Power Monitoring of Oporto 172

On Friday, 1 June 2018 we made a run on the line with car #172 to capture power usage. The car was operated hard in order to obtain some data at both full series and full parallel. Close to balancing speed was achieved in full series, but not for full parallel which was too fast for our track conditions.

How to read the data plots:

The minimum value is substation no-load losses, car lights and end of line bulb cluster, approximately 1750 watts. You can see a jump above the minimum which is the air compressor, approximately 2000 watts. The spikes on the plots represent to power that the car is consuming when moving. The approximate locations along the line are noted and controller positions estimated.

Observations:

The outbound trip is uphill reflecting higher power consumption that the return trip.

The outbound trip series points very nicely show the notching up of the controller and then the power decrease as the car accelerates. There is a good example of acceleration to full parallel at minute 29. There are a couple of 22 kW flat areas between minutes 32 and 33 that are balancing speed power with the car working uphill between Altoff and Black Log.

The inbound trip used the series points and then track conditions did not permit getting to balancing speed. There is an anomaly marked between minutes 40 and 43 when 311's air compressor was run.

Recommendation:

A 75 kW generator should be adequate for most operations with 172. Full Series balancing speed power consumption is around 25 kW and parallel points could be used, the generator's 115% overload capability would be needed for very short periods when going to full parallel. A 50 kW would be adequate, if only series points are utilized.

172 has a relatively short wheelbase and is very susceptible to low joints. High speed operation in the parallel points will give an bouncy ride.

I will be happy to answer any questions.

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Jun 01, 2018 to Jun 01, 2018

00068274 - 1s W
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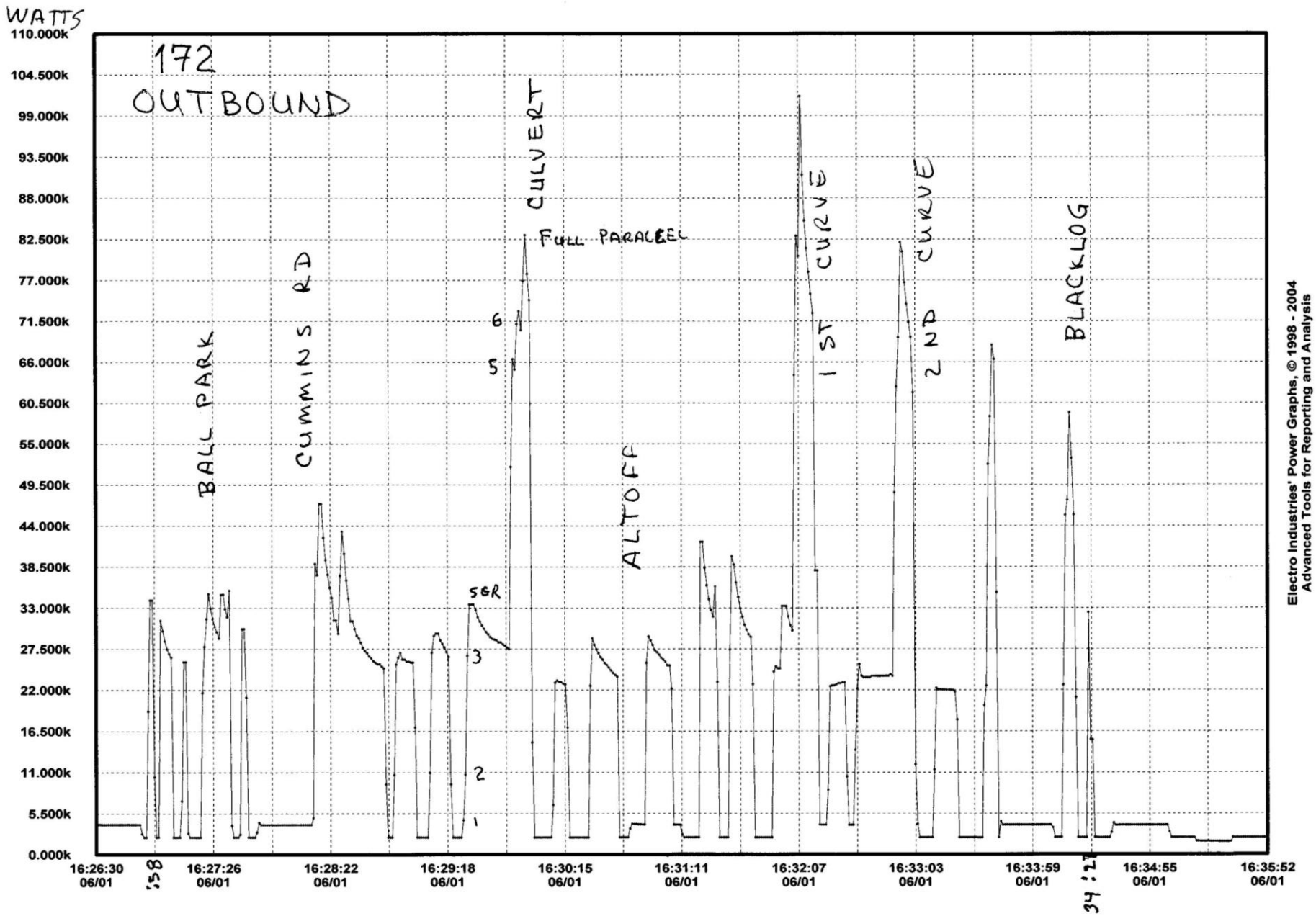
Min: 6/1/2018 2:21:17.00, 1503.76



Jun 01, 2018 to Jun 01, 2018

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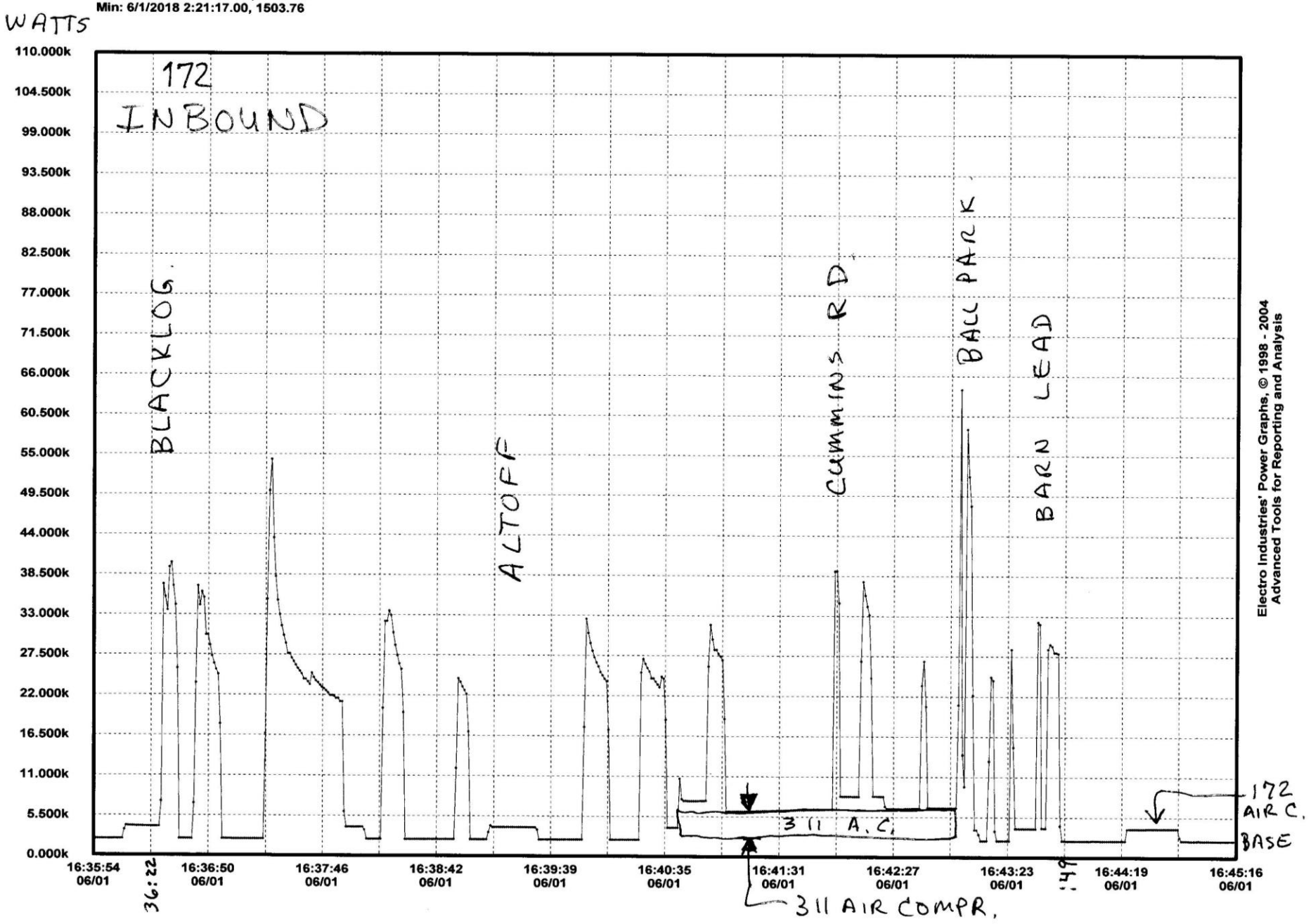
Max: 6/1/2018 4:32:08.01, 101616.97
Min: 6/1/2018 2:21:17.00, 1503.76



Jun 01, 2018 to Jun 01, 2018

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