

# Cylinder dressing

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- Need to glue locking brackets on the four cylinders
  - In total 2156 brackets of different geometry
  - Starting end of this year (2020)
- A first round of design is done and we are now building a prototype
- Have presented the current status as supplementary information to the Structures PRR in December (went well)
- Need to present status at ITk week, the probably again as supplementary information at Stave Core FDR in February
- Would like to get an ATLAS internal review in the summer

# Bracket types

Brackets have two main functionalities:

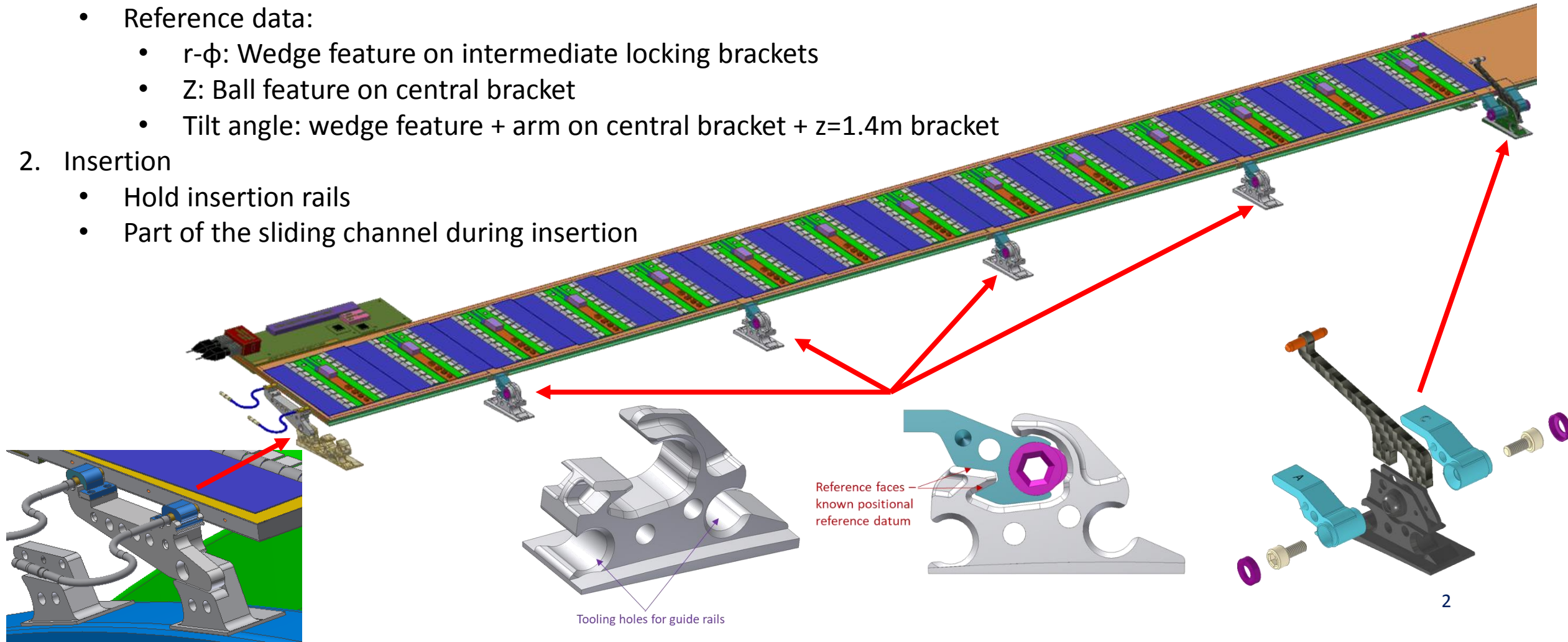
## 1. Support and position the staves

- Reference data:
  - $r-\phi$ : Wedge feature on intermediate locking brackets
  - Z: Ball feature on central bracket
  - Tilt angle: wedge feature + arm on central bracket +  $z=1.4m$  bracket

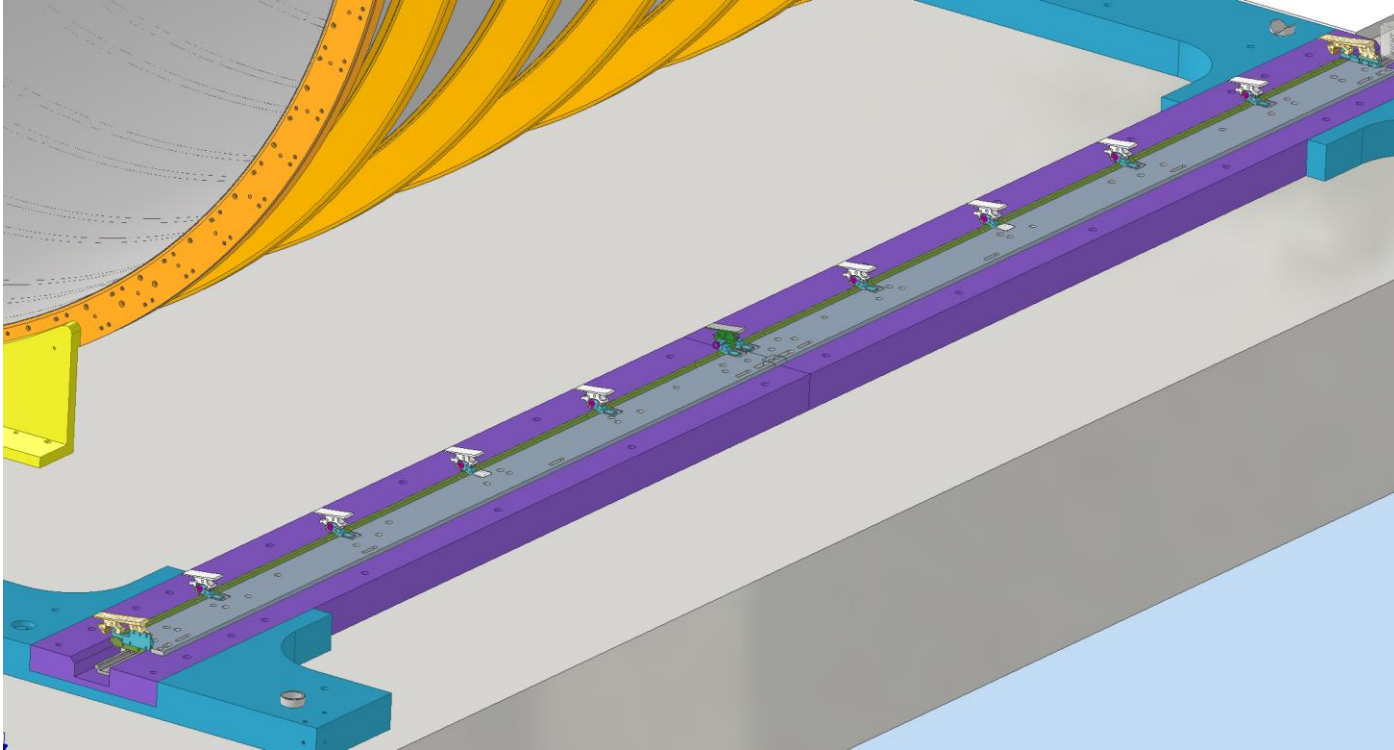
## 2. Insertion

- Hold insertion rails
- Part of the sliding channel during insertion

One end shown

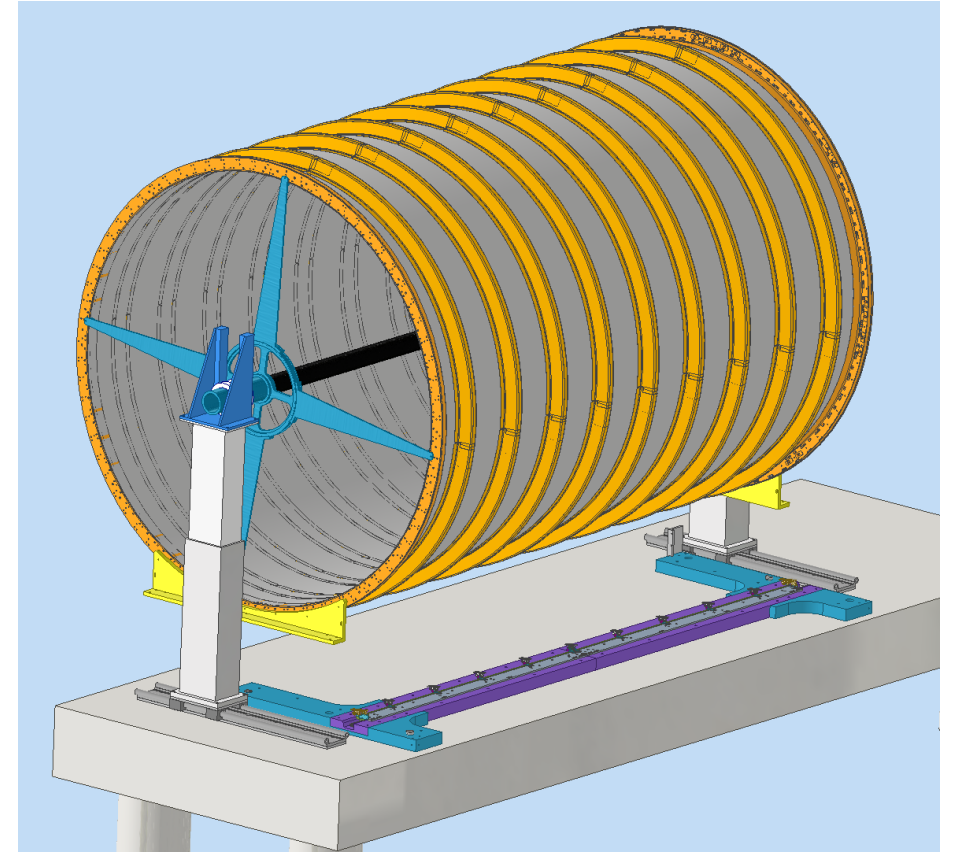


# Procedures



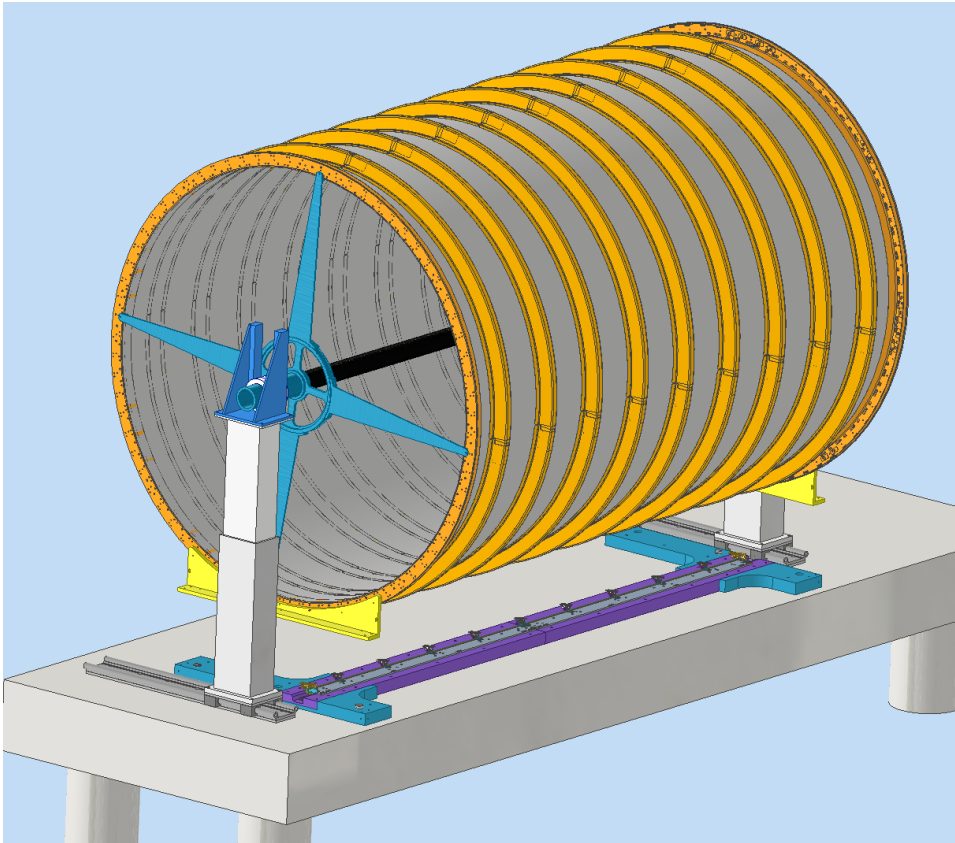
- Brackets are slid onto the lock points on the main jig and the lock points are locked using a hex key. This defines bracket positions.

- A dry run of the lowering is performed to verify correct setup
- Cylinder is lifted again and moved to the side

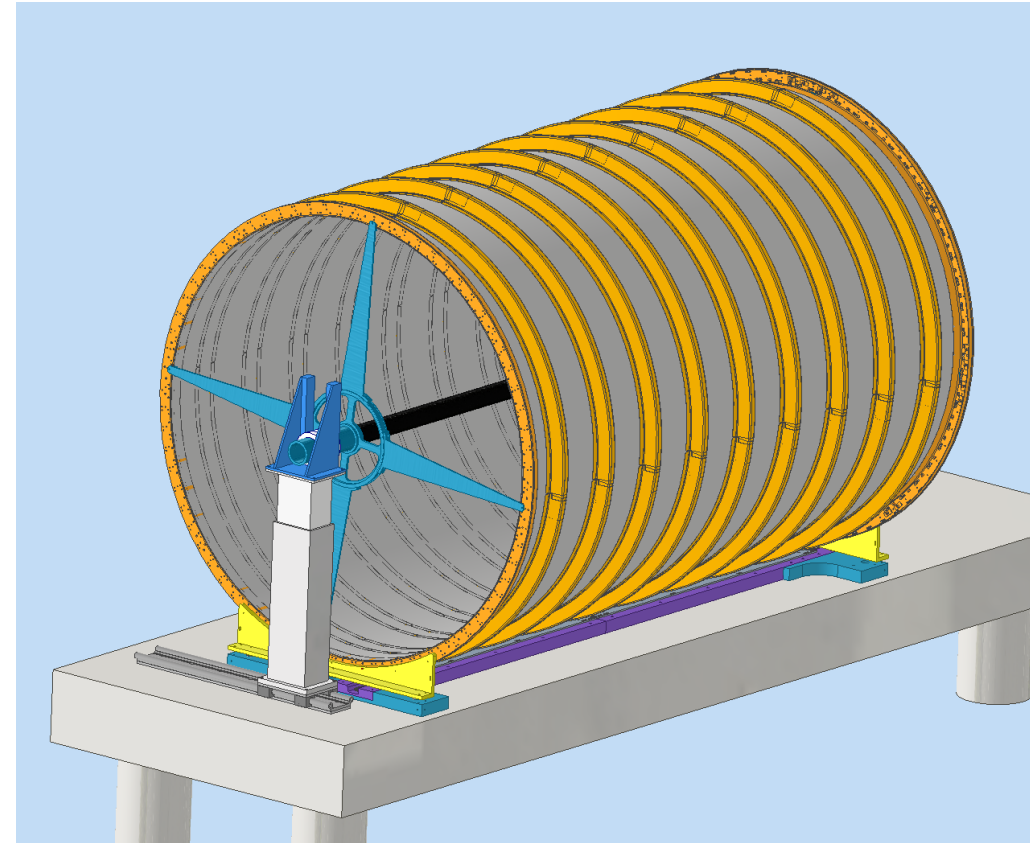


- Cylinder is located on lifting jacks
- Support plates are mounted on flange

# Procedures cont'd



- Glue is applied to the bracket bases (facing upwards)
- Move the lifting jacket carriages to position

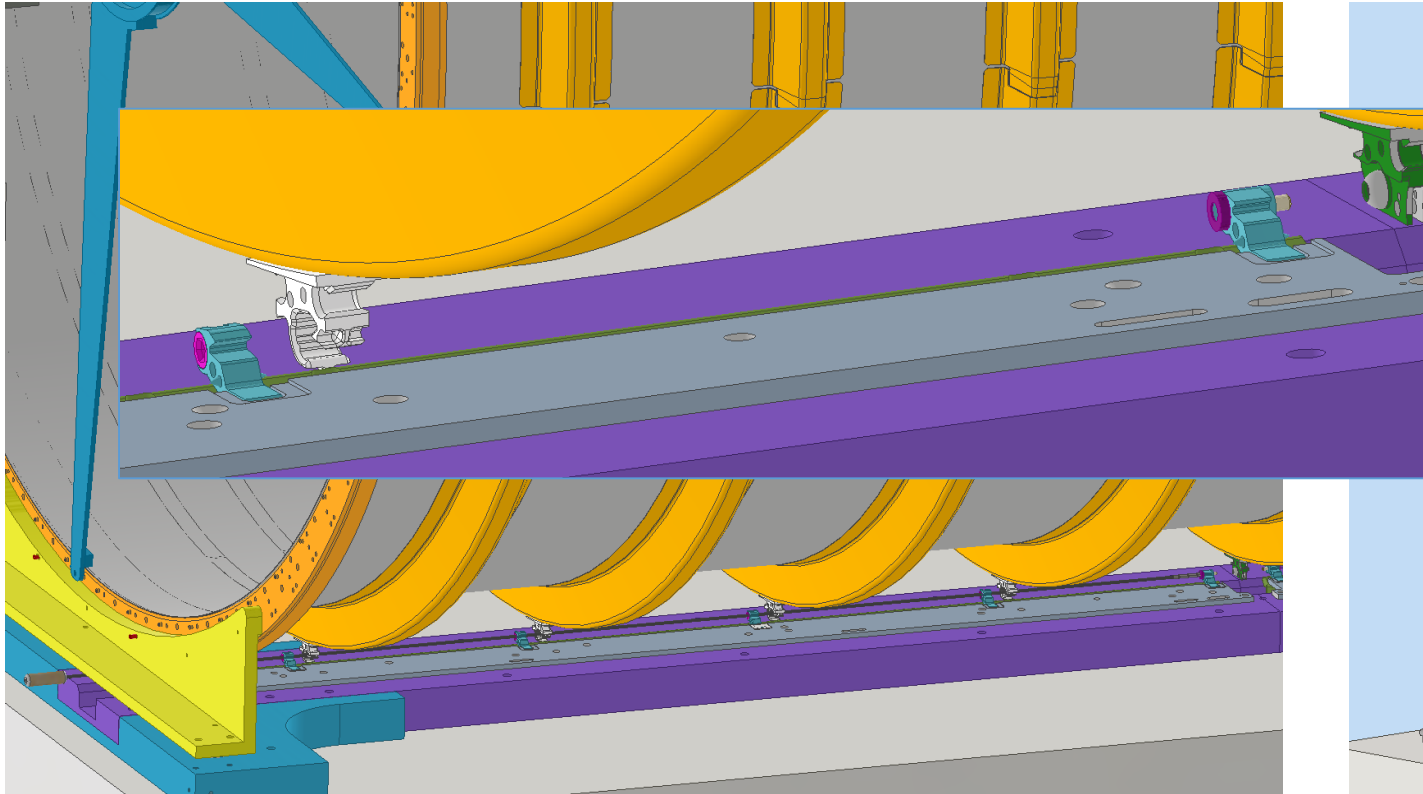


Cure...

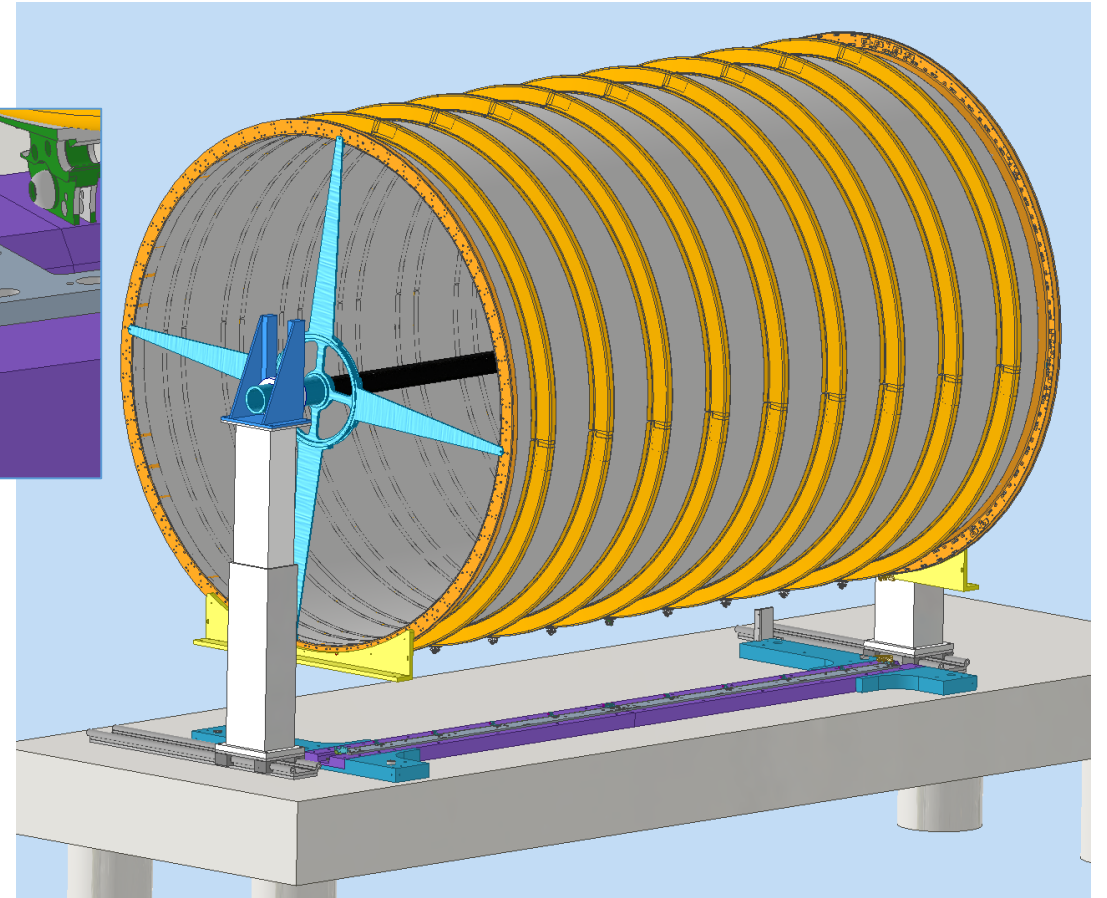
- Lower the cylinder until contact is made by the kinematic supports
- Weight is transferred to the kinematic supports, spindle disengages
- This positions the cylinder with respect to the main jig



# Procedures cont'd



- After cure, stave lock points are unlocked using long Allen key from the end
- Rulers slides sideways by ~20 mm to free brackets



- Cylinder is picked up by lifting jacks again
- Support plates are removed
- Ready for next row

# Production timeline

L3	cylinder at Oxford and inspect	4/12/2020 - 17/12/2020	10d
	install lock points	18/12/2020 – 18/2/2021	45d
	inspect lock points	19/2/2021 – 25/2/2021	5d
L2	cylinder at Oxford and inspect	25/2/2021 – 3/3/2021	5d
	install lock points	4/3/2021 – 24/3/2021	15d
	inspect lock points	25/3/2021 – 5/4/2021	8d
L1	cylinder at Oxford and inspect	11/10/2021 – 18/10/2021	6d
	install lock points	19/10/2021 – 1/11/2021	10d
	inspect lock points	2/11/2021 – 9/11/2021	6d
L0	cylinder at Oxford and inspect	15/8/2022 – 22/8/2022	6d
	install lock points	23/8/2022 – 31/8/2022	7d
	inspect lock points	1/9/2022 – 8/9/2022	6d

- L3: 72 rows in 45d = 1.6 rows/d
- L2: 56 rows in 15d = 3.7 rows/d
- L1: 40 rows in 10d = 4 rows/d
- L0: 28 rows in 7d = 4 rows/d
- Target processing time per row: 2 – 3 h

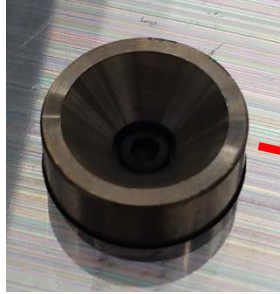
# Prototyping

- We have an old SCT carbon fibre cylinder
  - Dimensions are not correct, but we can adapt (special support bracket etc.)
- A full prototype of the jig with rulers is being made
  - Lancaster had to help because our workshop was overloaded
  - Now doing some modifications and then survey using CMM and VSTARS
- This is in principle fully functional and could be the final tool
- No lifting gear yet, cylinder will be moved manually
- Goal is to practise gluing rows of brackets and to survey location achieved using the CMM

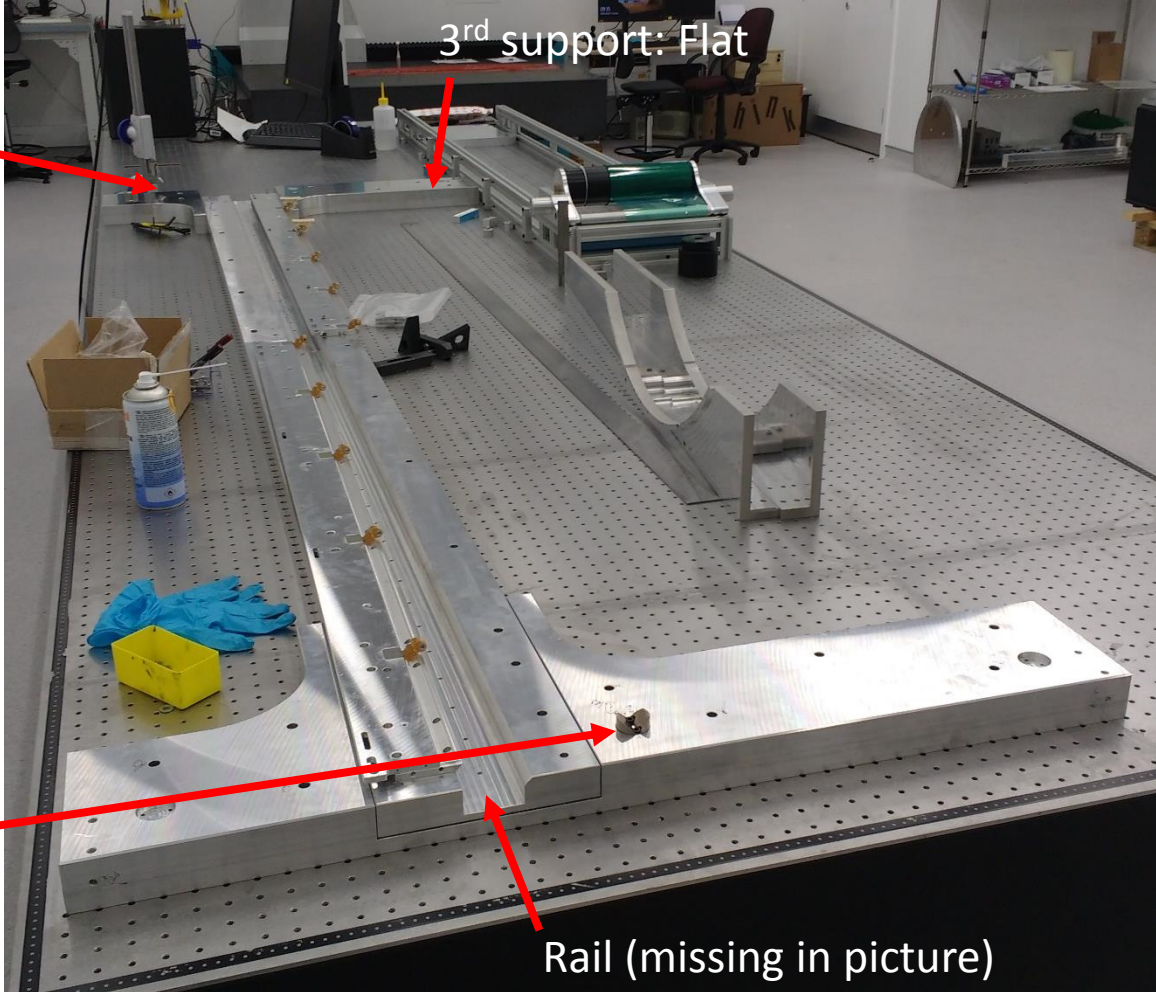




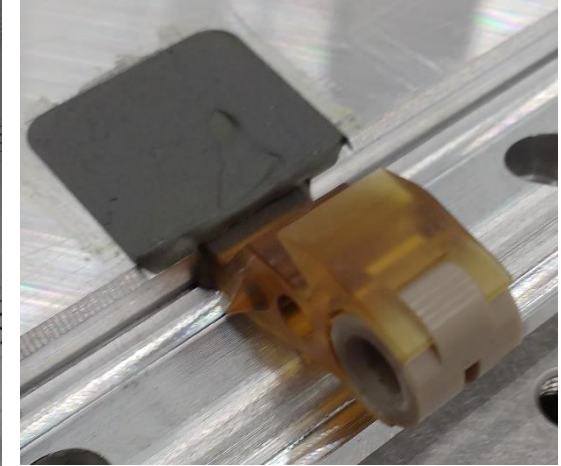
# Gluing jig



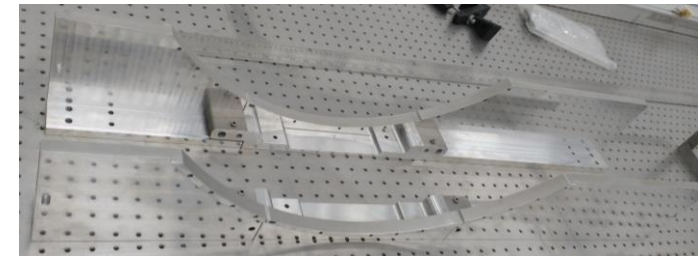
Kinematic supports



Rail (missing in picture)



Ruler with lock points to support brackets  
(Identical to stave lock points)



Support brackets for dummy cylinder