

## Analysis - Feature #1670

### Magnetic Axis of FC2, USS and DSS

08 April 2015 10:01 - Blackmore, Victoria

<b>Status:</b> Closed	<b>Start date:</b> 08 April 2015
<b>Priority:</b> Normal	<b>Due date:</b>
<b>Assignee:</b> Blackmore, Victoria	<b>% Done:</b> 100%
<b>Category:</b>	<b>Estimated time:</b> 0.00 hour
<b>Target version:</b>	
<b>Description</b>	
<b>Related issues:</b>	
Follows Analysis - Support #1589: FC1 Magnetic Axis <span style="float: right;">Closed 13 November 2014</span>	

#### History

##### #1 - 08 April 2015 10:18 - Blackmore, Victoria

This issue summarises what we know (so far) about the magnetic axis of FC2, USS and DSS and the cross-checks that have been made.

- [Item #2](#): FC2 current axis estimates
  - Axis in mapper co-ordinate system
  - Axis w.r.t. fiducials in R9 co-ordinate system
  - Axis w.r.t. PCD
- [Item #3](#): USS current axis estimates
  - Axis in surveyed co-ordinate system
- [Item #4](#): DSS current axis estimates
  - Axis in surveyed co-ordinate system
- [Item #5](#): Method summary
- [Item #6](#): Alternative axis cross-check using |B|
- ...

##### #2 - 08 April 2015 10:19 - Blackmore, Victoria

### FC2 axis estimates

The mapper was centred and surveyed w.r.t. the centre defined by the inner flanges of the warm bore. This was related to the fiducials by a second survey within the R9 network of survey nests. First determine the axis in the mapper's co-ordinate system, then translate to the R9 network.

- Define '\_z\_' as the longitudinal co-ordinate
- Define '\_x\_' as the horizontal co-ordinate
- Define '\_y\_' as the vertical co-ordinate

### Magnetic axis in the mapper system

- The magnetic axis is assumed to be a straight line (as the coils are wound on a common bobbin), which has the form:
  - $x = az + b$
  - $y = cz + d$
- $a$  and  $c$  are rotations around the  $y$  and  $x$  axes respectively,  $b$  and  $d$  are offsets.
- Within the mapper system, the two flanges are at approximately  $z = 918\text{mm}$  and  $z = 1762\text{mm}$  (the latter being the side with the inner flange).
- Have determined the  $(x, y)$  co-ordinates of the axis at these locations, and the equation of their lines, at different currents and in Flip and Solenoid mode.

##### #3 - 08 April 2015 10:19 - Blackmore, Victoria

USS axis estimates

[Placeholder]

##### #4 - 08 April 2015 10:20 - Blackmore, Victoria

DSS axis estimates

[Placeholder]

##### #5 - 08 April 2015 10:20 - Blackmore, Victoria

Method summary

[Placeholder]

**#6 - 08 April 2015 10:20 - Blackmore, Victoria**

Alternative cross-check using |B|

[Placeholder]

**#7 - 26 June 2015 14:27 - Rogers, Chris**

Note talk at CM42

<https://indico.cern.ch/event/374187/session/6/contribution/29/material/slides/1.pdf>

**#8 - 27 January 2016 07:27 - Rogers, Chris**

- *Status changed from In Progress to Closed*

- *% Done changed from 50 to 100*

I think this is closed... can reopen a new issue after the realignment work done in Feb