

Aiming for a step-change in reliability

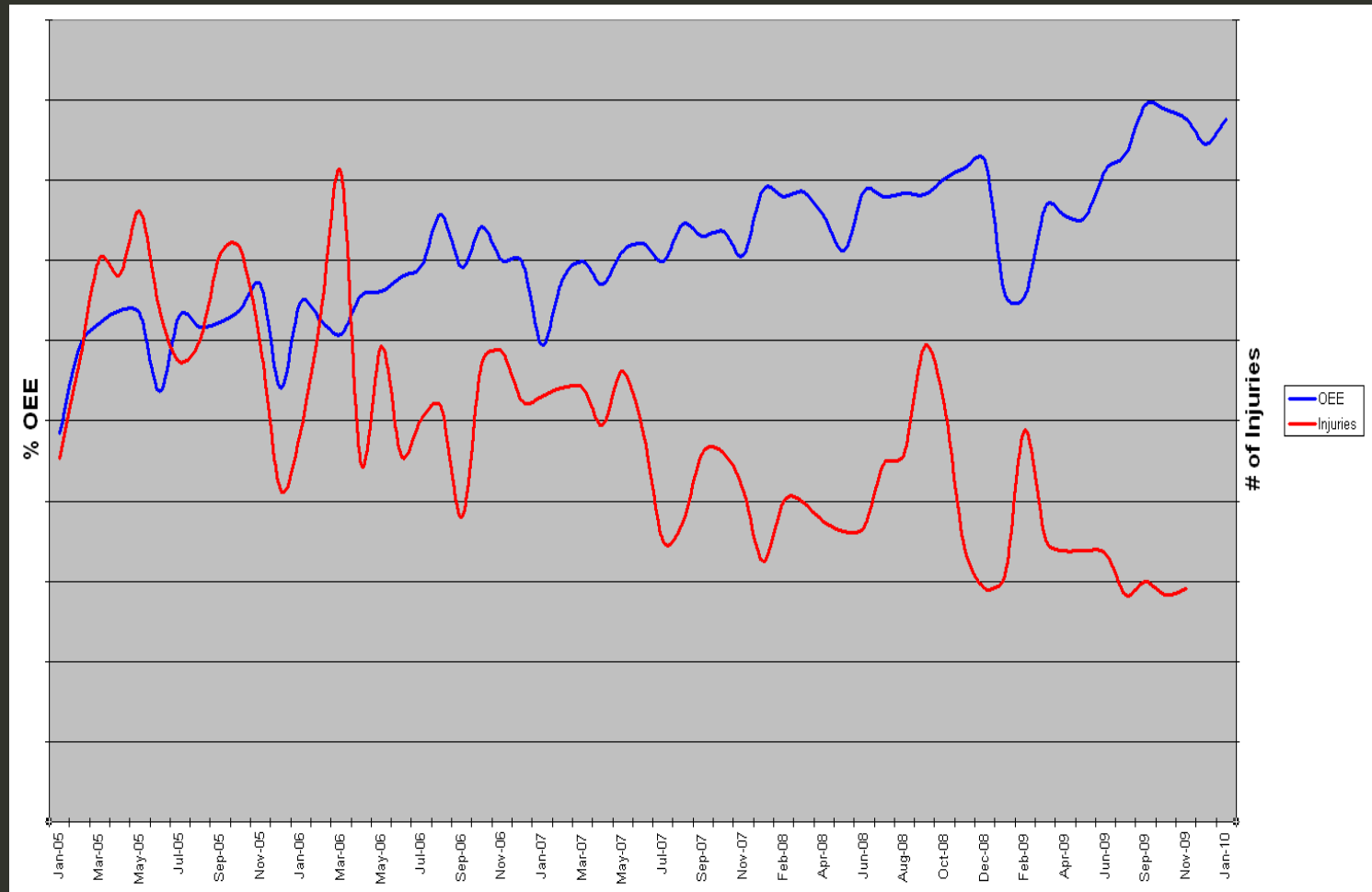
Martin Mikiewicz – VP, Manufacturing Excellence

Benefits of being reliable

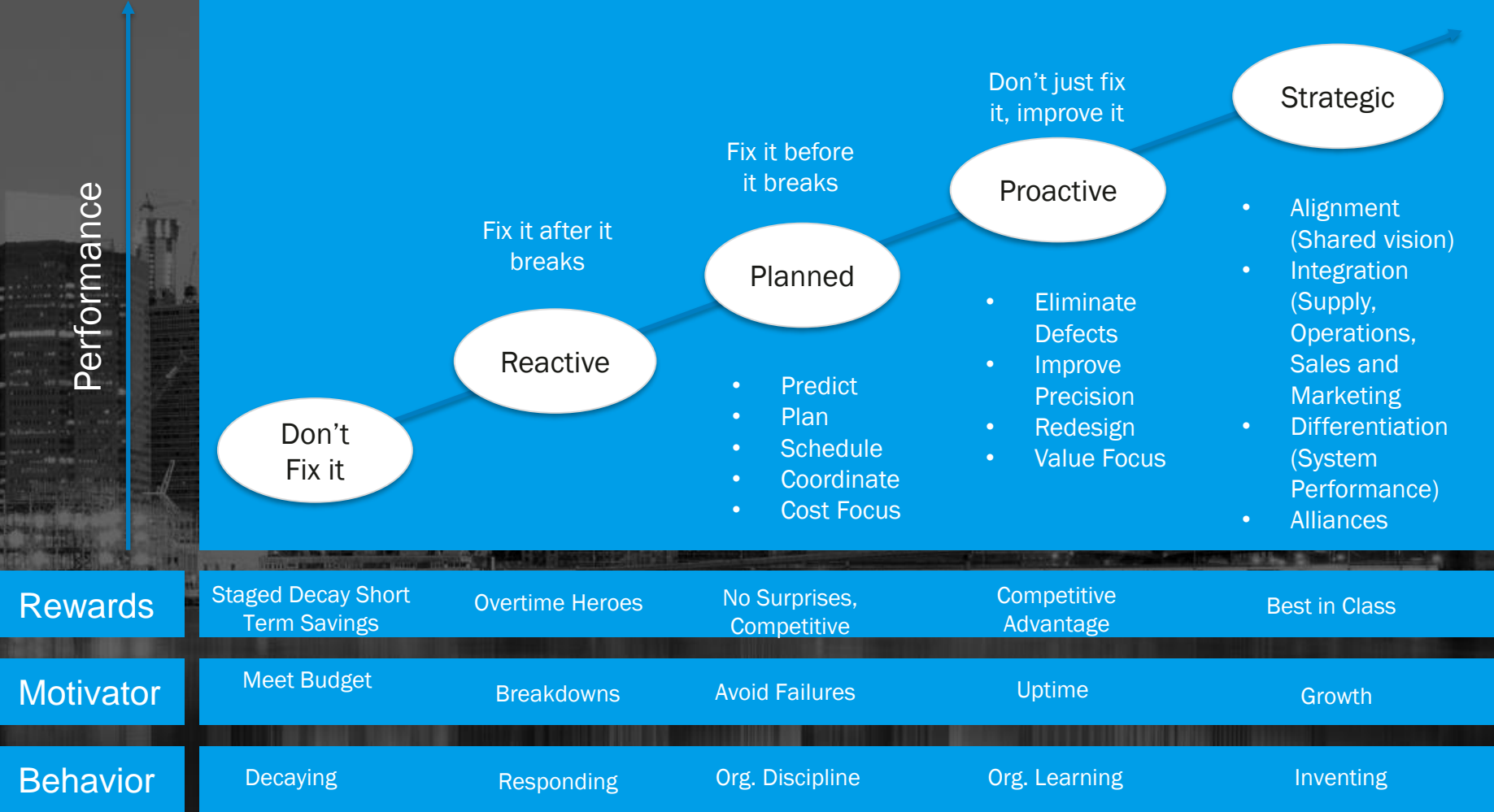
- Improved safety and delivery time, and reduced cost
 - Improves the operational performance of equipment by reducing break-downs and other downtimes
 - Greater maintenance cost-effectiveness through better use of resources
 - Longer equipment life and lower capital requirements for new equipment
- More motivated operations and maintenance staff

"A reliable plant is a safe plant" – Ron Moore

OEE vs. injuries with equipment not in good order as contributing factor



Shifting culture from a maintenance focus to reliability focus



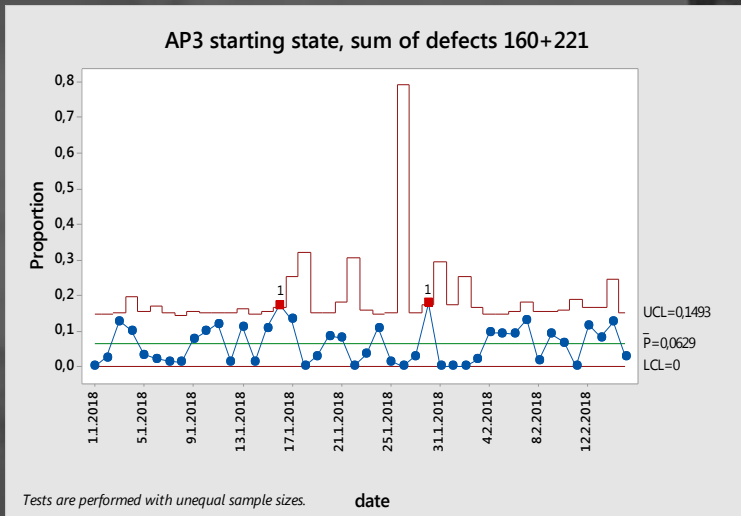
Eliminate scale residues from AP3

Before

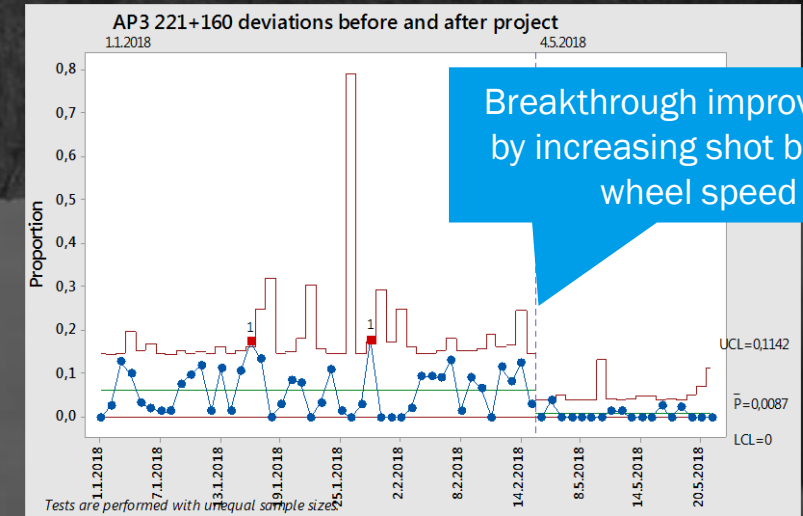
- AP3 descaling ability clearly worse than comparable line AP1 with similar material feed and time frame
- Problem specially with 3-4 mm material
- Improvement potential found in annealing temperature, pickling and shot blasting

After

- Increased annealing temperature for <4 mm material, now same for all thicknesses
- New acid pumping rules with higher concentration targets
- Maintenance improvement to increase shot blasting wheel speed from 800 to 900 rpm



- Control plan created for the process
- Revised existing Standard Operating Procedure
- Operators trained in new SOP



Scale base deviations at AP3 decreased from 6% in beginning of 2018 to less than 1%.

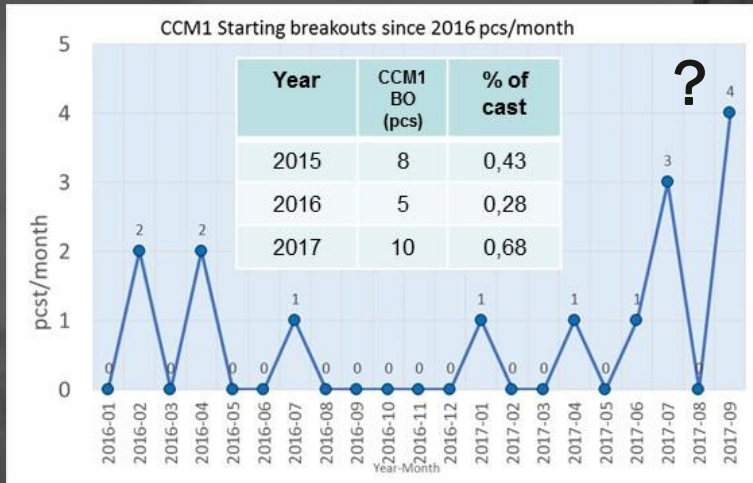
Melting: Standardize cast starting operations

Before

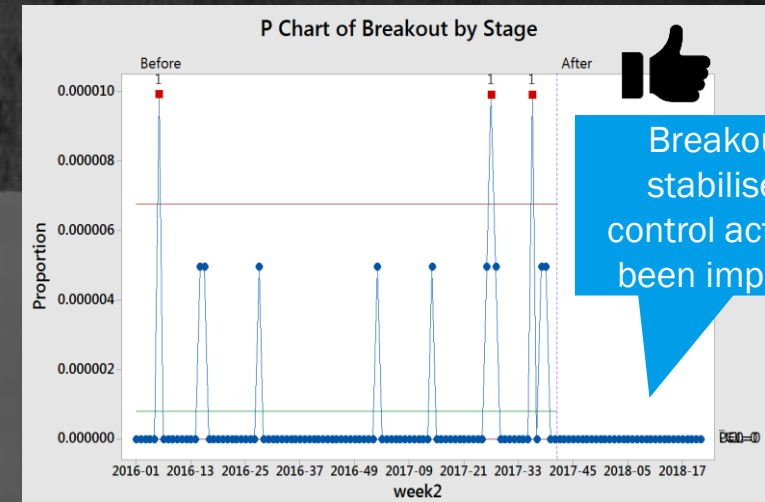
- Too fast mold filling
- Mold corner cap
- Too many iron chips
- Too short tundish heating time

After

- Min 30 s mold filling time
- Silicone seals the gap between the mold plates
- Reduced use of iron chips
- Min 55 min heating time



- Revised the existing and create a new SOP
- Operators trained in new SOP
- Control plan created for the process



Starting breakouts reduced from 10 in 2017 to 0 in 2018.

Project management structure with visibility

