

DeckWise Destructive Compression Testing

Tool Testing Lab, Inc.

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1. Title

Destructive Compression Test

2. Objective

Test new product for Deckwise under 4 different conditions, and report the point of failure.

Tool Testing Lab, Inc. is not responsible for any possible manufacturer defects. All data is based on test samples provided.

3. Tested For

DeckWise

4. Testing Organization

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5. Reference Equipment

TTLS042- MOREHOUSE 50K load cell

TTLPT017- FLUKE 2638A DATA ACQUISITION UNIT

6. Test Description

Samples to be tested were provided by the client. Sample height was approximately 24in. A hydraulic press capable of generating 55 tons was used for testing. With a 50 Kip MOREHOUSE load cell in combination with a Fluke data acquisition unit was used to record the loading of the sample. Samples we set in the press and loaded until failure.

7. Test Results

a. Sample Level, base completely retracted

Sample	Peak Load	Comments
S1	12,135	At Time 43.89 sec. First major failure of top piece
S2	11,941	At time 55.11 sec First Major Failure of top piece
S3	10,374	At time 30.06 First Major failure of top piece
	Ave:11,483	

*note loading rate are not uniform

Sample S1

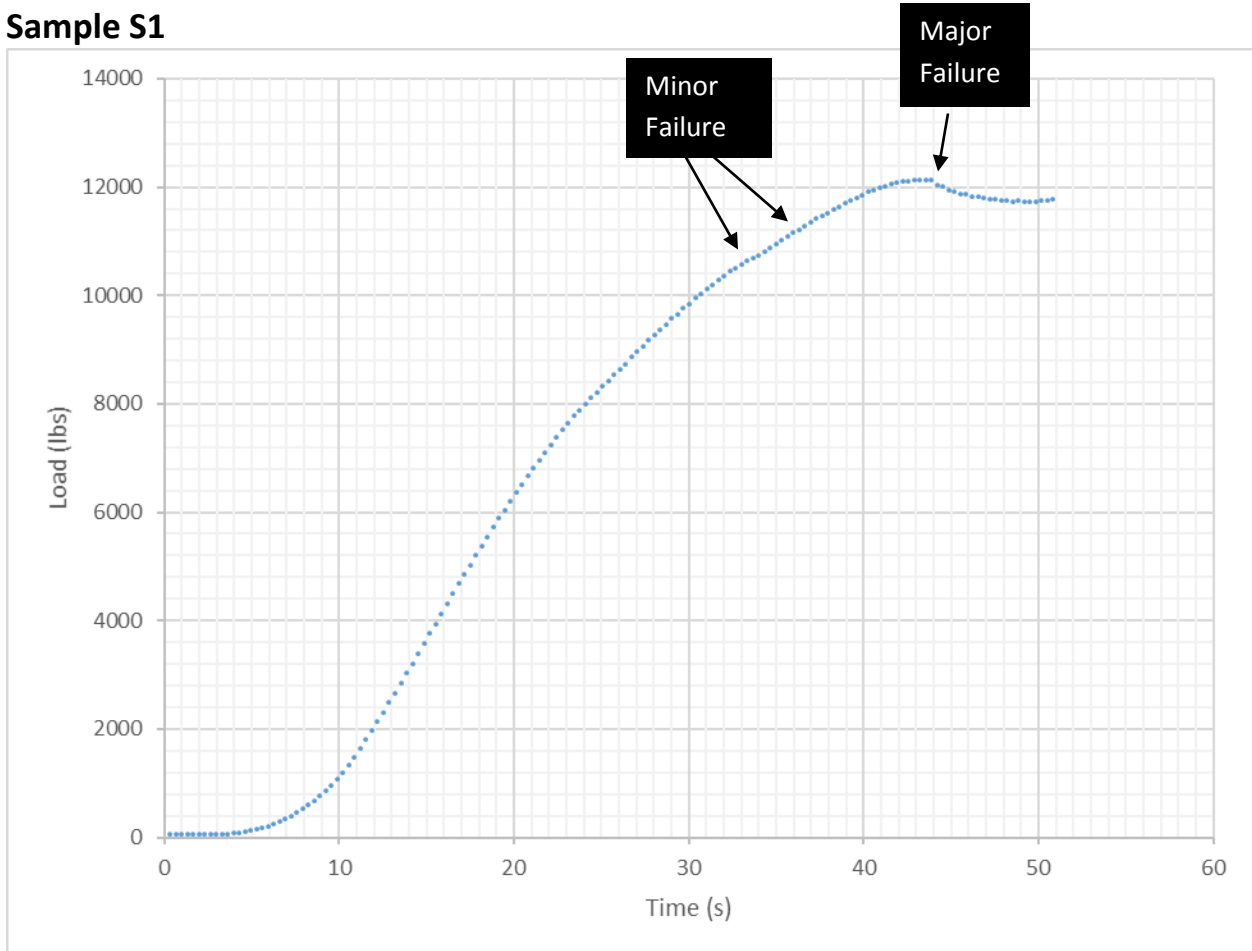


Figure 1

. A few non critical cracks occur around the 34 second mark this can be heard on the video as well as seen by a slight dip in the graph. The sample continued to be loaded until a major crack is heard around the 45 second mark this is also denoted in the graph by a sharp dip in the load signaling a critical failure. This sample failed in top cup.

Sample S2

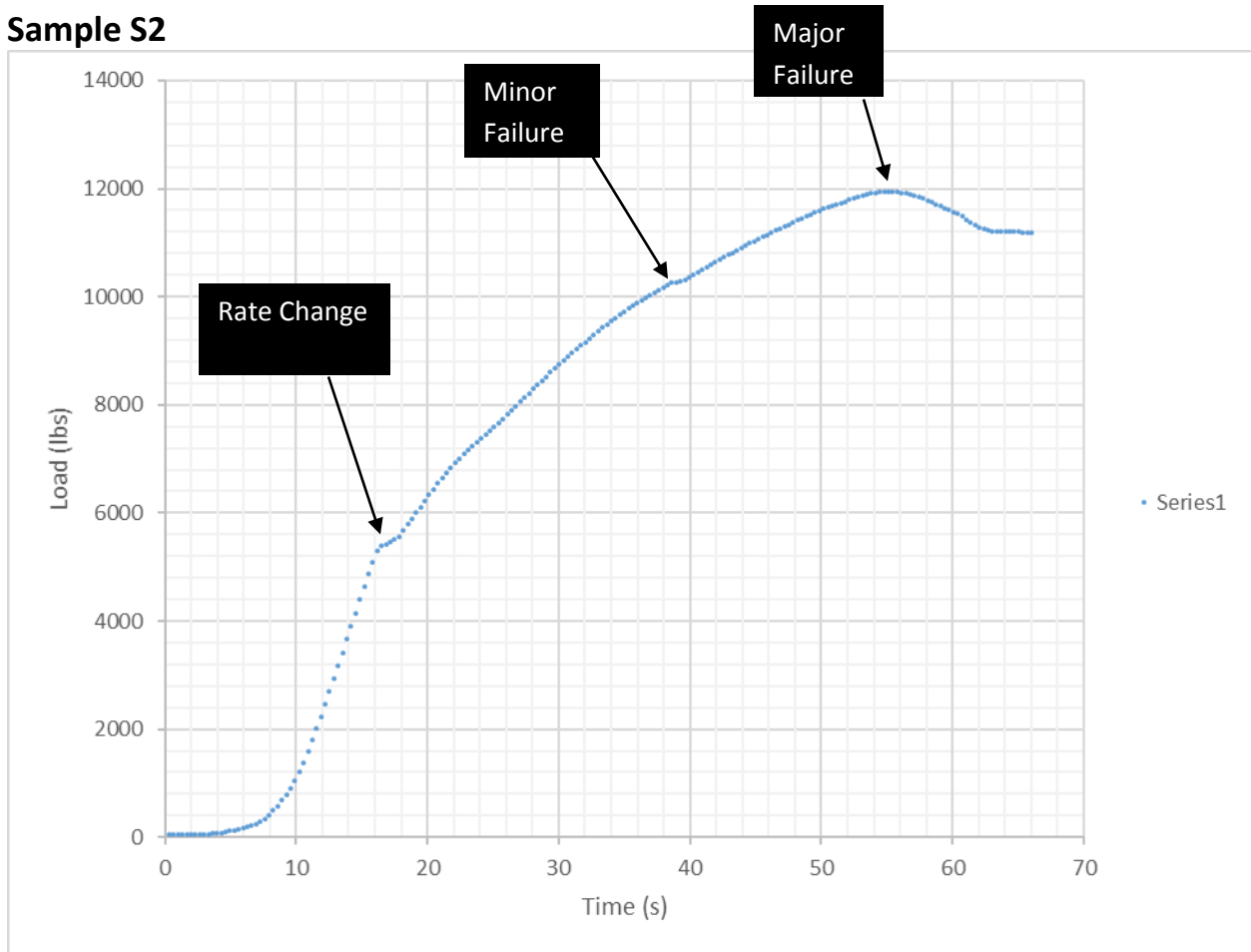


Figure 2

The load rate was slowed around the 13 second mark to allow for better data collection. A non-critical cracks occurred around the 40 second mark and a second non-critical crack occurred around the 45 second mark. The major failure occurred around the 55 second mark. Failure occurred in the top cup of the sample.

Sample S3

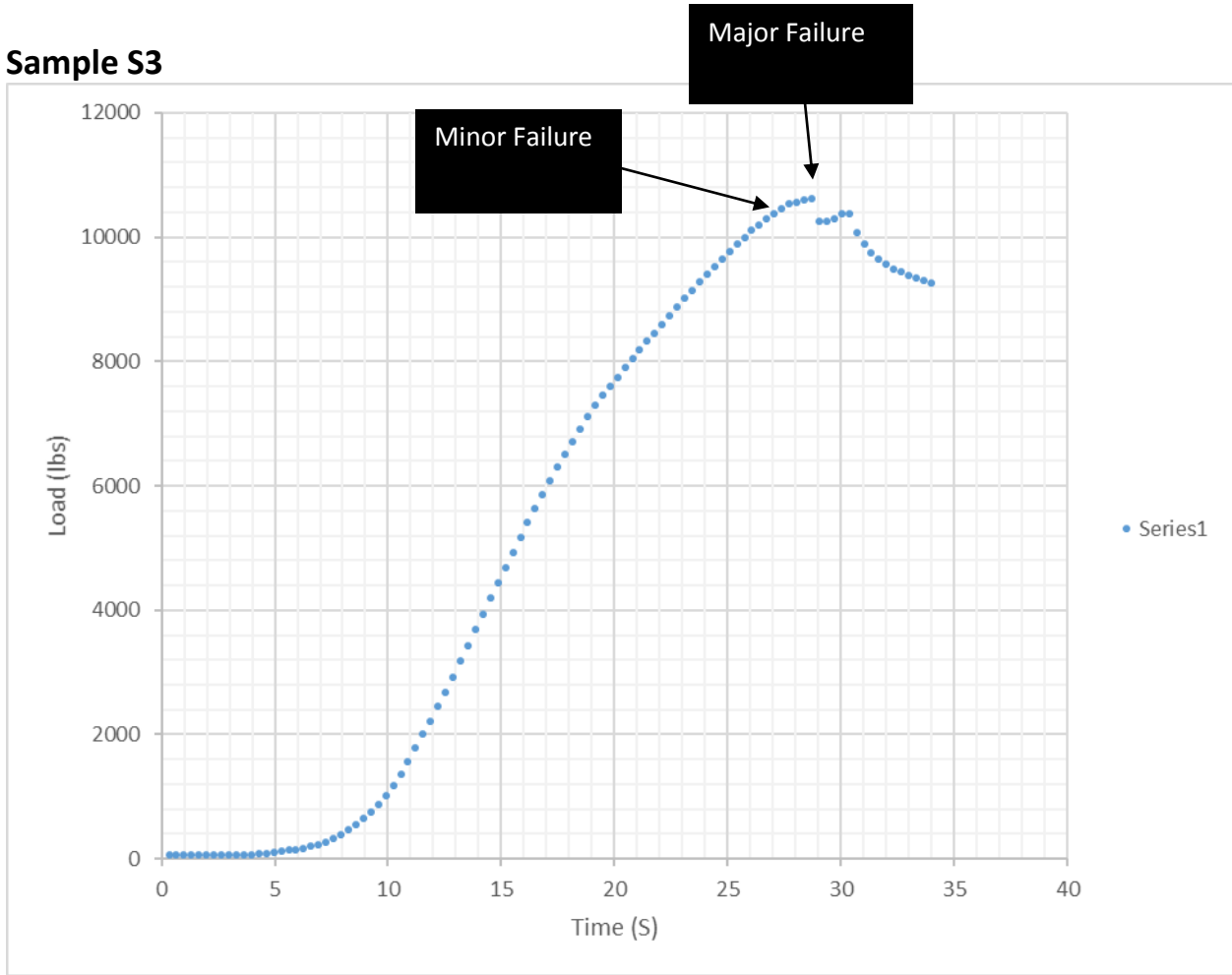


Figure 3.

This sample was loaded at a faster rate than the other samples. For this sample the major and minor failures occurred about the same time, additionally a more distinctive failure was observed. The mode of failure for this sample is the top cup.

Sample Level, base extended four turns

Sample	Peak Load	Comments
S4	6,445	At Time 12.54 sec. First major failure of bottom piece
S5	6,344	At time 16.17 sec First Major Failure of bottom piece
S6	6,379	At time 16.5 First Major failure of bottom piece
	Ave: 6,389	

Sample S4

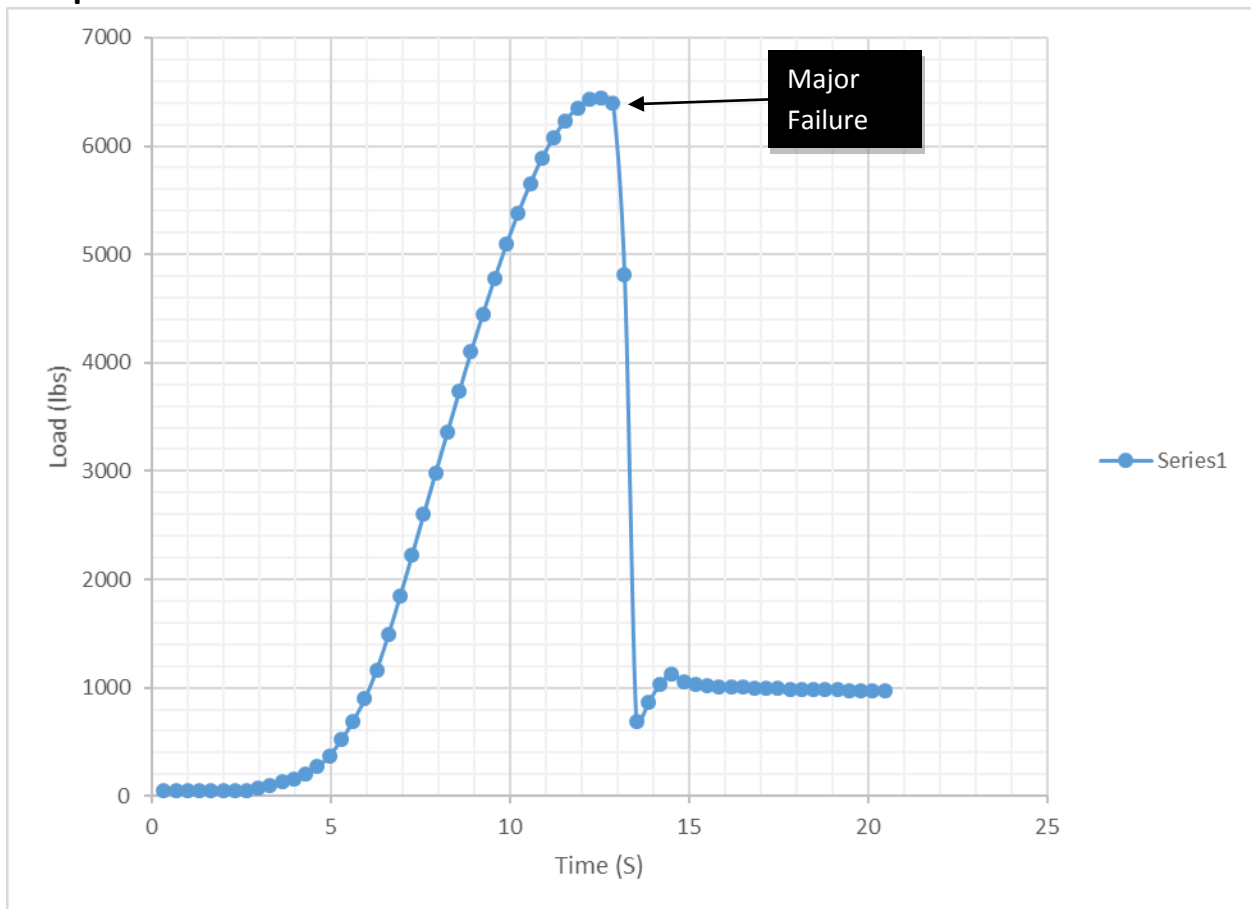


Figure 4.

In this test the failure is critical and easy to see it occurs about the 13s of the test. The base is the mode of failure for this test. During testing you can see the base begin to deform then fail.

Sample S5

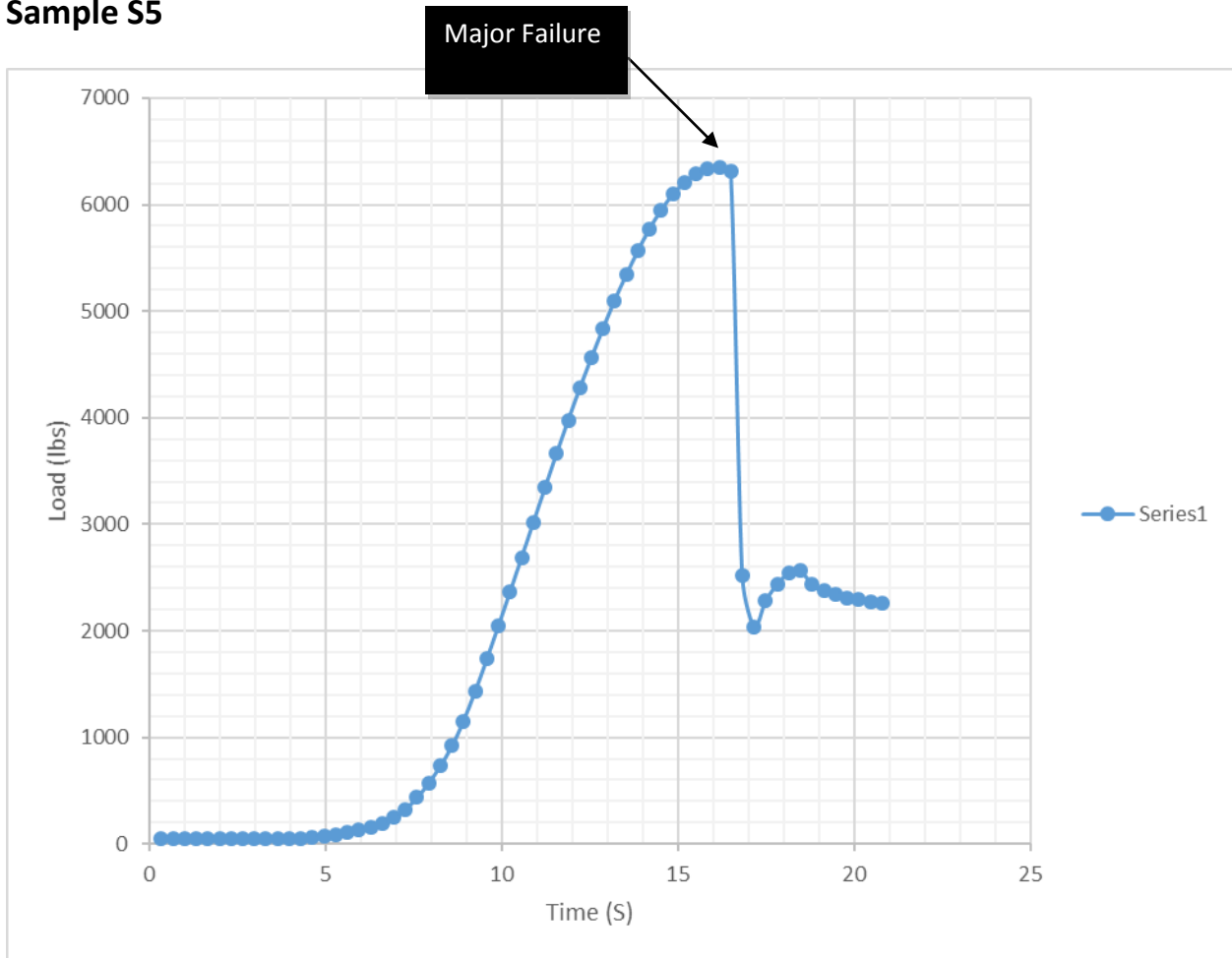


Figure 5

Obvious failure for this test happens around the 16 second mark. Again the part failure mode for this part was the base right at the threads where the mold halves join during injection.

Sample S6

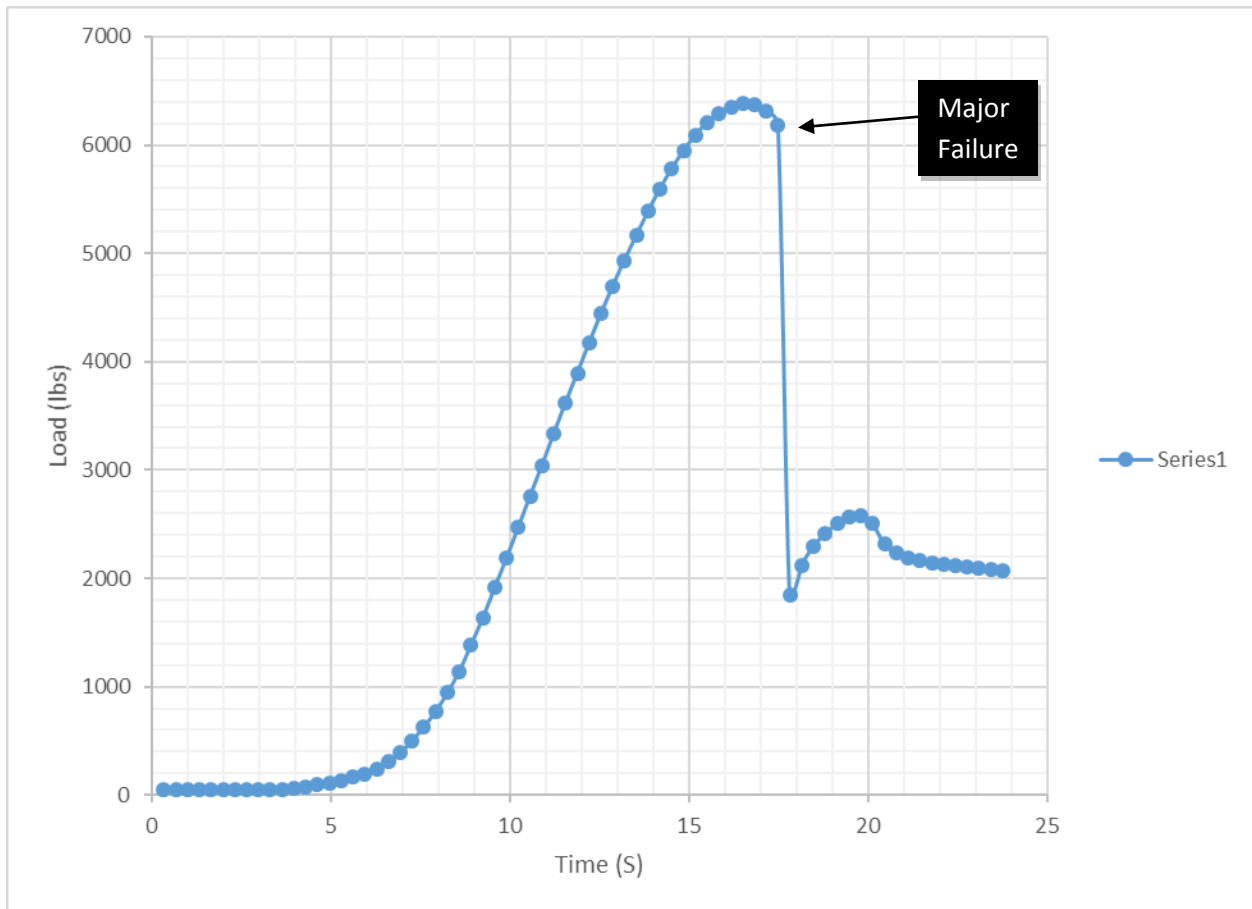


Figure 6

This sample failed at the base. The failure can clearly be at the 17 second mark. Again this failure can be seen during testing as the base section compresses as plastic deformation takes place the black base starts to turn white then failure occurs.

Sample at 6% slope, base completely retracted

Sample	Peak Load	Comments
S7	13,407	At Time 21.45 sec. First major failure of top cup
S8	12,589	At time 24.75 sec First Major Failure of top cup
S9	15,822	At time 41.91 First Major failure of top cup
	Ave: 13,939	

Sample S7

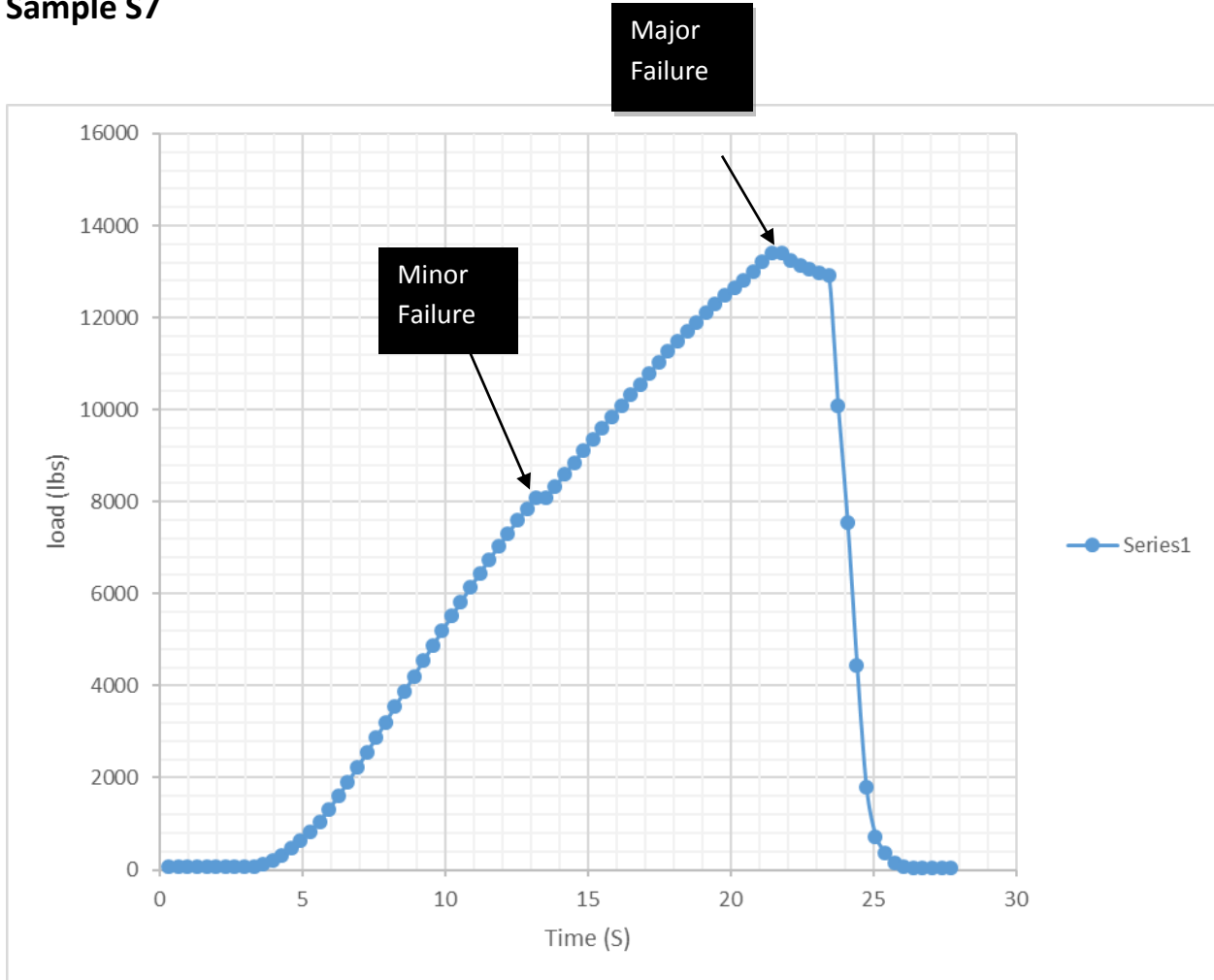


Figure 7

The mode of failure in this test the top cup. A Minor failure happened around 13 seconds loading was continued until a critical failure was reached around 21 seconds. Pressure was released around 23rd second. Resulting the the load drop down to zero.

Sample S8

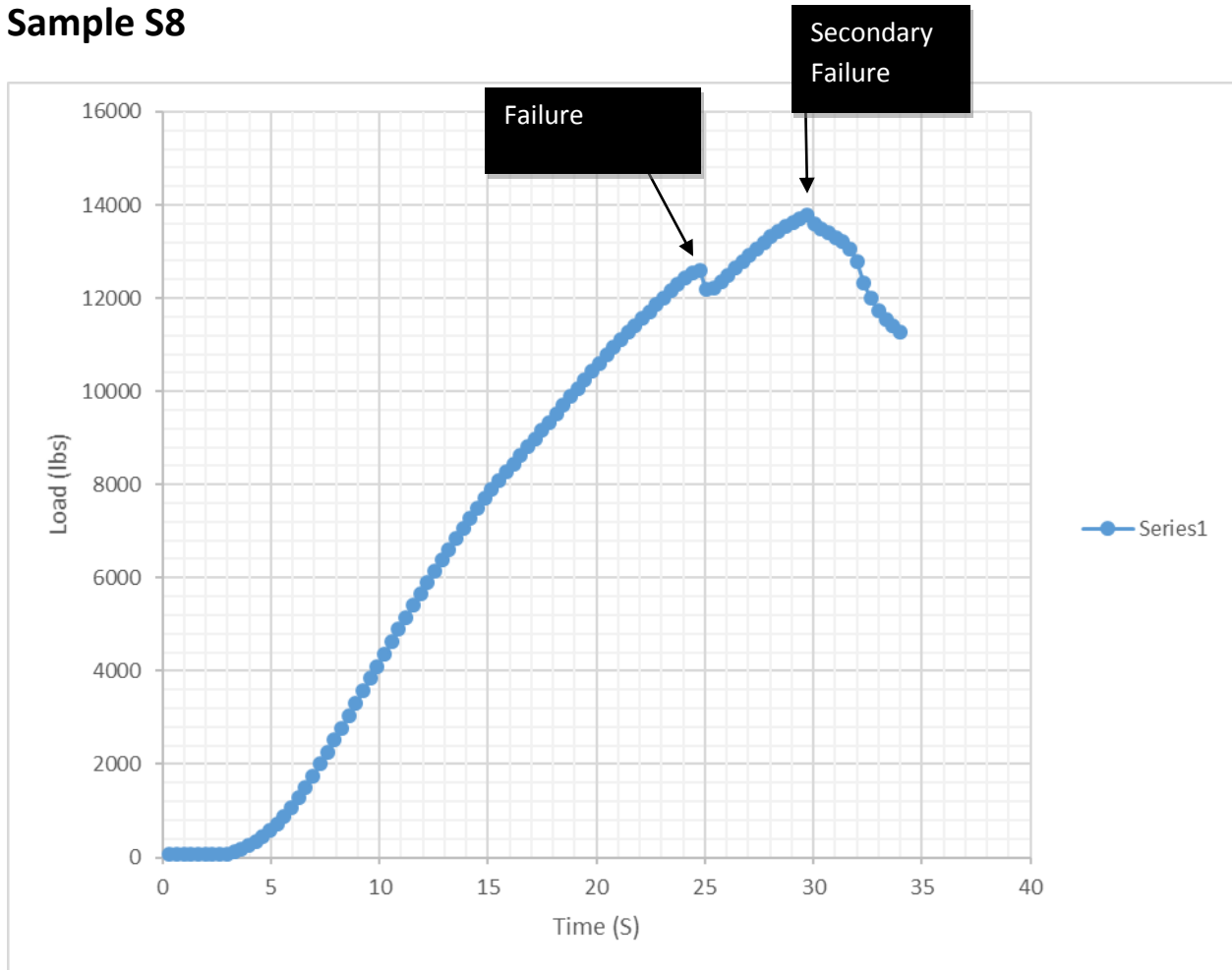


Figure 8

This sample is a little harder to analyze. There is distinctive failure and unloading at the 25 second mark with around 12,300 lbs dropping to around 12,000 lbs. The sample continued to be loaded until a second failure was reported at the 30 second mark. At the 12,000 lb mark would make this sample the lowest failure point by about 1,000 lbs. It is my assessment that the test sample failed at the 25second mark. This conclusion is reached both by the evidence of the sample unloading seen in the graph and a visible jump of the sample in the testing. The mode of failure for this sample is the top cup.

Sample S9

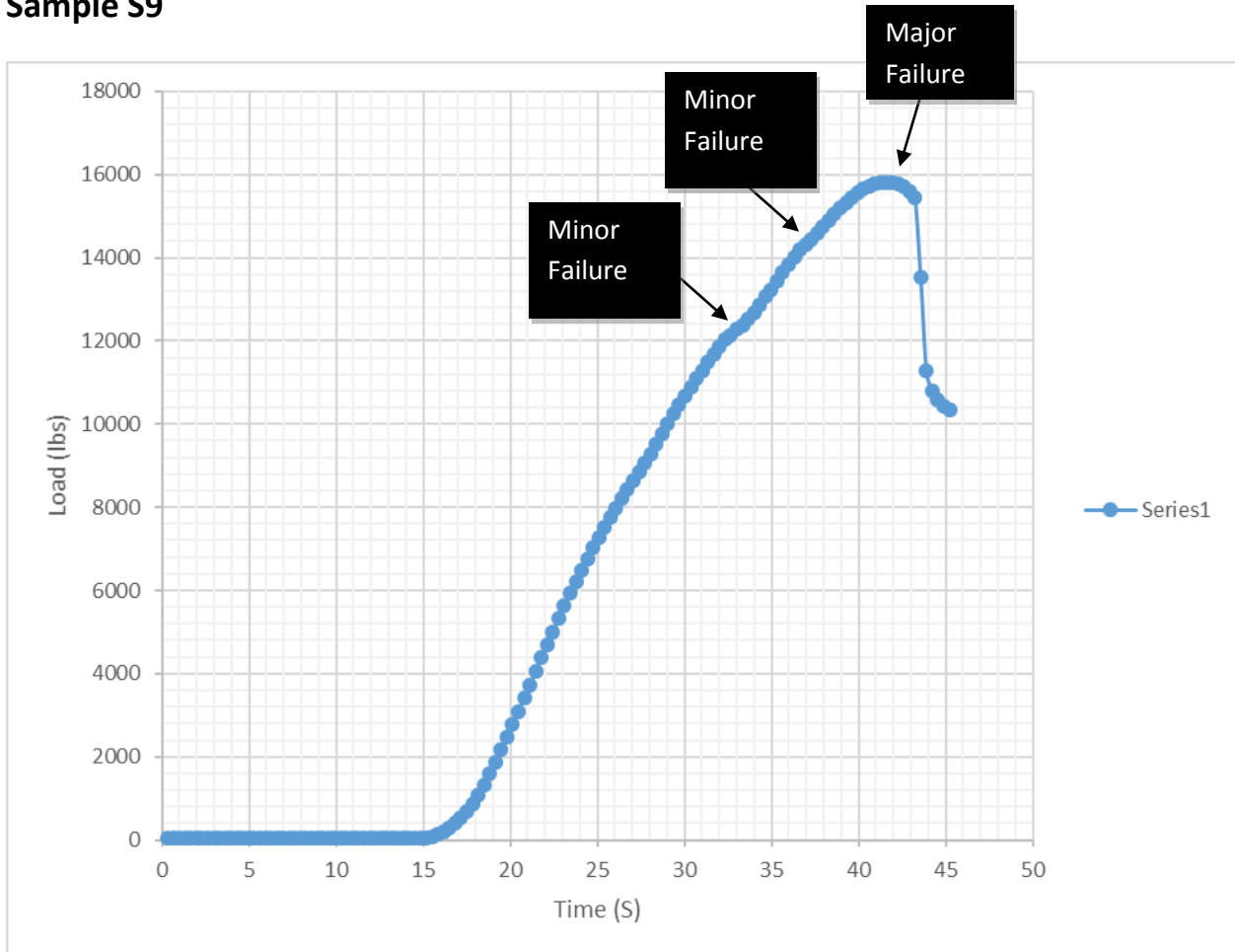


Figure 9

This sample was delayed in starting about about 15 seconds. Loading went of this sample was normal with 2 minor failure the first taking place about the 33 second mark. The second being around the 36 second mark both of these failure can be seen on the graph as well as heard in the testing. The major failure happened 42 second mark and can be seen on the graph. The mode of failure for this sample was the top cup.

Sample at 6% slope, base extended four turns

Sample	Peak Load	Comments
S10	6,145	At Time 13.53 sec. First major failure of Base
S11	5,392	At time 12.87 sec First Major Failure of Base
S12	6,385	At time 12.54 First Major failure of Base
	Ave: 5,974	

Sample S10

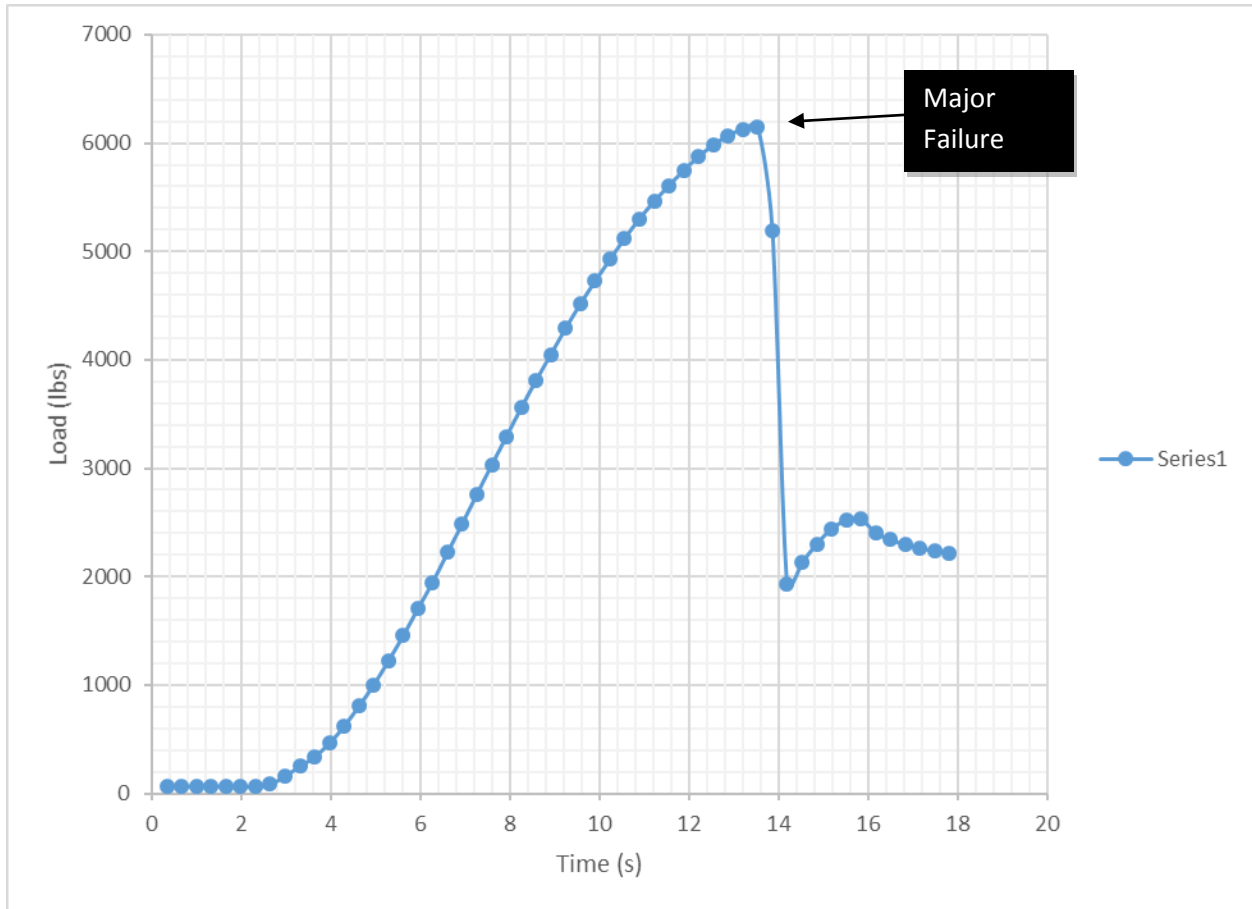


Figure 10

The mode of failure for this sample is the base of the sample. With a similar loading pattern to sample 4,5,6. With a distinctive failure around the 13 second mark. The failure occurred around at the threads in the base.

Sample S11

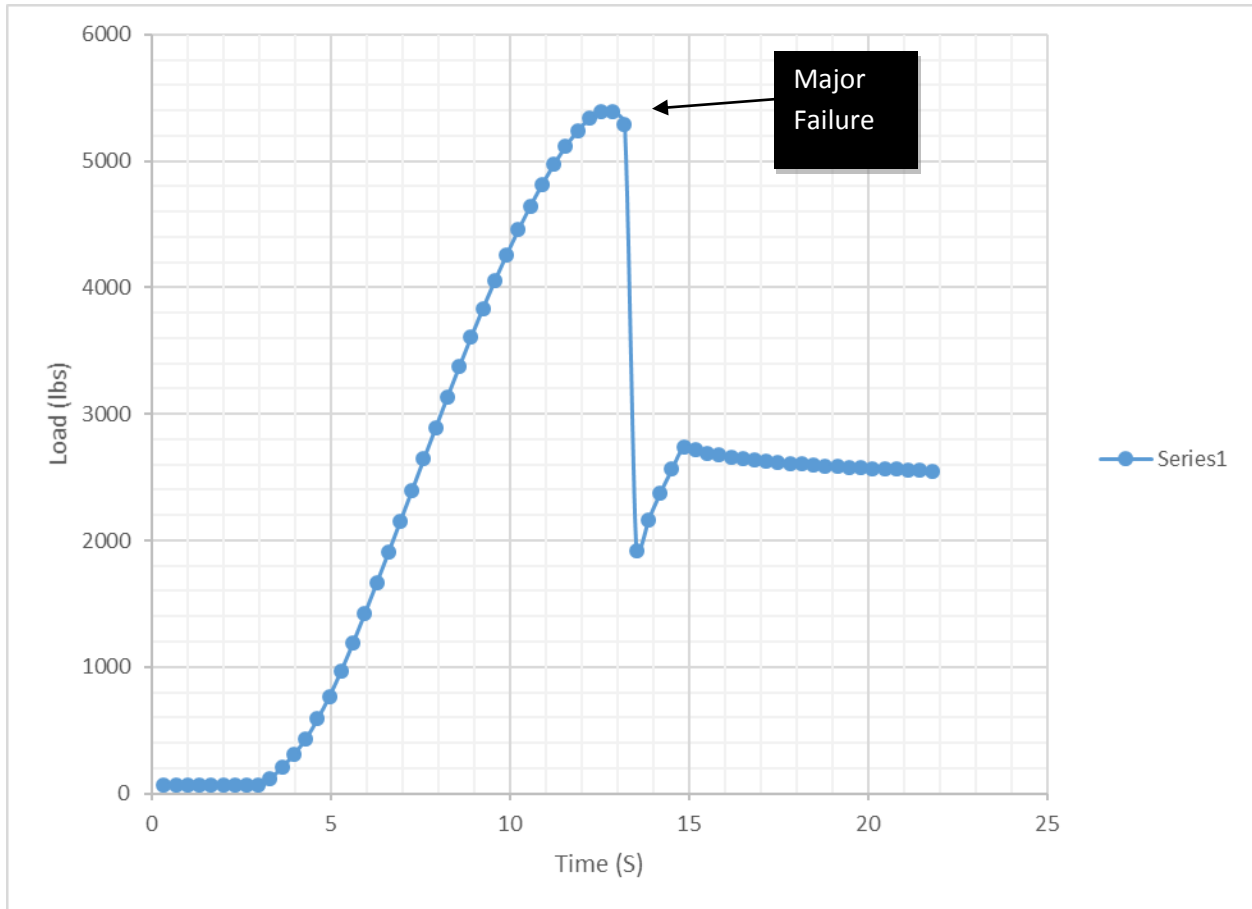


Figure 11
This sample has a major failure at the 13 second mark. This failure occurs at the base with in the threads.

Sample S12

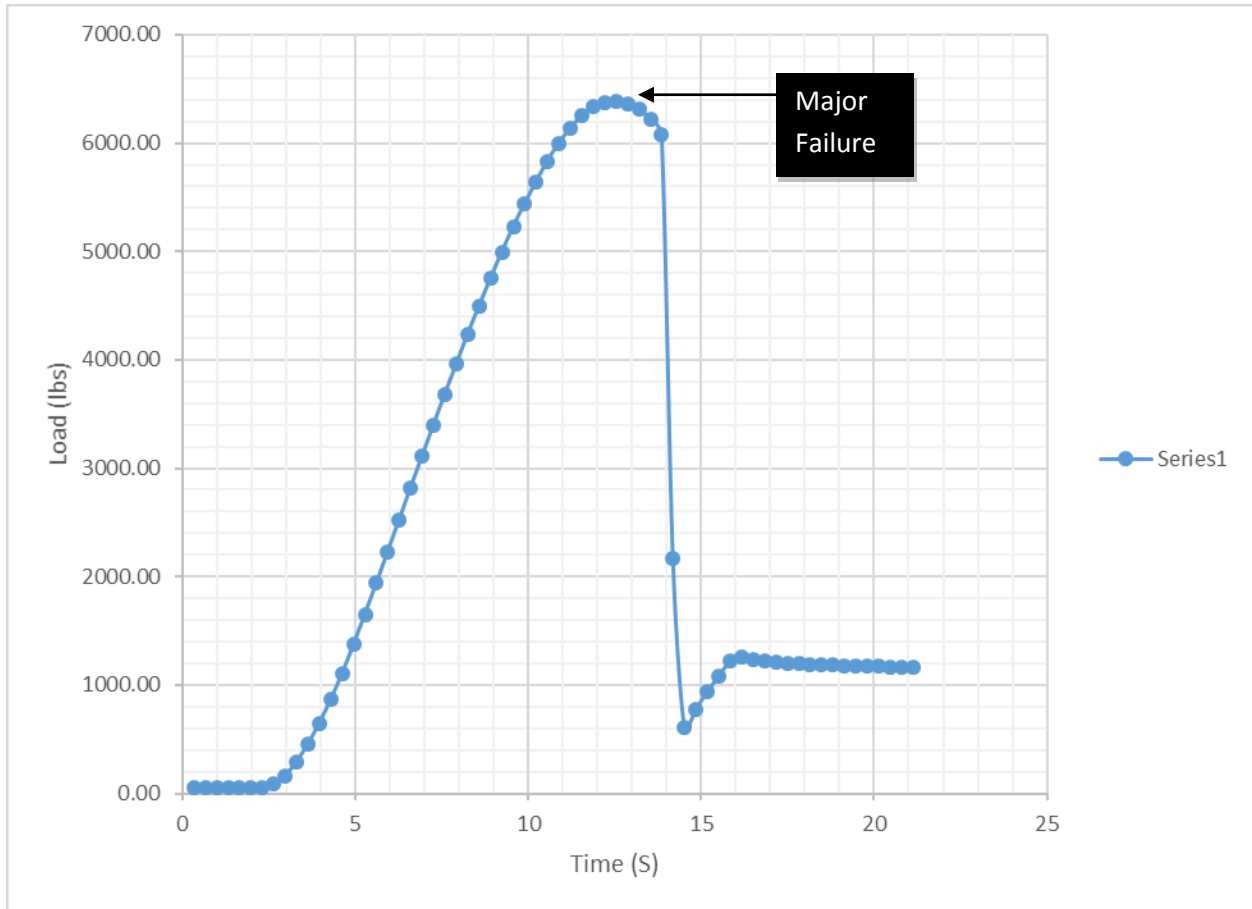


Figure 12

Major failure occurs around 13 second mark at the base of the sample right on the threads.