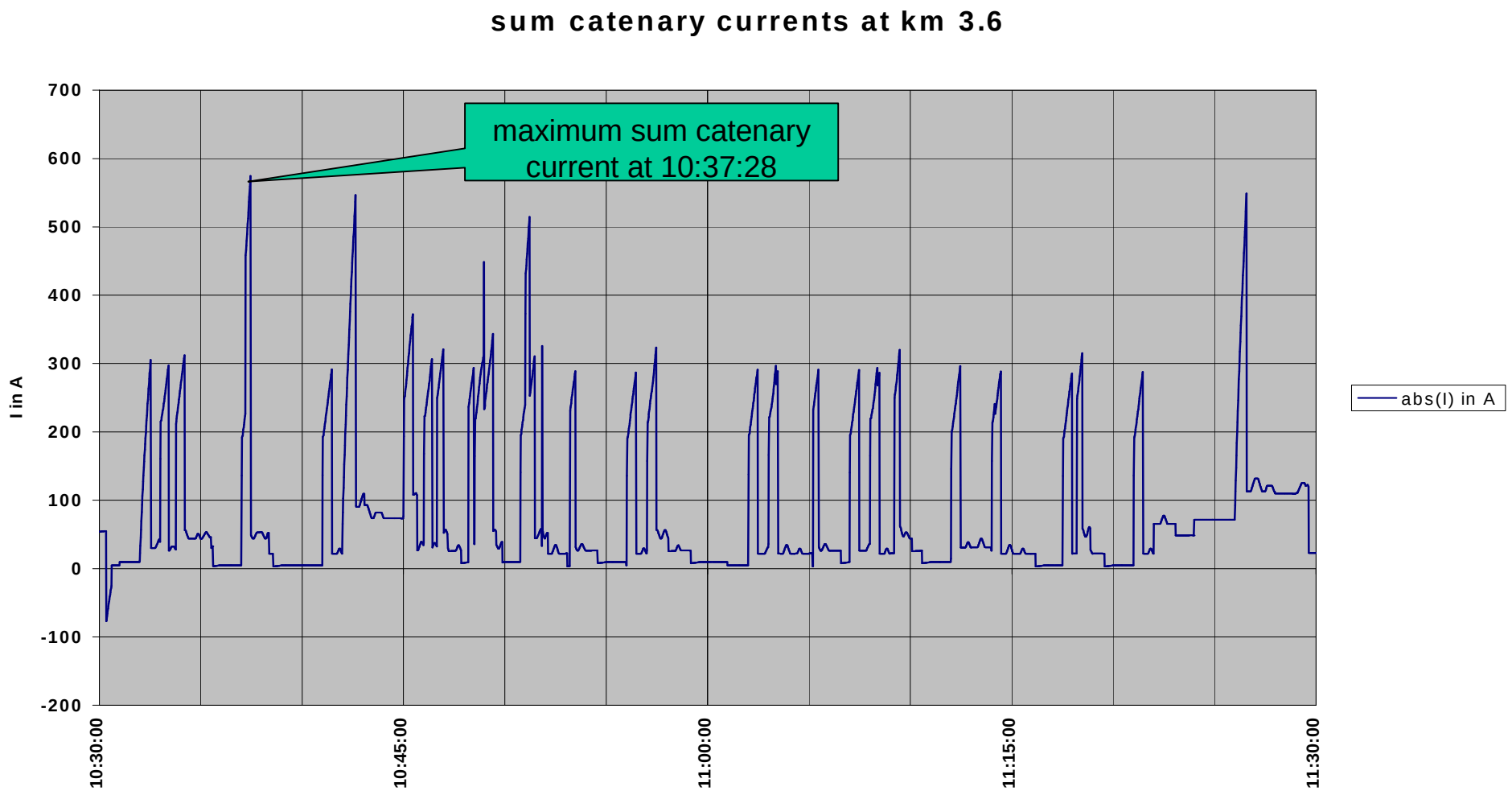

2. Determination of maximum sum catenary current at given position (**km 3.600**)

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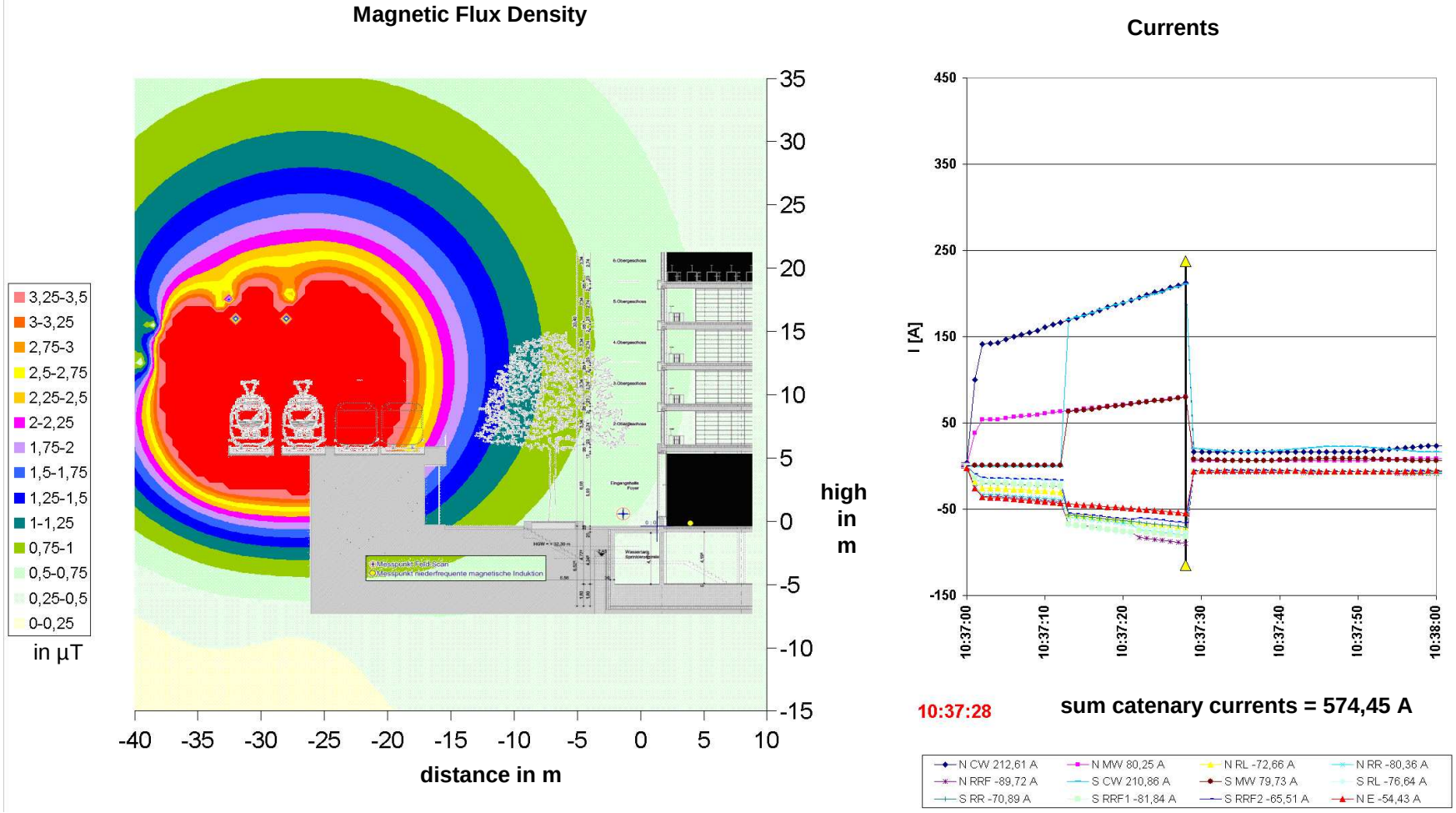

3. Calculation of magnetic flux density at time of maximum sum catenary current at **km 3.600**

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Additional analysis of maximum magnetic flux density at specified point

Check of magnetic flux density at each time of current peaks.

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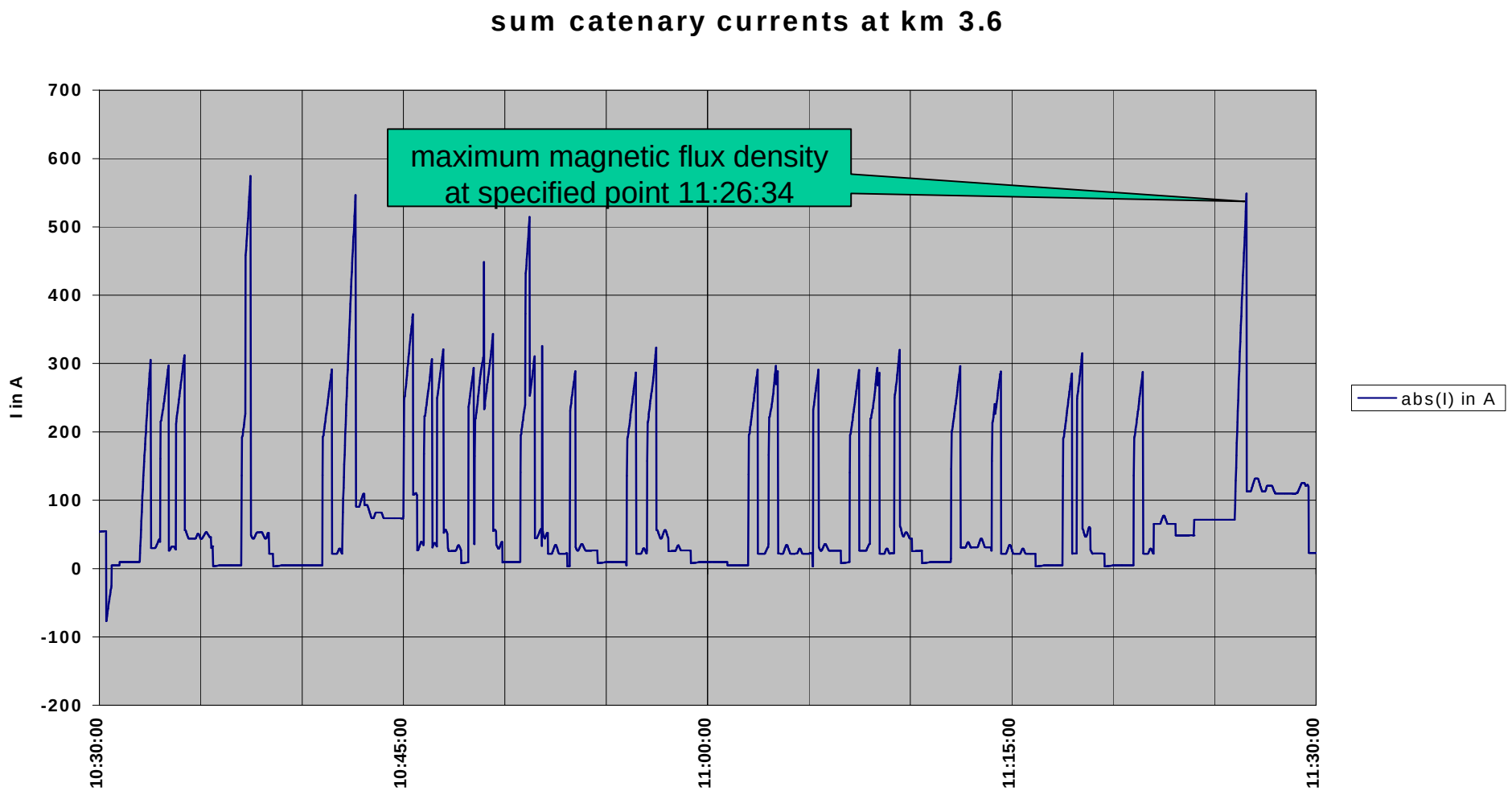

4. Determine time of peak sum catenary current at given position (**km 3.600**)

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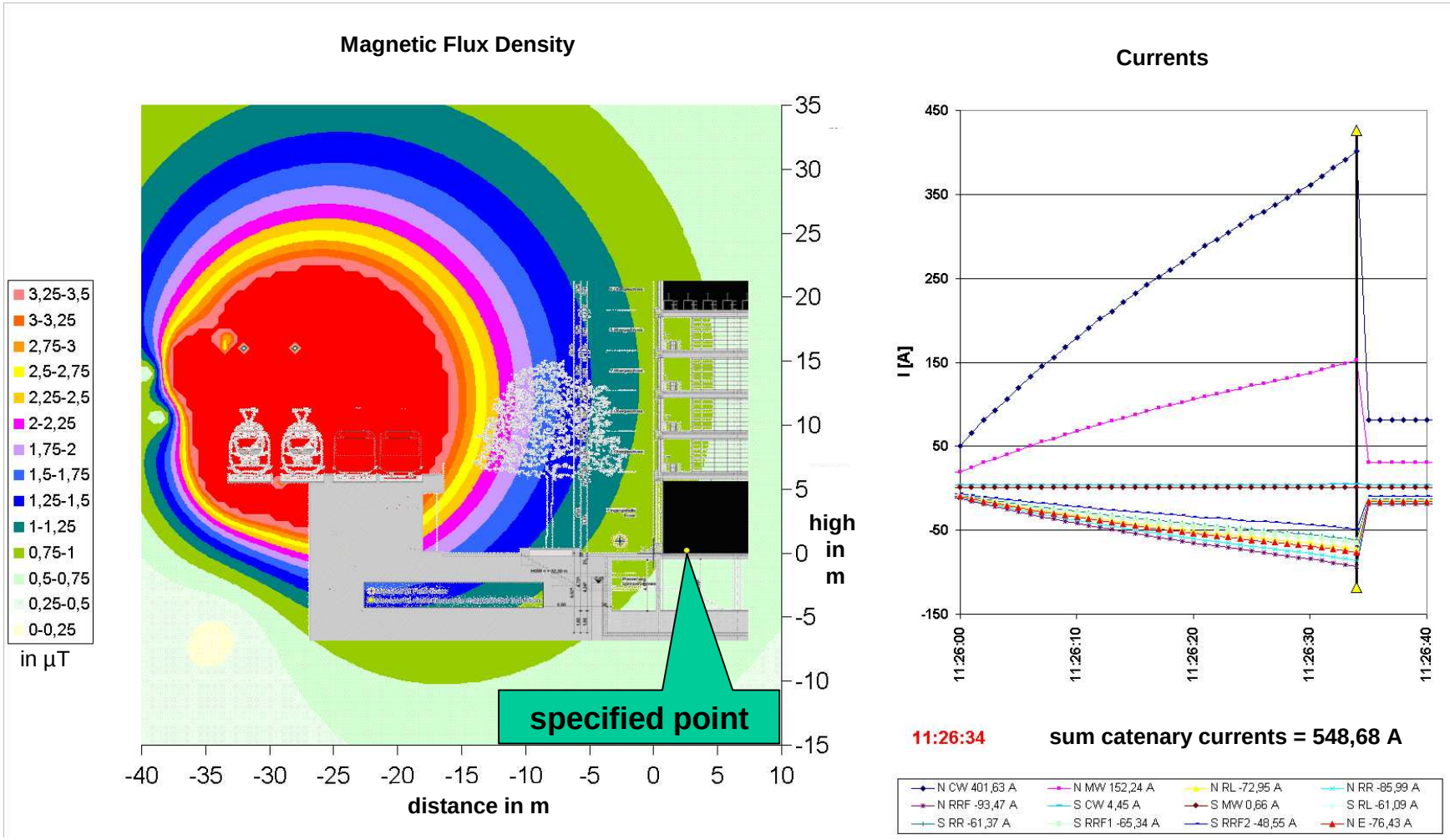

4. Calculation of magnetic flux density at time of peak sum catenary current at **km 3.600**

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Simulated magnetic flux density at specified point

	Simulated magnetic flux density in µT
maximum sum current	0.46
maximum value	0.73

- Maximum sum catenary current does not correspond with maximum value of magnetic flux density, caused by complex combinations.
- It is possible to determine the maximum magnetic flux density because of the calculated data by OpenPowerNet.

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Verification of calculation results by measurement

by use of scheduled timetable and estimated train characteristics

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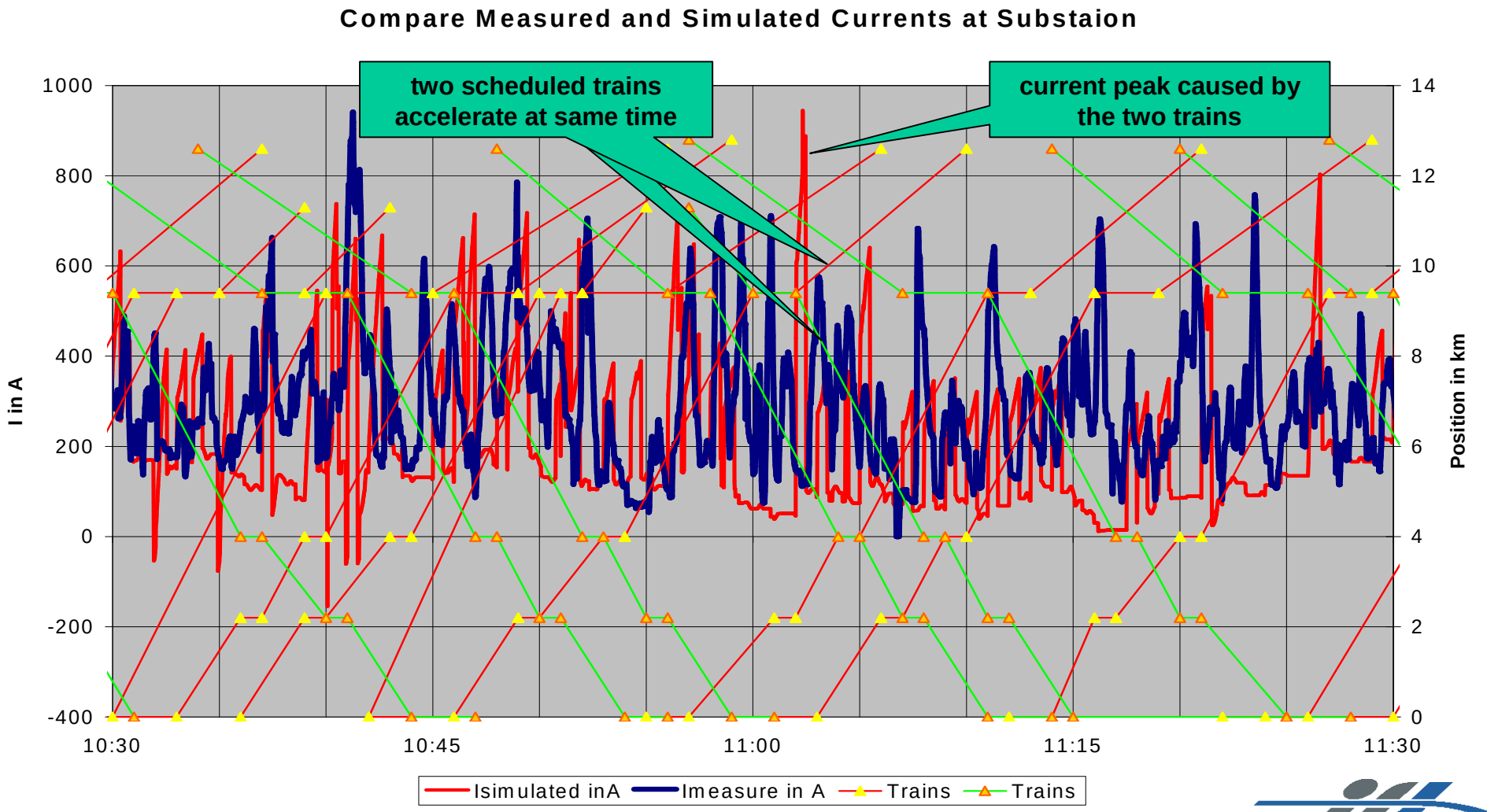

Compare measured and simulated currents at **substation**

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Compare Measured and Simulated Currents at Substation

- Different time characteristic because of slightly delayed trains compared with scheduled timetable
- Similarly values of current peaks
- About same base load current
- Same characteristic of measured and simulated currents

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Compare maximum measured and simulated magnetic flux density at measuring point

	Measurement	Simulation
maximum magnetic flux density in µT	0.67	0.73

- Good correspondence of measured and simulated maximum values nevertheless the unknown real train dynamics.

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