WILLIAM E. BOEING DEPARTMENT OF
AERONAUTICS & ASTRONAUTICS
College of Engineering

Flexure Replacement Procedure

Version 1.0, <Date 2024-05-18>

SPACE Lab Capstone

Date: _____ / _____ / _____
yyyy mm dd

Part Number: _____

Serial Number: _____

Initials: _____, _____, _____, _____

Objective

Procedure for flexure replacement for the inverted pendulum test stand. The test stand will be assumed to be fully assembled, with all 4 pendulum arms with flexures installed. Flexures shall be changed depending on the size of the thruster being tested, such that the proper range of measurements can be determined from the stand deflection.

Verify through testing that the system meets all requirements and validate it can complete the mission objective.

You must make this objective more specific by identifying actionable parts:

- what are the requirements/hypothesis being verified, with specific **quantities** to be checked
- what are the data you plan to collect

Equipment Required

Qty	Description	Specs/Calibration	Check

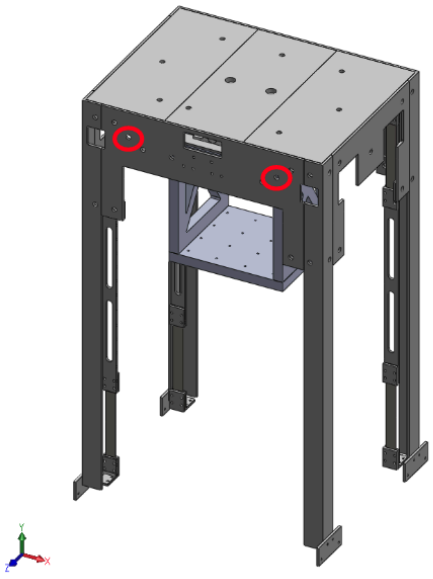
1	Inverted Pendulum Test Stand	Built by SPACE Lab Capstone team	*Initials of the person who got the equip ment*
3	Stainless steel bolts	1” length, 0.25” diameter	
1	Phillips head screwdriver	PH1	
1	Box end wrench	0.25”	
1	Socket driver	3/16” attachment	

Test Procedure

PRD 1 Flexure Replacement Procedure (~25 min)

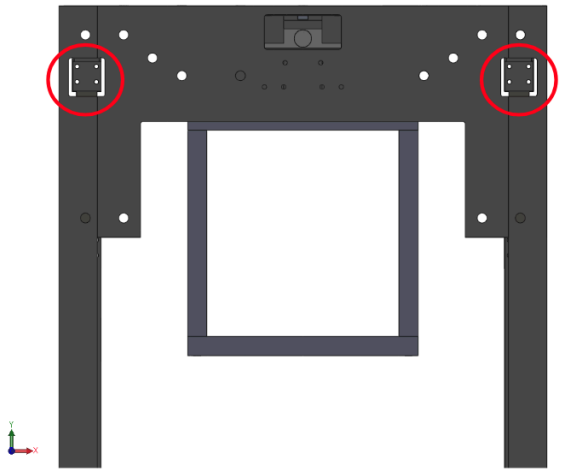
PRD 1.1 Pendulum Arm Removal

1. Insert 3” long, 0.25” diameter bolts into holes indicated with red circles below. These bolts should fit under the top of the pendulum in order to support the pendulum while flexures are removed.



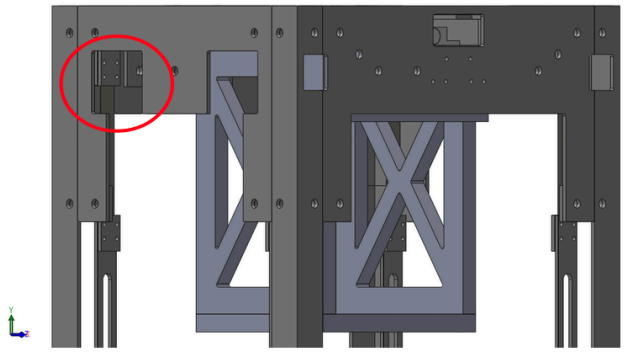
Ortho view

2. Once the pendulum top is supported, access bolts through cut out, indicated in red circles below, using a size PH1 phillips head screwdriver



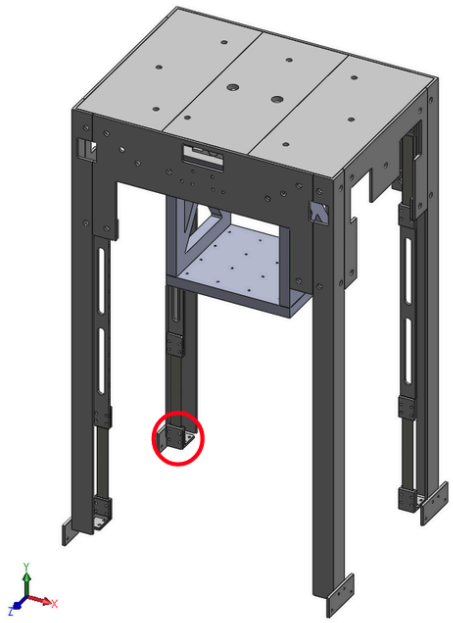
Front view

Access the nuts on the other side of the pendulum arm through the cut outs indicated with red circles below. Using a ¼” box end wrench to counter hold the nuts, fully loosen each bolt using the screwdriver. Remove each nut, but leave bolts and the upper flat bracket in place to keep pendulum arm supported.



? view

3. At lower flexure access nuts and bolts on corner bracket indicated below in red circles



Ortho view

Using socket driver with 3/16” socket attached, loosen nuts on lower flexures while counter holding bolts using ¼” box end wrench. Remove nuts, bolts, and the lower flat bracket from the pendulum arm.

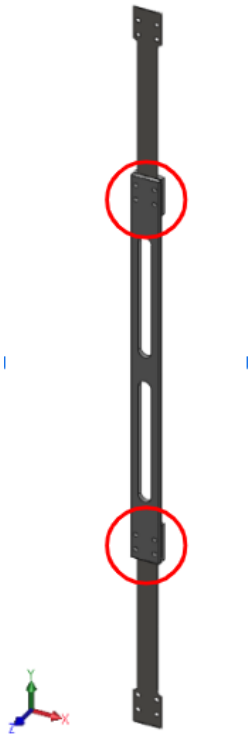
4. Remove pendulum arm without corner brackets, shown below.

Ortho view

5. Repeat procedure for other 3 pendulum arms.

PRD 1.2 Flexure Removal

1. With pendulum arms removed from pendulum, remove nuts, brackets, and bolts from pendulum arms and remove flexures. Place removed flexures with flexures of the same thickness to avoid confusion.



Ortho view

2. Install new flexure onto the pendulum arm by reversing PRD 1.2.
3. Install pendulum arms with new flexures by reversing PRD 1.1.
4. Remove 0.25” support bolts from the pendulum frame.