

# DS11T coil size – multipoint injection impregnation



# Content

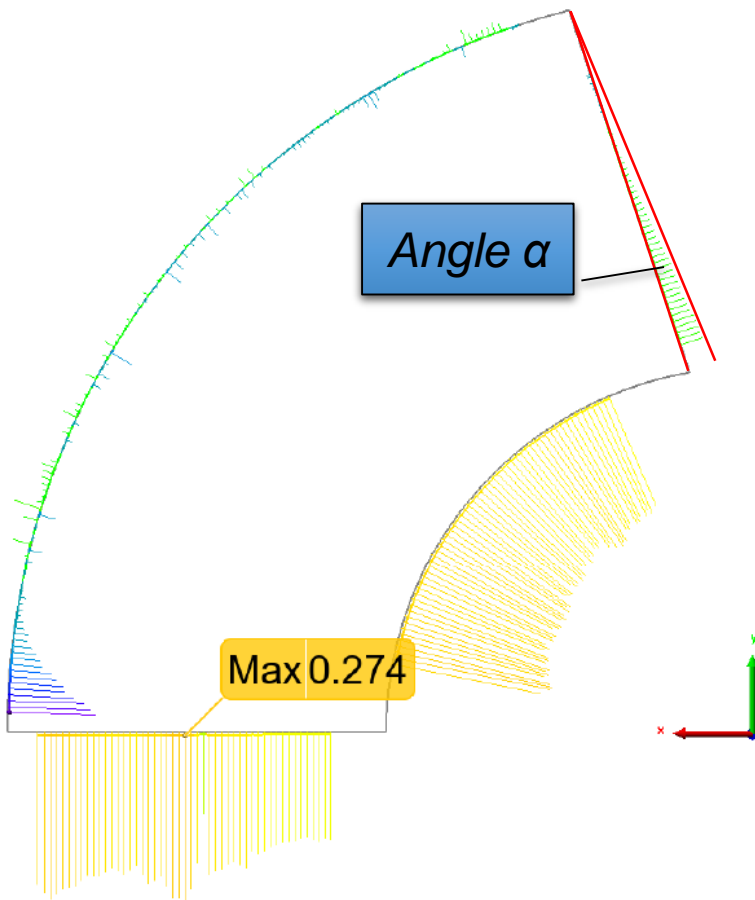
- loading plate orientation
  - Angular mismatch
  - Tool dependency
  - Coil 110&111 compared to predecessors
- Azimuthal length of coil arc
  - Coil 110&111 compared to predecessors

*No data from 107 or before will be presented due to time/space*

# Measured locations

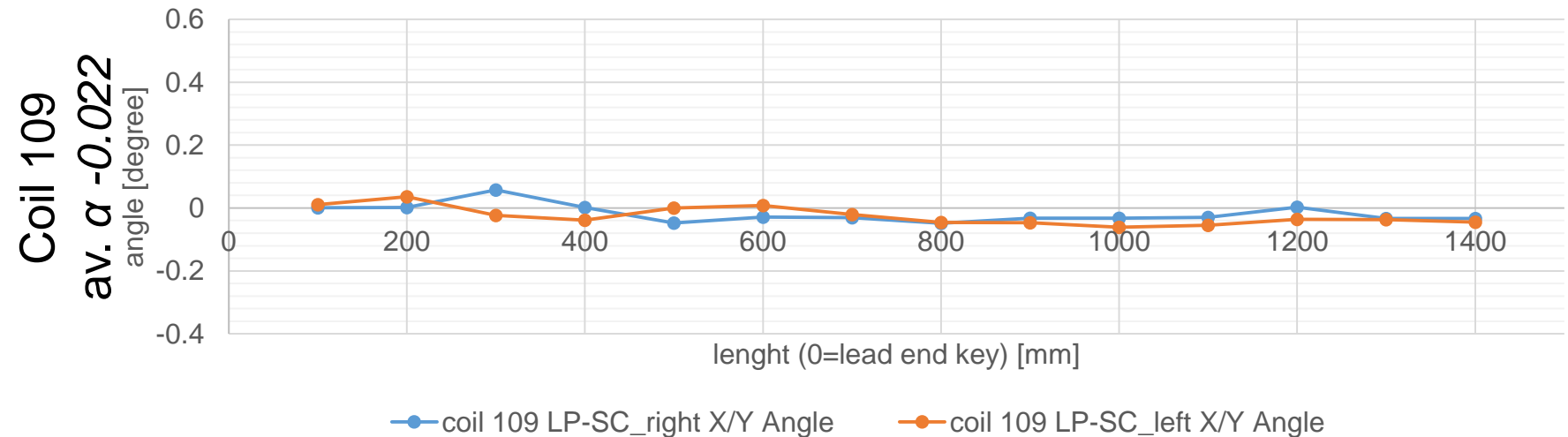
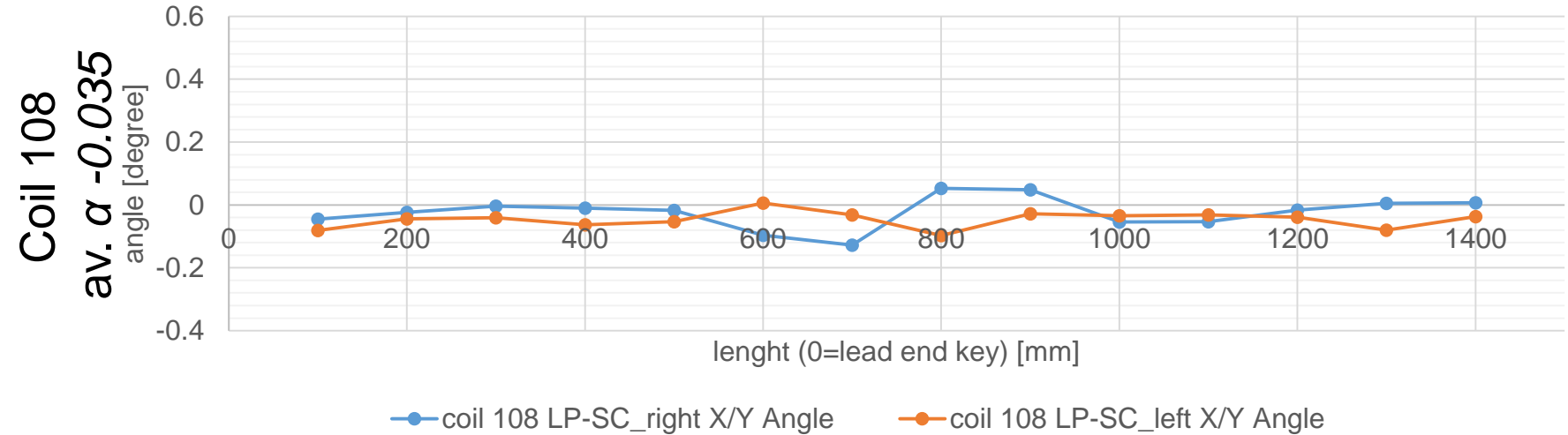
- Only measurements from the straight section will be displayed (heads in progress)
- Z-axis=0mm is on the *lead end key*
- Z-axis=1500mm is on the *return end key*
- Every 100mm a cross-section was measured
- Cross-section are divided in left and right leg

# Loading plate angle orientation

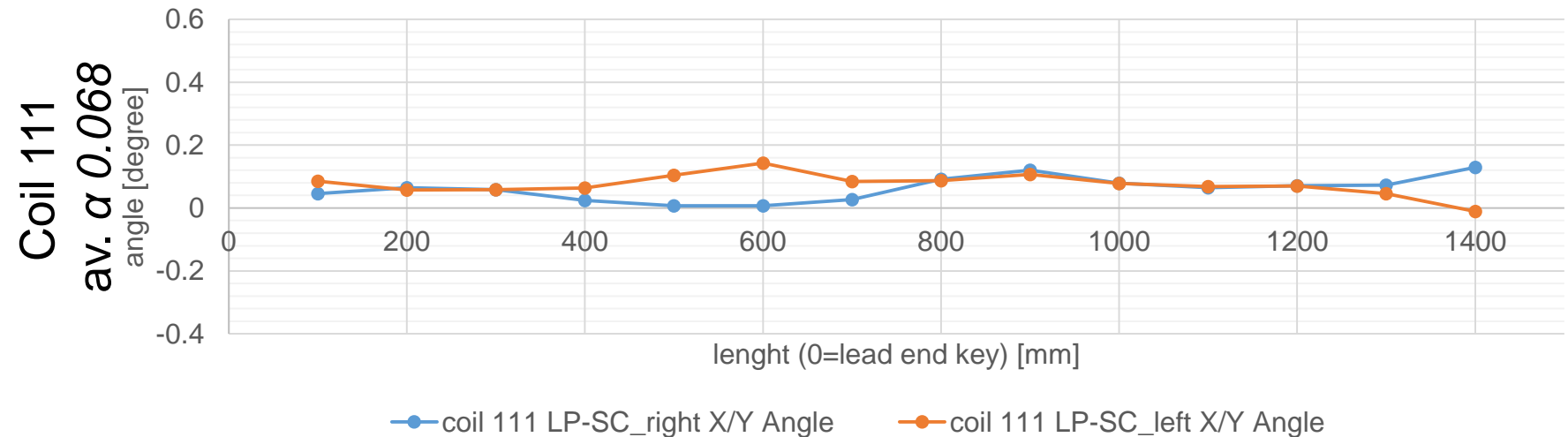
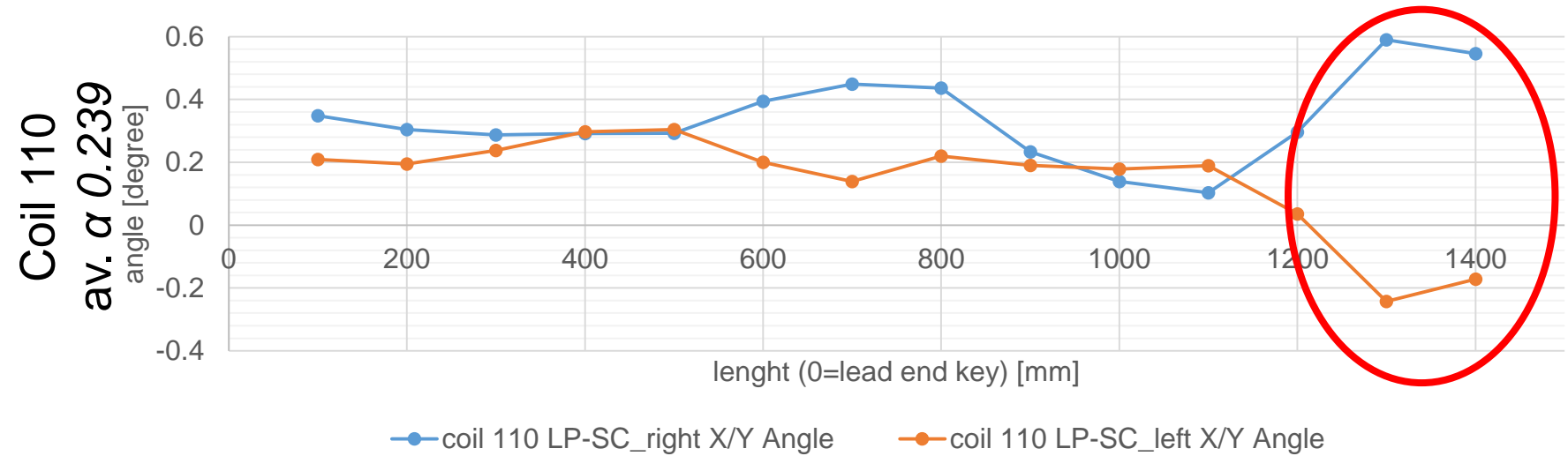


- as displayed  $\alpha$  is positive
- Coil 108&109 are the current benchmark (tool #2; standard impregnation; no issues during assembly)
- **0.1 degree = 50 $\mu$ m** azimuthal difference in length over the loading plate (50 $\mu$ m=25MPa difference during powering)

# Angle $\alpha$ of LP coil 108 & 109



# Angle $\alpha$ of LP coil 110 & 111



# Loading plate angle summary

	Average $\alpha$ [degree]	ST.DEV $\alpha$ [degree]
108	-0.035	0.04
109	-0.022	0.028
110	0.239	0.175
111	0.068	0.035

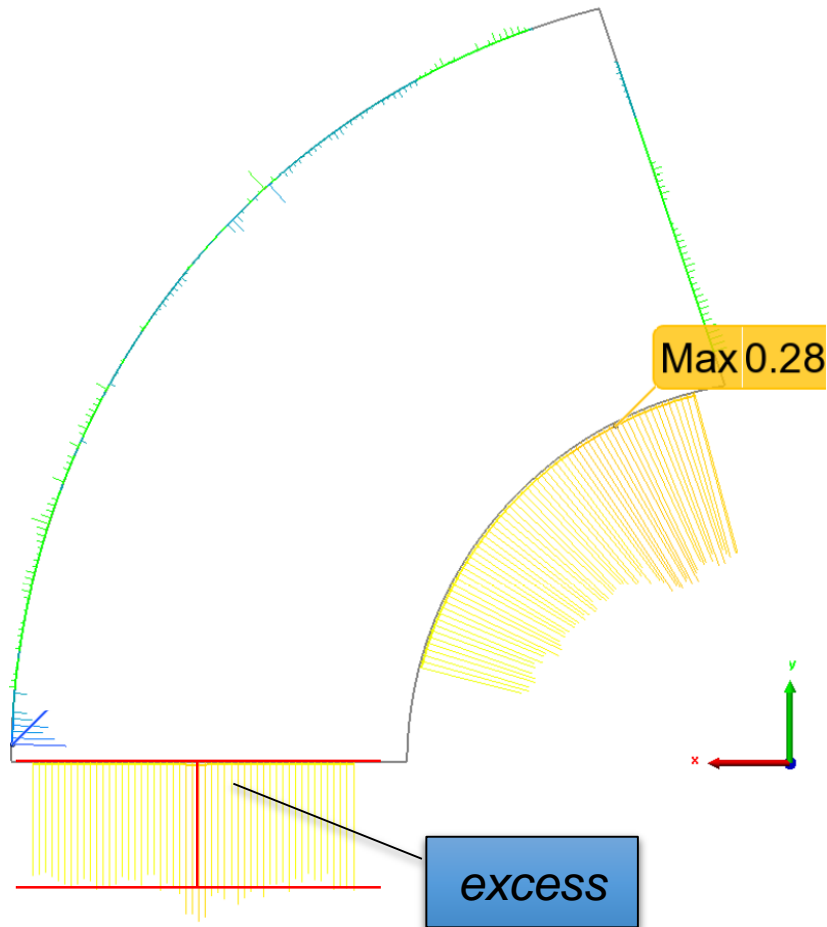
- Coil 108&109 very similar
- Coil 111 angle is on average positive, not like in 108&109
- Coil 110 has the biggest angle and deviation

# Loading plate angle summary

- Coil 111 was impregnated in tool #2 (like 108&109). Changing the mandrel in tool #2 for multipoint injection might have caused the noticeable difference (0.05° different orientation)
- Coil 110 is completely different than all the other coils, made in (tool #1 & #2). The angle is by a factor 3 bigger!
- *Angle errors on the loading plate can not be corrected with shims!*

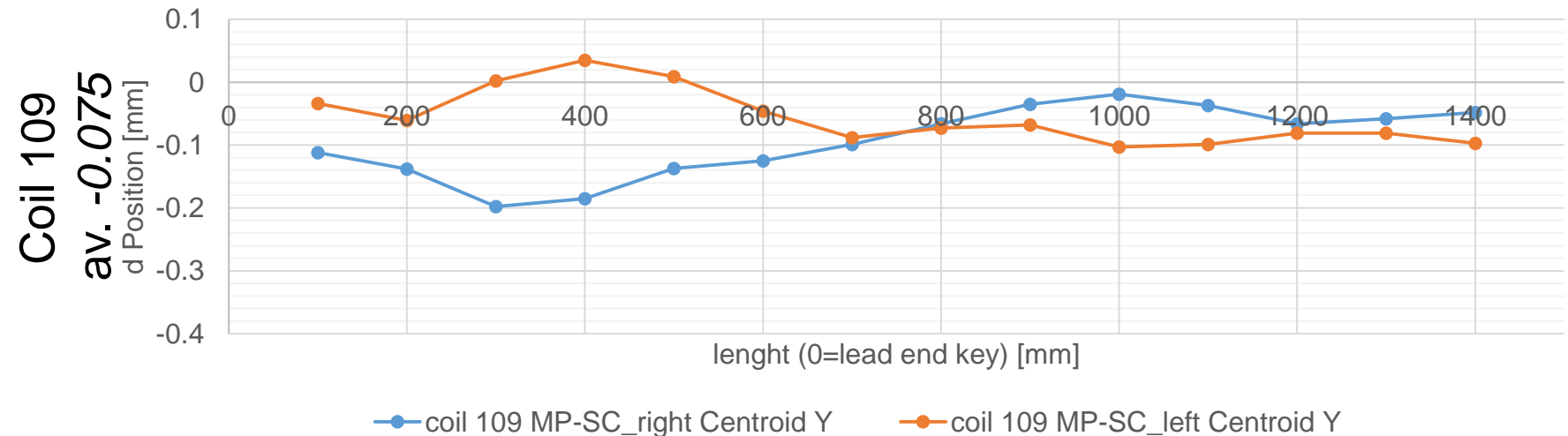
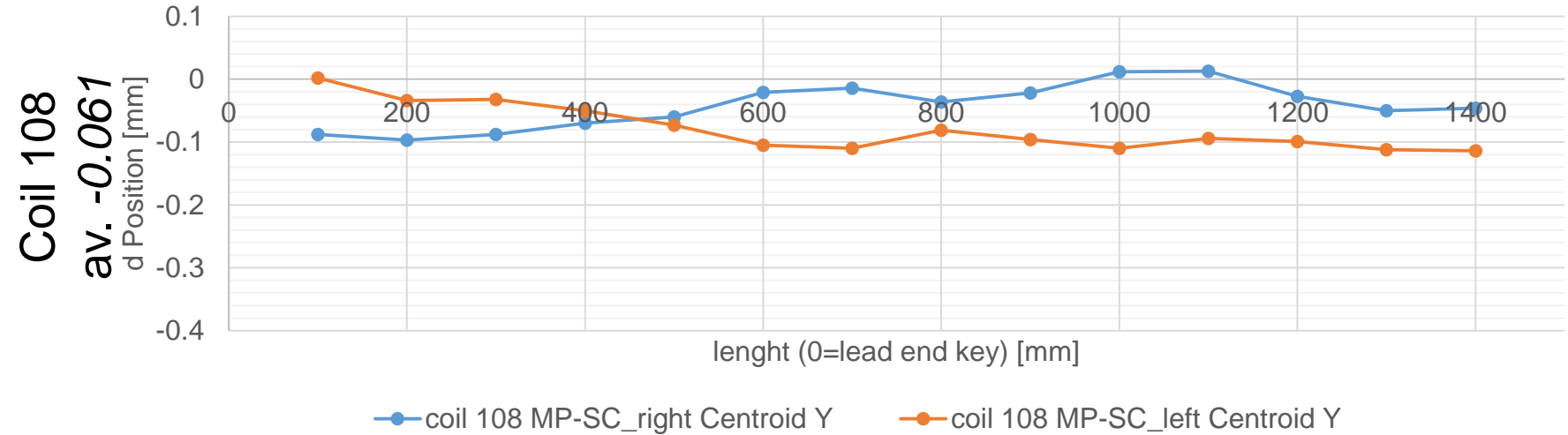


# Midplane excess

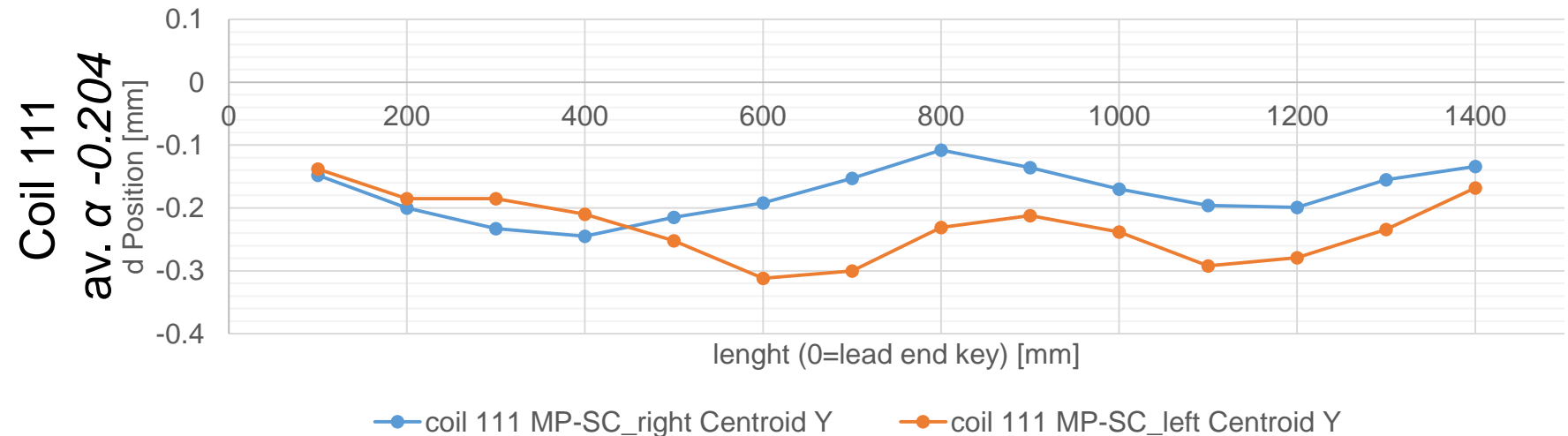
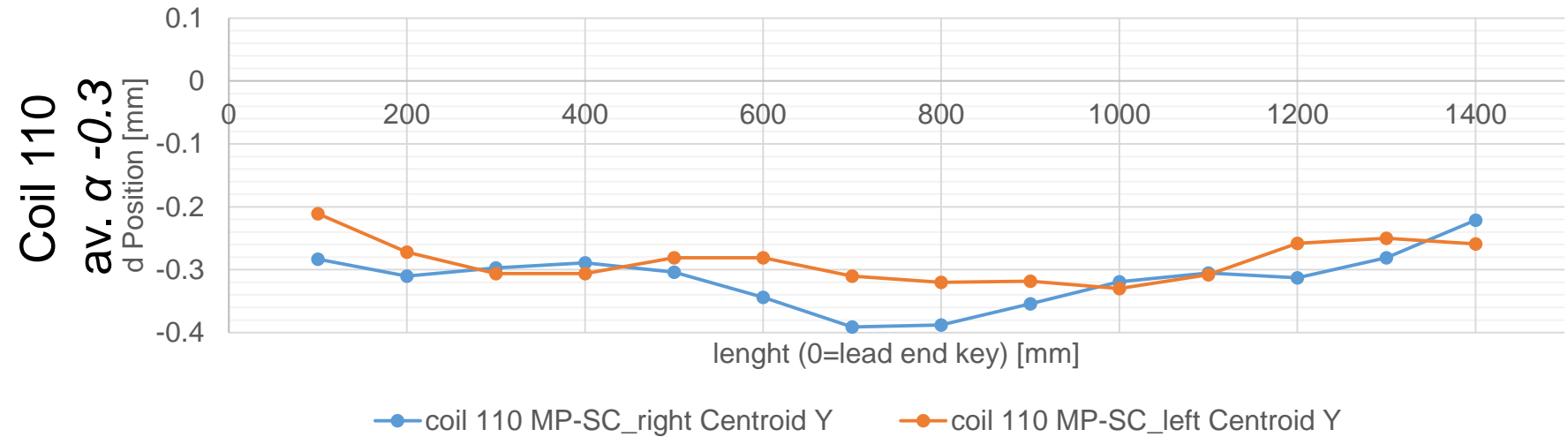


- midplane is “too big” when value is *negative* (below the coordinate system)
- Coil 108&109 are the current benchmark
- **50 $\mu$ m azimuthal difference =25MPa** (during powering)

# Midplane excess on 108&109



# Midplane excess on 110&111



# Midplane excess summary

	Average excess	ST.DEV excess
108	-0.061	0.039
109	-0.075	0.052
110	-0.3	0.04
111	-0.204	0.052

- The deviation of the excess is similar in all the coils
- Coil 110&111 are azimuthal much larger then the previous coils

# Summary

- Although the coils 110/111 are different in size compared to coils 108/109, this is probably not due to the injection method (single vs multiple injection points)
- The coil geometry depends a lot on the tool cavity
- In general, there is **no** improvement of the coil size, i.e. the deviations are of the same order of magnitude

# Summary

- The methodology used for coil 110&111 clearly altered the position of the LP and the midplane compared to previous coils
- Coil 109 will be paired with 111, the given coil geometry will result in a vertical and horizontal imbalance. Which needs to be corrected with the shimming.