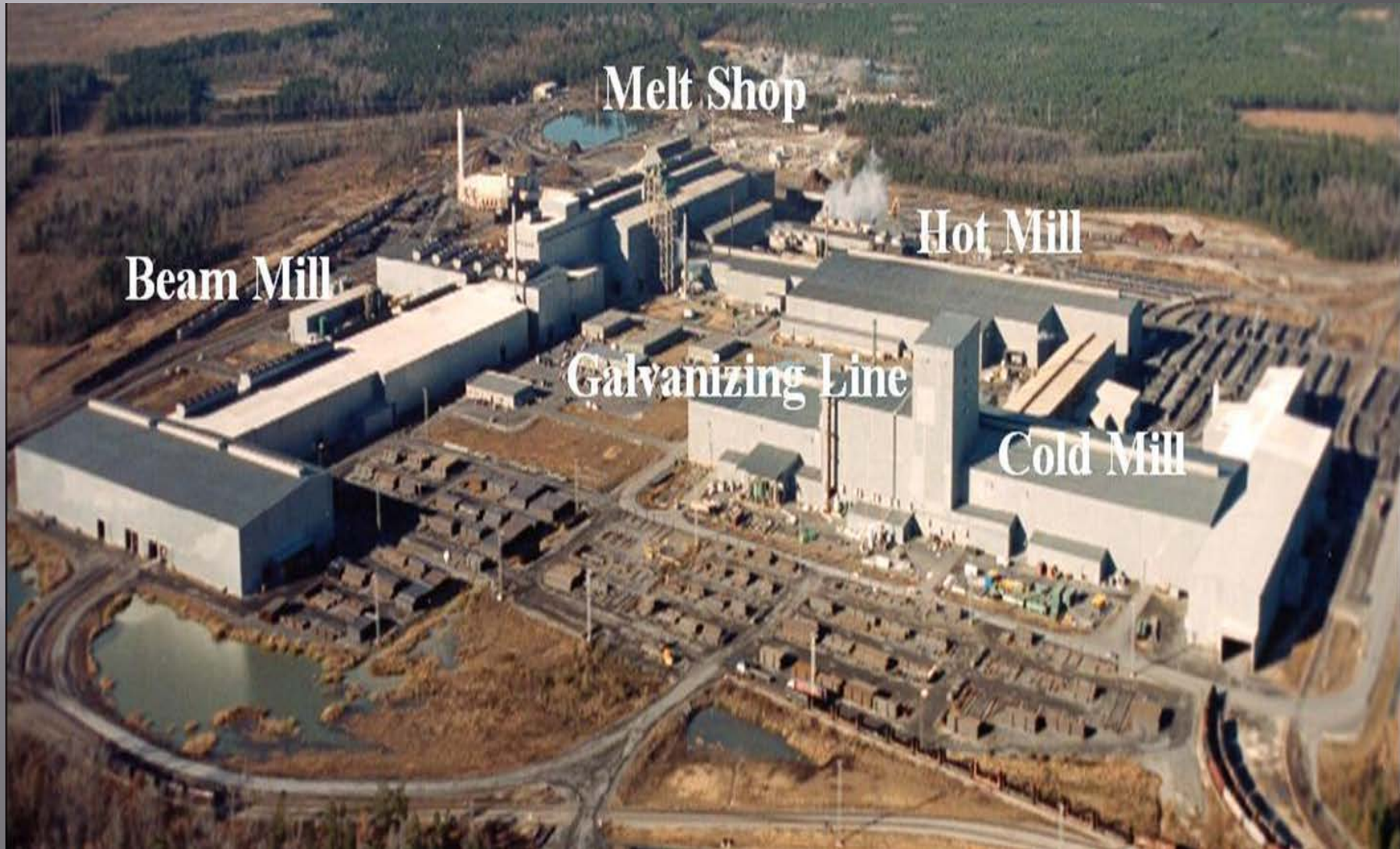


NUCOR STEEL BERKELEY BEAM MILL

Mill Spring Improvements to improve
quality and repeatability of mill stand

By Jerry Herrmann

Nucor Steel Berkeley CSP Start up 1996



840,000 tons per
year Structural Mill

Start Up 1998

Four strand caster. Billets, Blooms and Beam Blanks



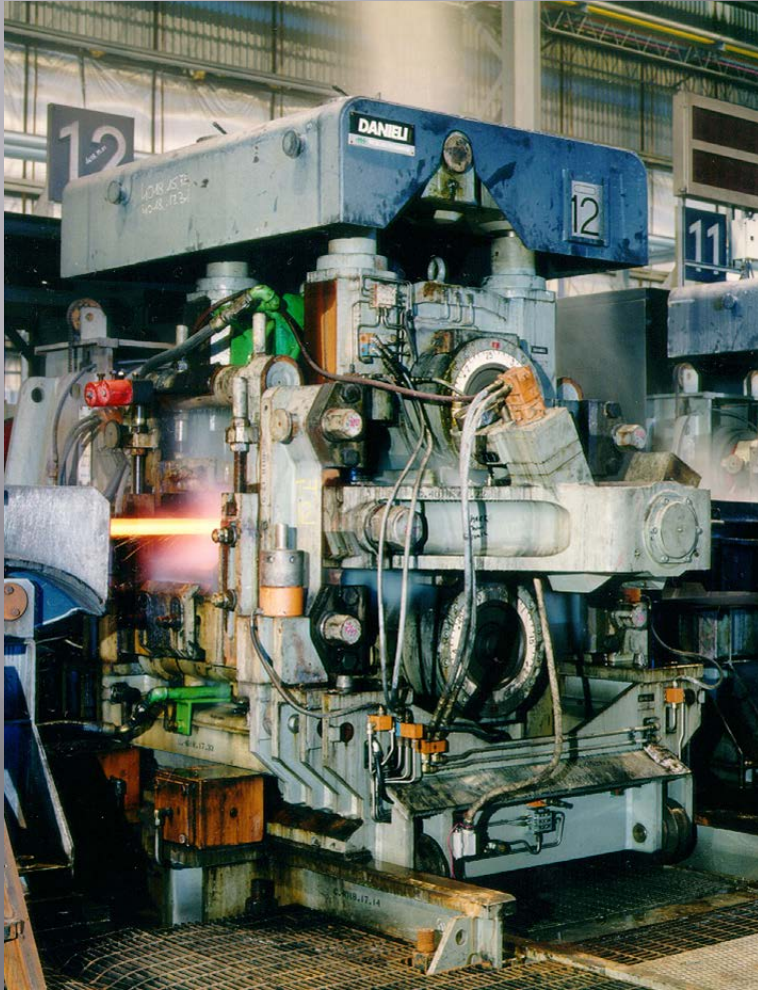
Run out table, Hot/ Cold charge or storage



15 Stands: 6 roughing mill stands 9 finishing stands.



Danieli SHS mill stands



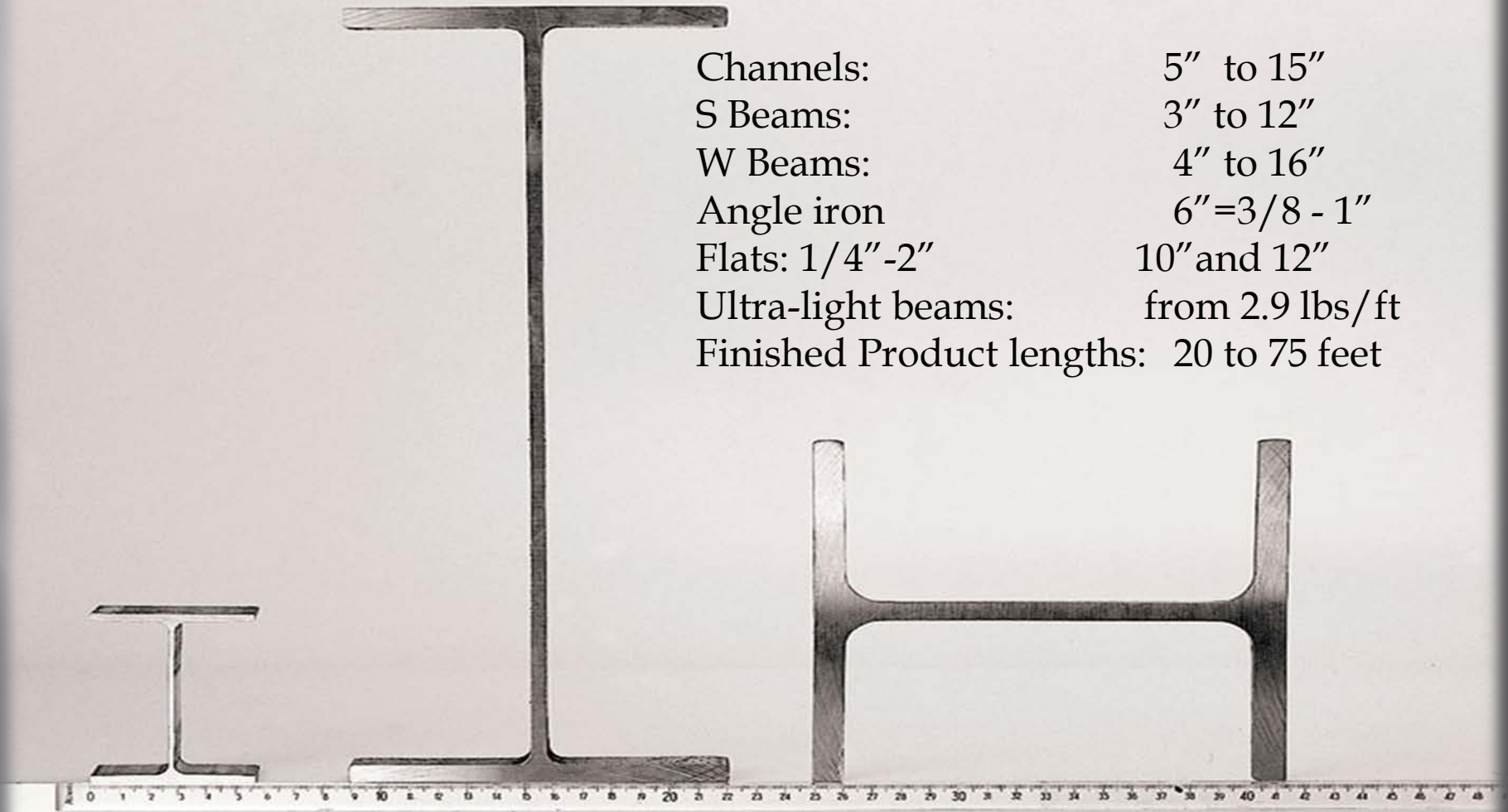
Two different mill sizes for the entire mill.

Stand type 8565 (max. roll dia=38.5")

Stand type 9555 (max. roll dia=33.5")

Sections produced.

Channels:	5" to 15"
S Beams:	3" to 12"
W Beams:	4" to 16"
Angle iron	6" = 3/8 - 1"
Flats: 1/4" - 2"	10" and 12"
Ultra-light beams:	from 2.9 lbs/ft
Finished Product lengths:	20 to 75 feet



Why Upgrade equipment

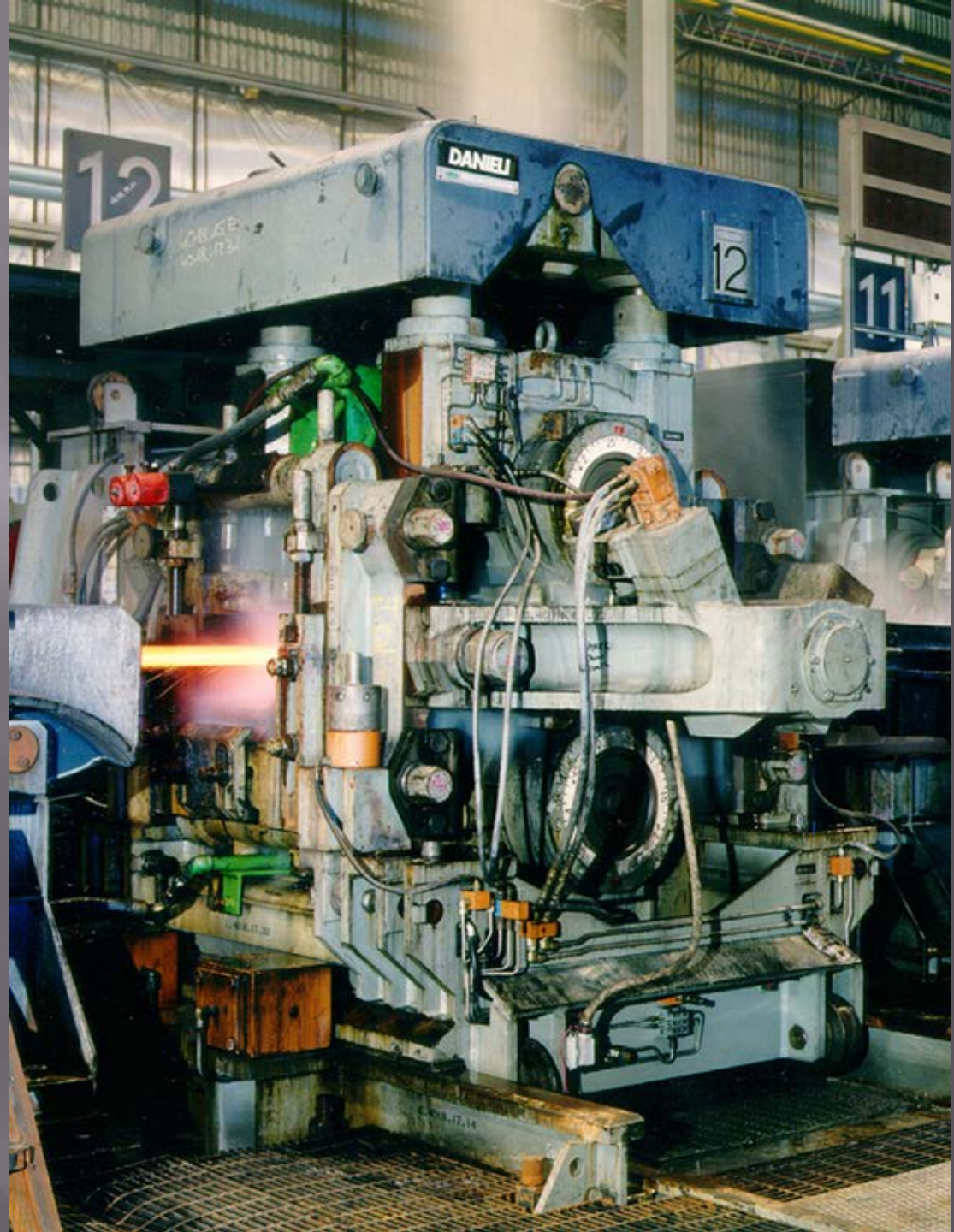




2x6
#8

2x6
#8

Equipment
is not new
anymore

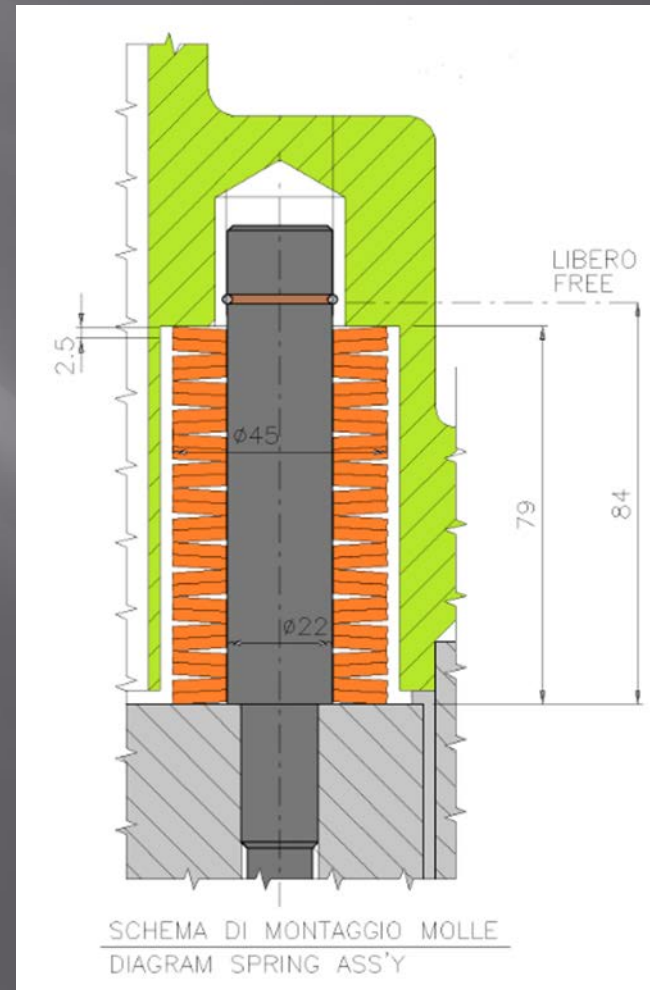
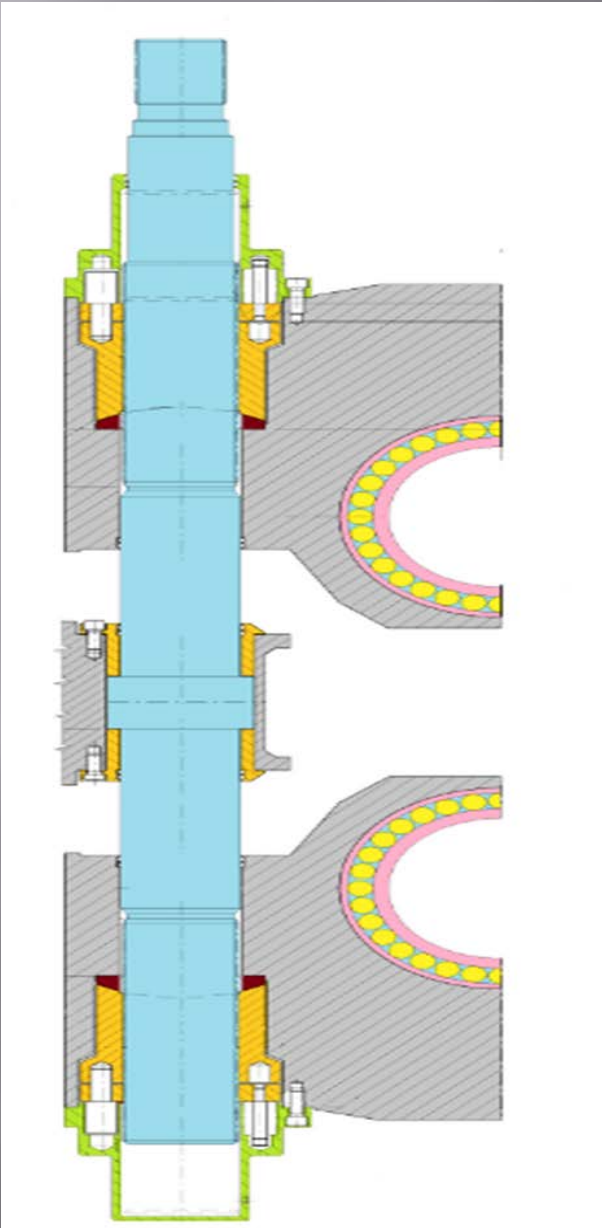


Improved Steady Stand Springs

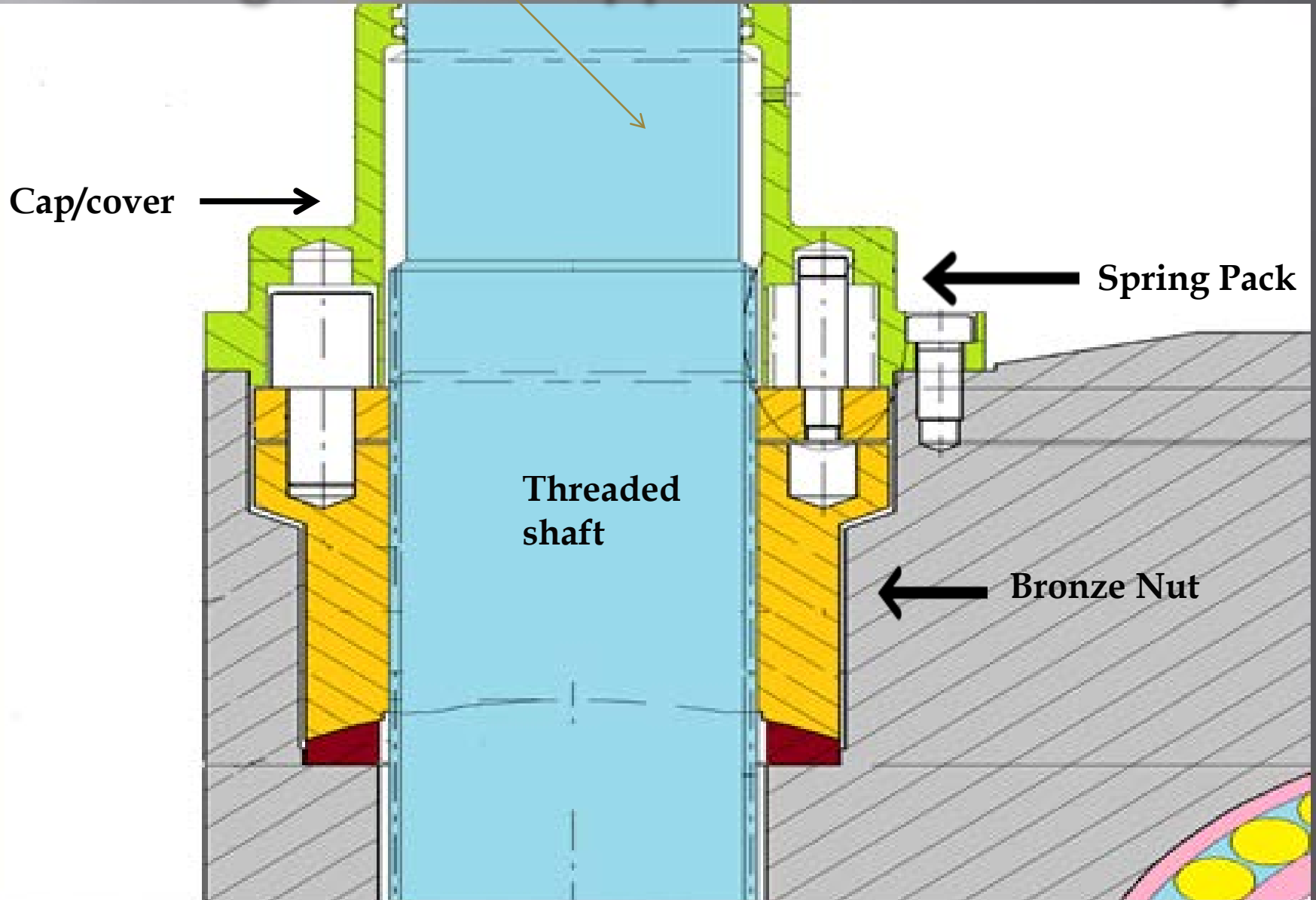
Current situation:

We understood how critical the mill stand chock support springs are to our performance. Without repeatable performance of the chock springs it causes the mill frustration and increased cost. Over the years the roll shop has performed numerous trials with the spring stack arrangement and spring replacement. Using thousands of springs over time.

Mill stand configuration



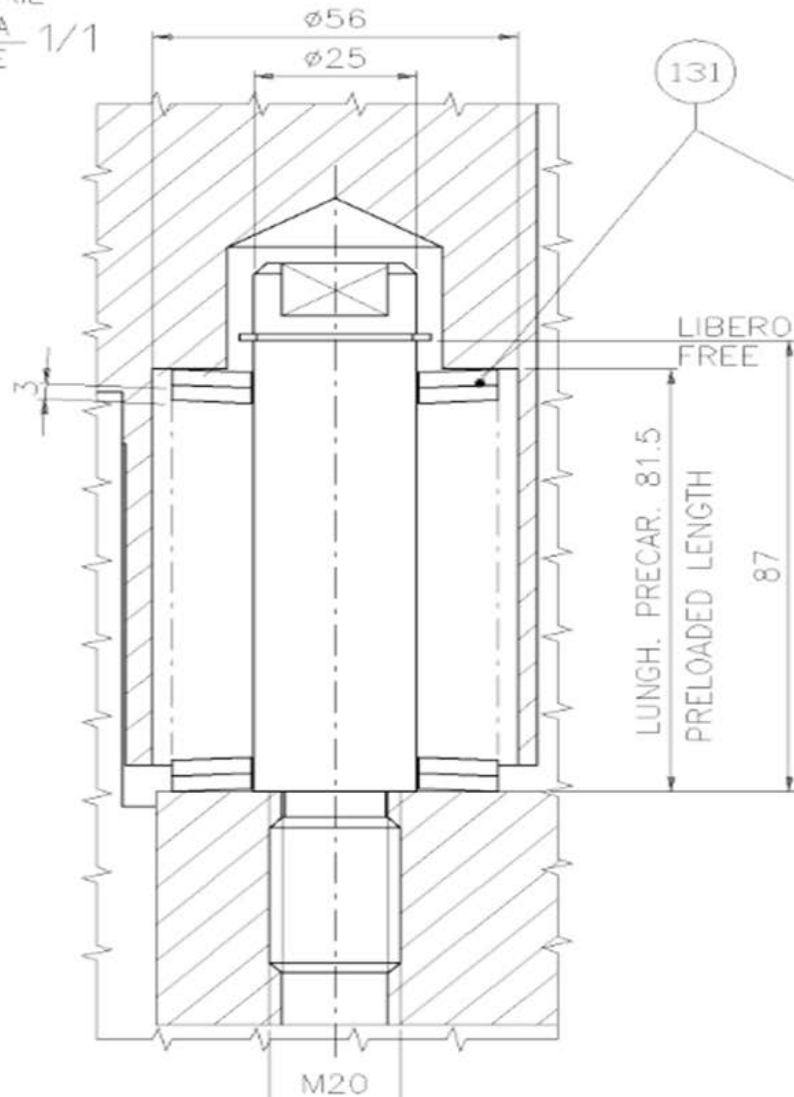
Arrangement of upper chock assembly



Spring washer stack arrangement

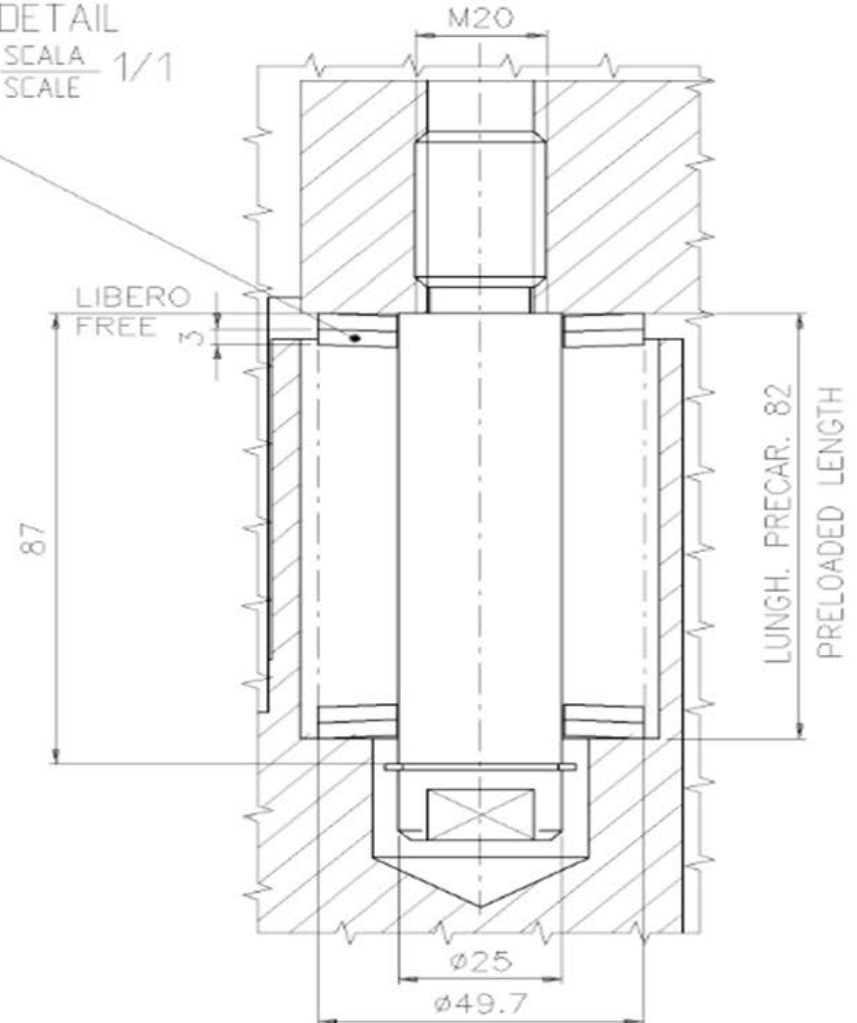
DETTAGLIO "L"
DETAIL

SCALA 1/1
SCALE



DETTAGLIO "M"
DETAIL

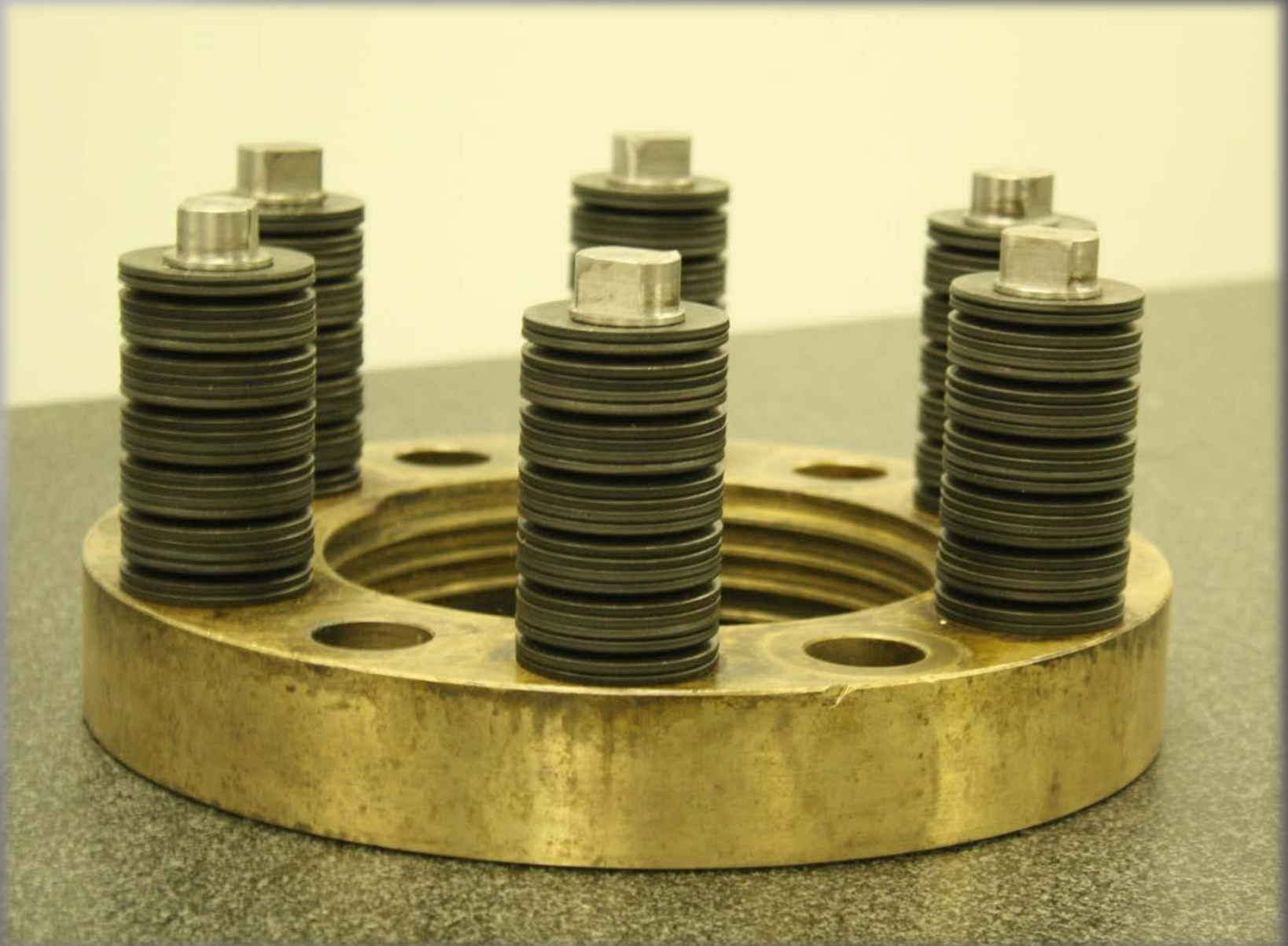
SCALA 1/1
SCALE



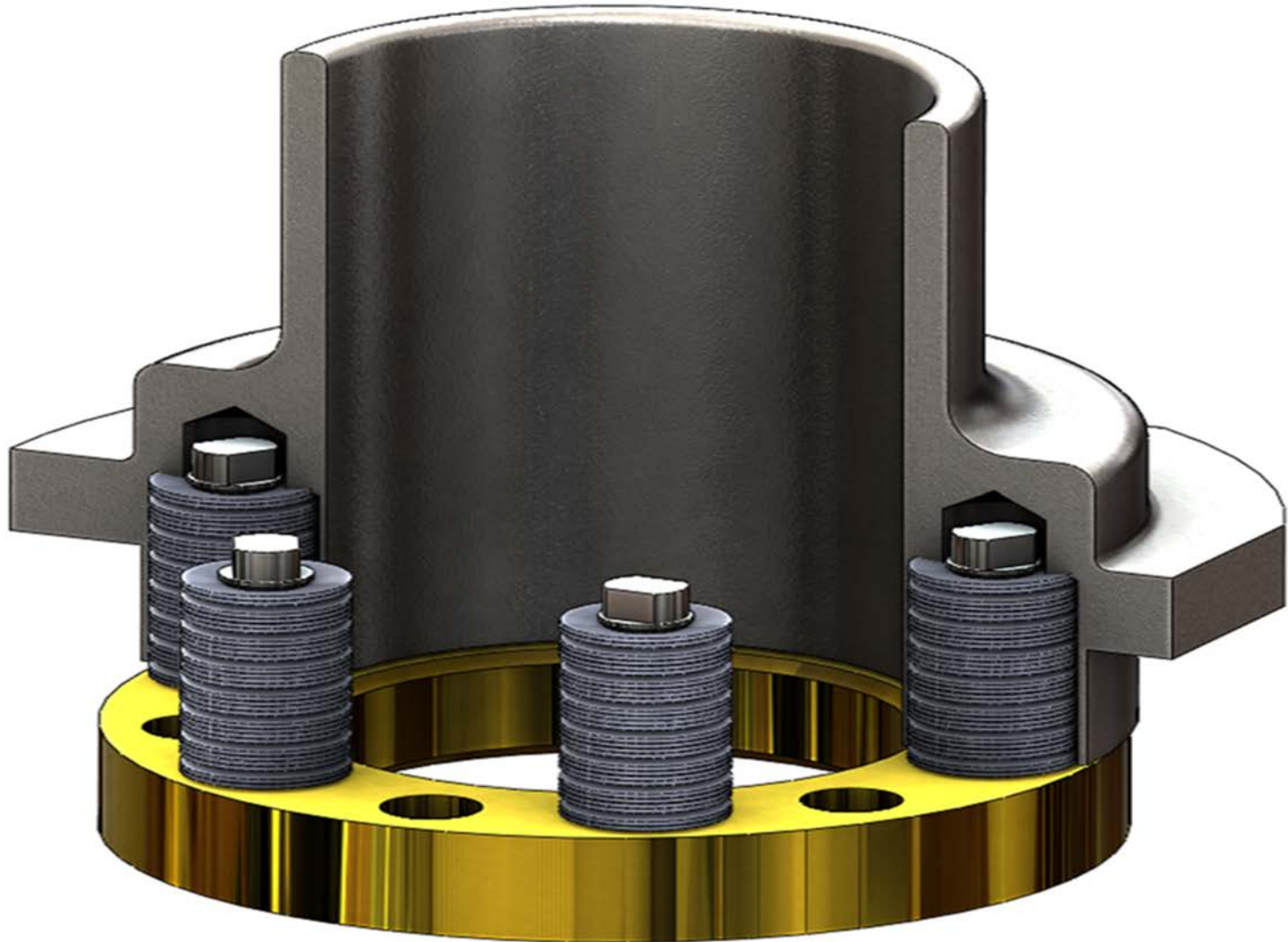
Belleville Spring Assembly



Belleville Spring Assembly

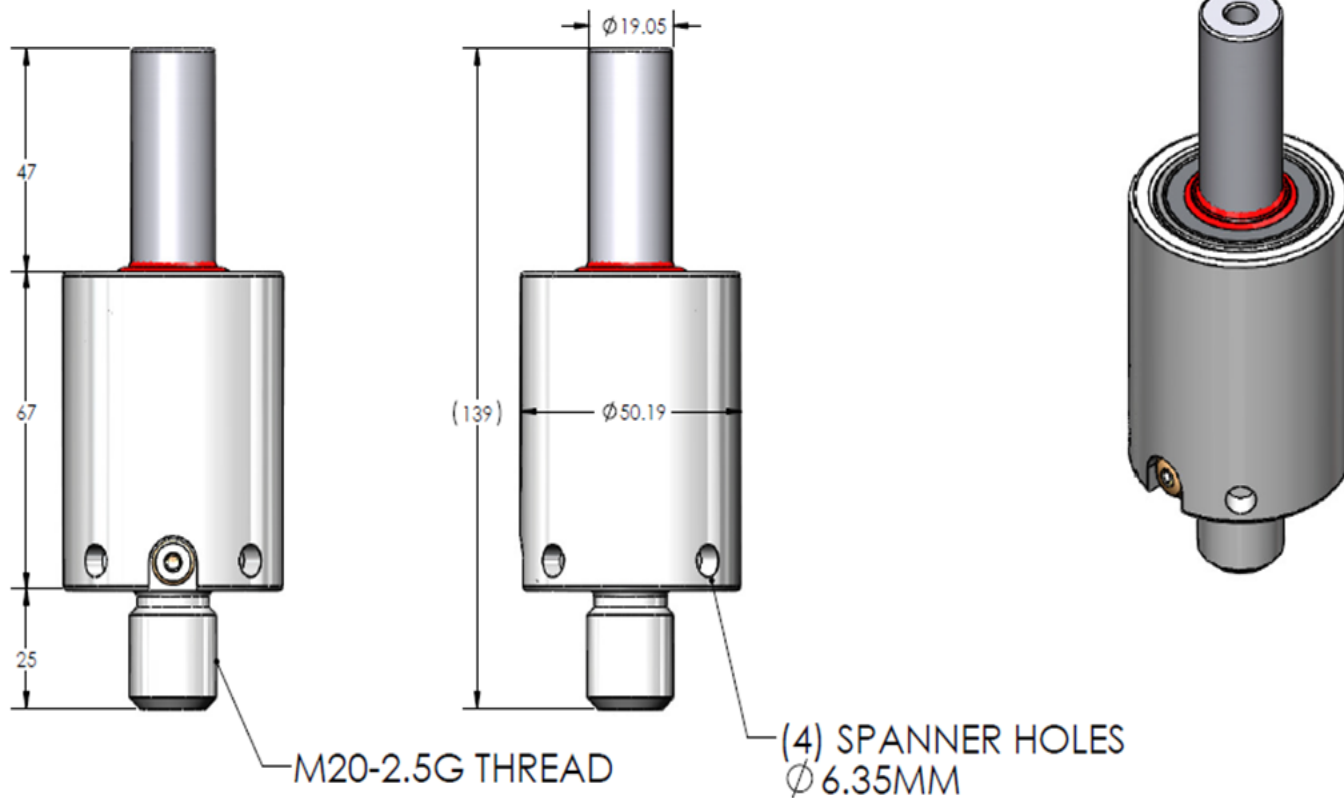


Spring Washer Arrangement



HYSON Steady Stand Spring

NUCOR BERKELEY WRSS-141-8



SPRING WILL BE COMPRESSED BY APPROXIMATELY 6MM FOR INSTALLATION

CONTACT FORCE: 2160LBS
CHARGE PRESSURE: 2175PSI

TOLERANCES NOTE: DECIMAL EQUIVALENTS OF FRACTIONS NOT BOUNDED OFF		DRAWN	THG	12/5/12	Hyson Products	
ENGLISH	METRIC	CHECKED	XXX	"/"/"	PHONE: (440) 526-5900	10367 Brecksville Rd
XX.X = ± .030	XX = ± 1	ENG APPR.	XXX	"/"/"	FAX: (440) 539-7684	Cleveland, OH 44141
XX.XX = ± .010	XXX = ± .25	CONCENTRICITY: 0.010 TLR		TITLE:		
XX.XXX = ± .005	XX.XX = ± 1	FINISH (MACHINE)		WRSS-141-8		
ANGLES = ± .00°30'	RADIANS = ± .008	EDGE BREAK: 010		FILETS: R015		
HYSON PROPRIETARY INFORMATION		REFERENCES:		UNLESS OTHERWISE NOTED		
THE INFORMATION CONTAINED HEREIN IS THE SOLE PROPERTY OF HYSON PRODUCTS. NO REPRODUCTION, DISTRIBUTION OR ALTERATION OF THIS DOCUMENT IS AUTHORIZED. IN ADDITION, IT CANNOT BE USED AS THE BASIS FOR MANUFACTURE OR SALE OF EQUIPMENT WITHOUT THE WRITTEN PERMISSION OF HYSON PRODUCTS.		MATERIAL:		SIZE		DWG. NO.
		FINISH / TREATMENT:		B		3
		DO NOT SCALE DRAWING		SCALE: 1:2		WEIGHT: SHEET 1 OF 1

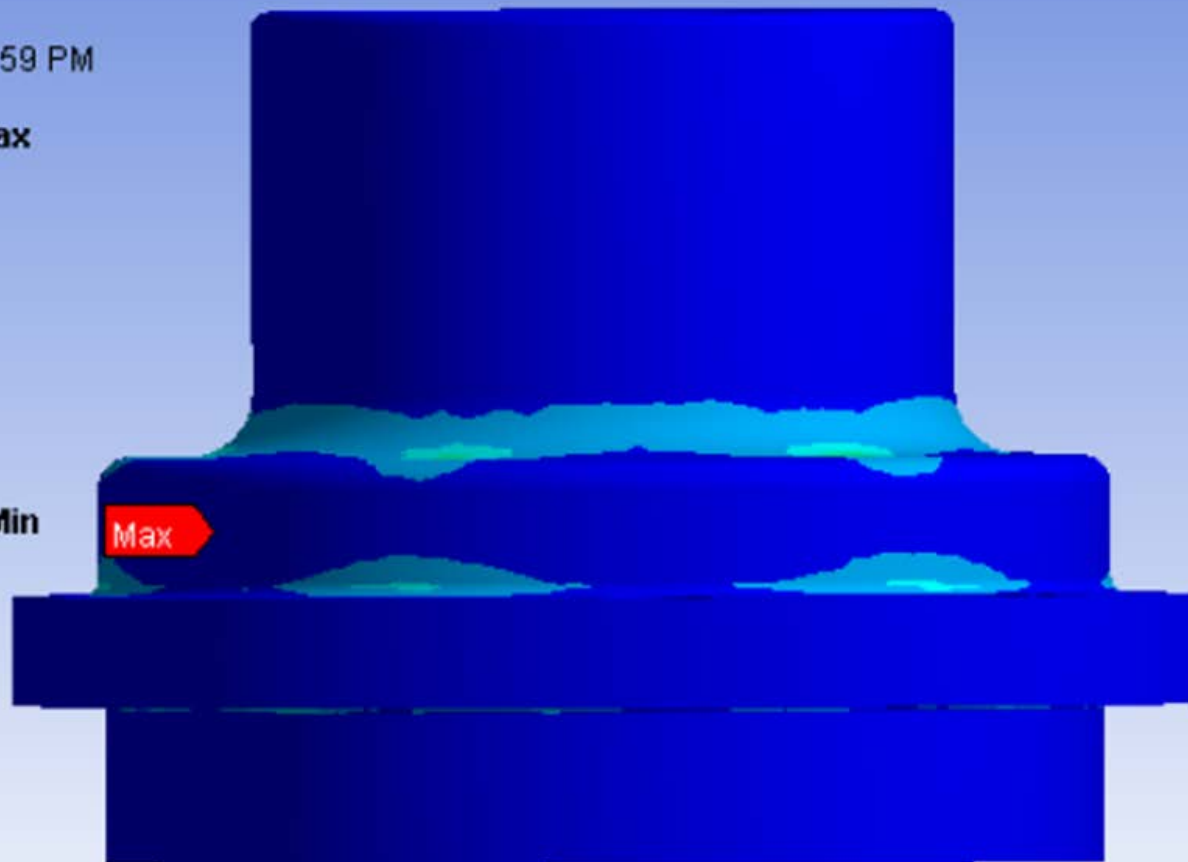
Nitrogen Cylinder & Belleville Assembly



Cross Head force analyses

ANSYS
13.0

A: Static Structural
Stress Intensity
Type: Stress Intensity
Unit: psi
Time: 1
12/12/2012 3:59 PM

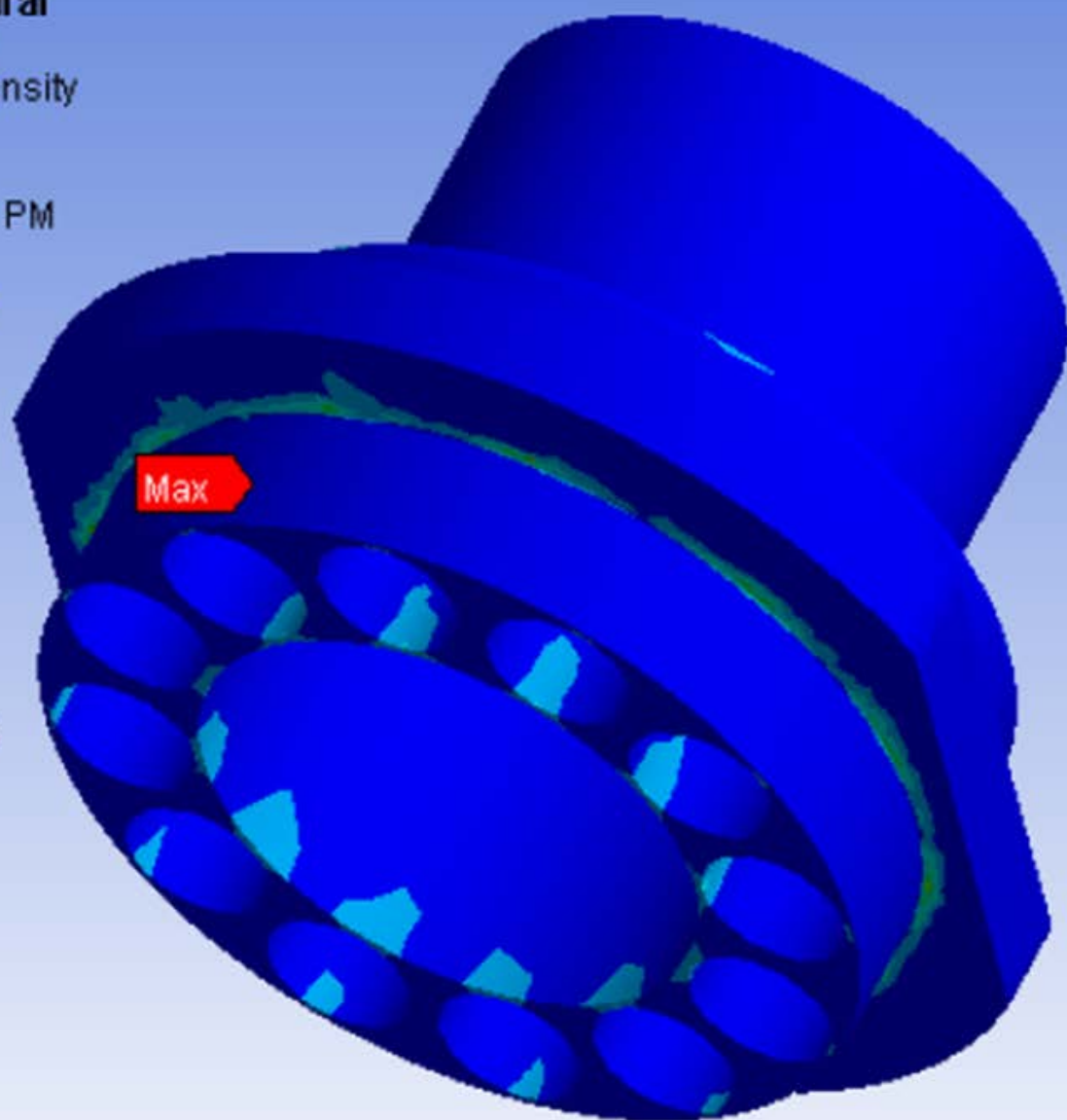


0.000 6.000 (in)
3.000

A horizontal scale bar is shown below the model, with a total length of 6.000 inches. A tick mark is placed at the 3.000-inch mark.



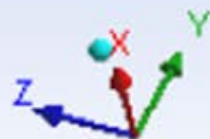
A: Static Structural
 Stress Intensity
 Type: Stress Intensity
 Unit: psi
 Time: 1
 12/12/2012 4:01 PM



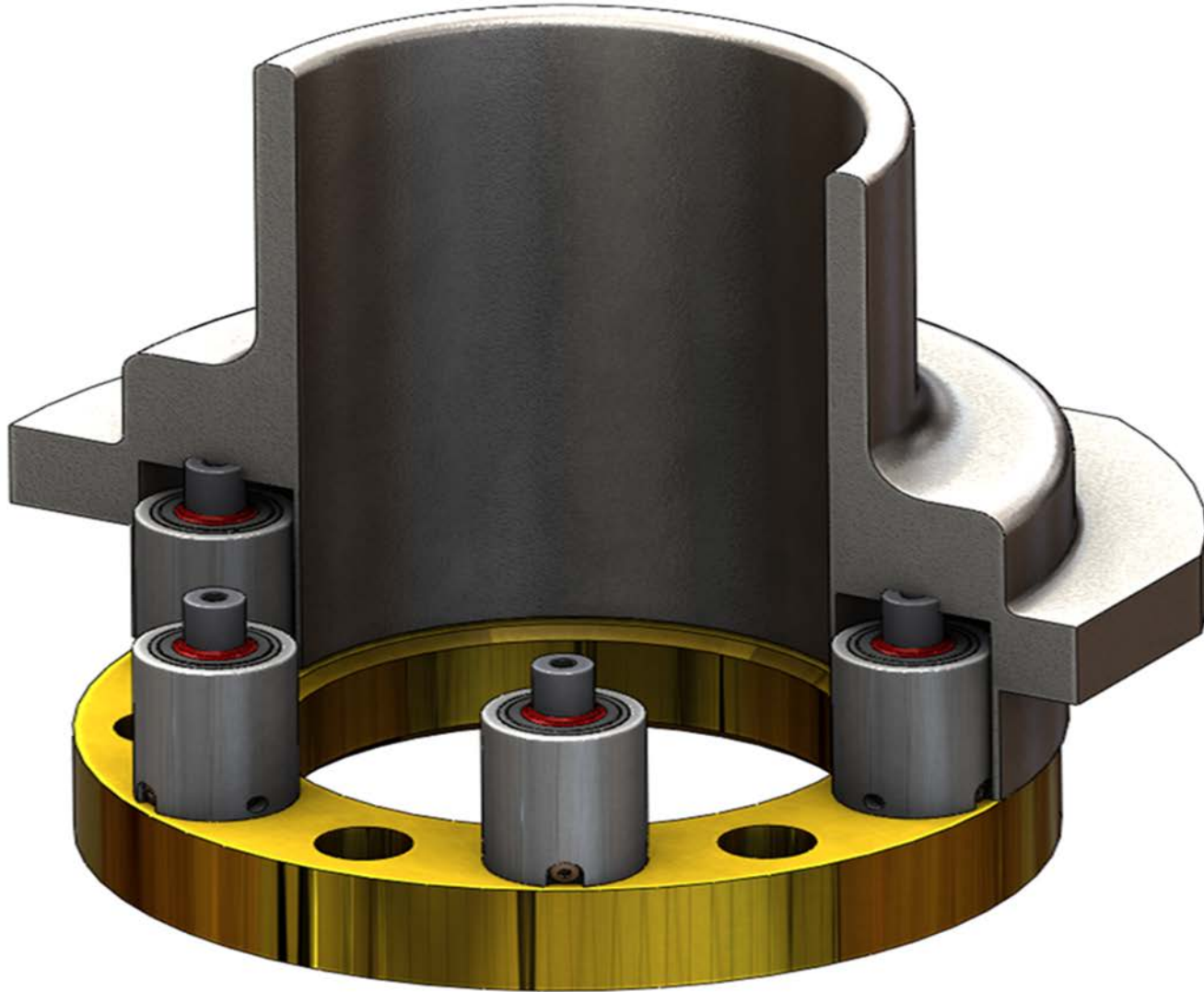
0.000 3.500 7.000 (in)



3.500



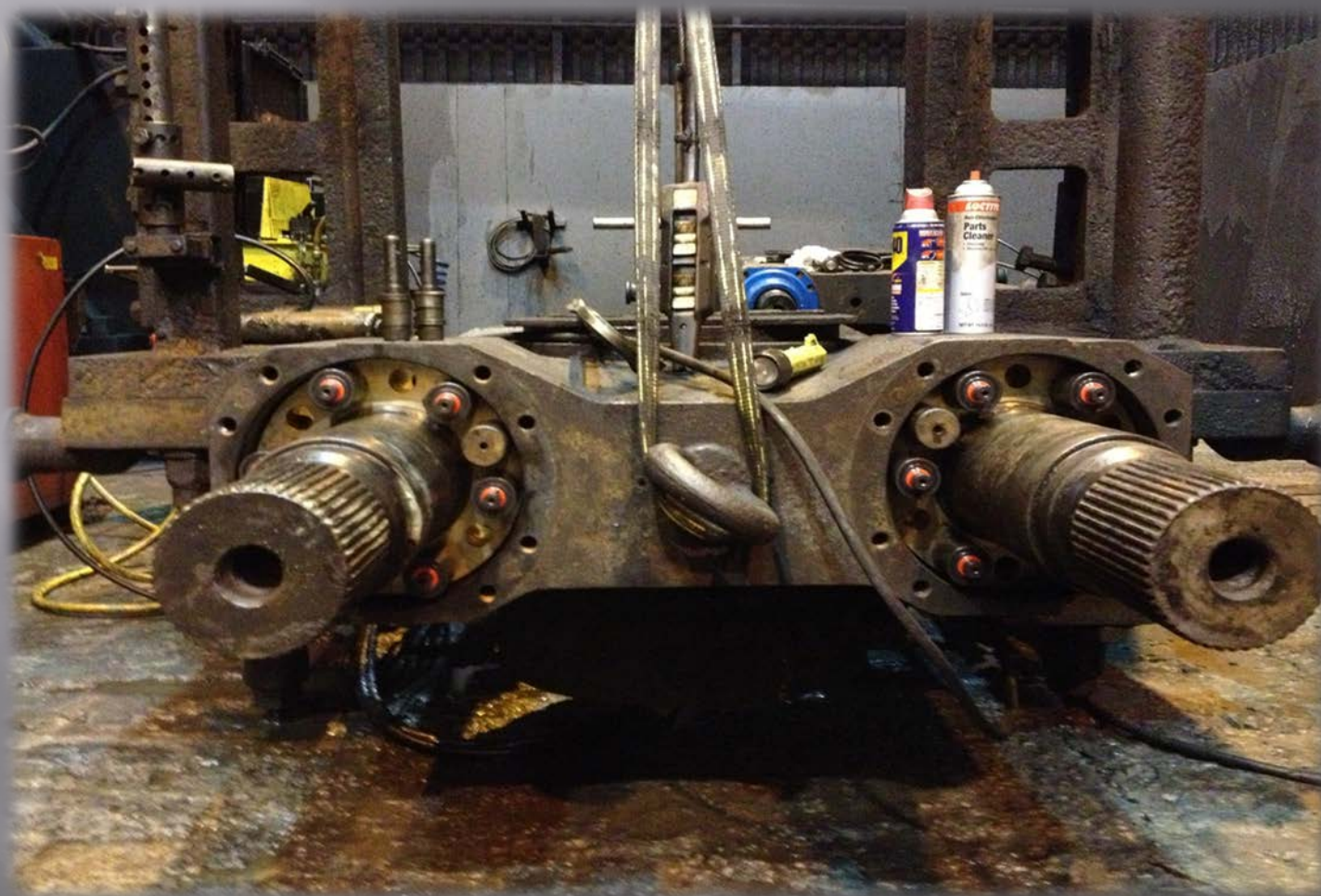
Compressed Nitrogen Cylinders



Nut Installation



Assembling the upper chock



Measuring and setting cylinder position for correct compression



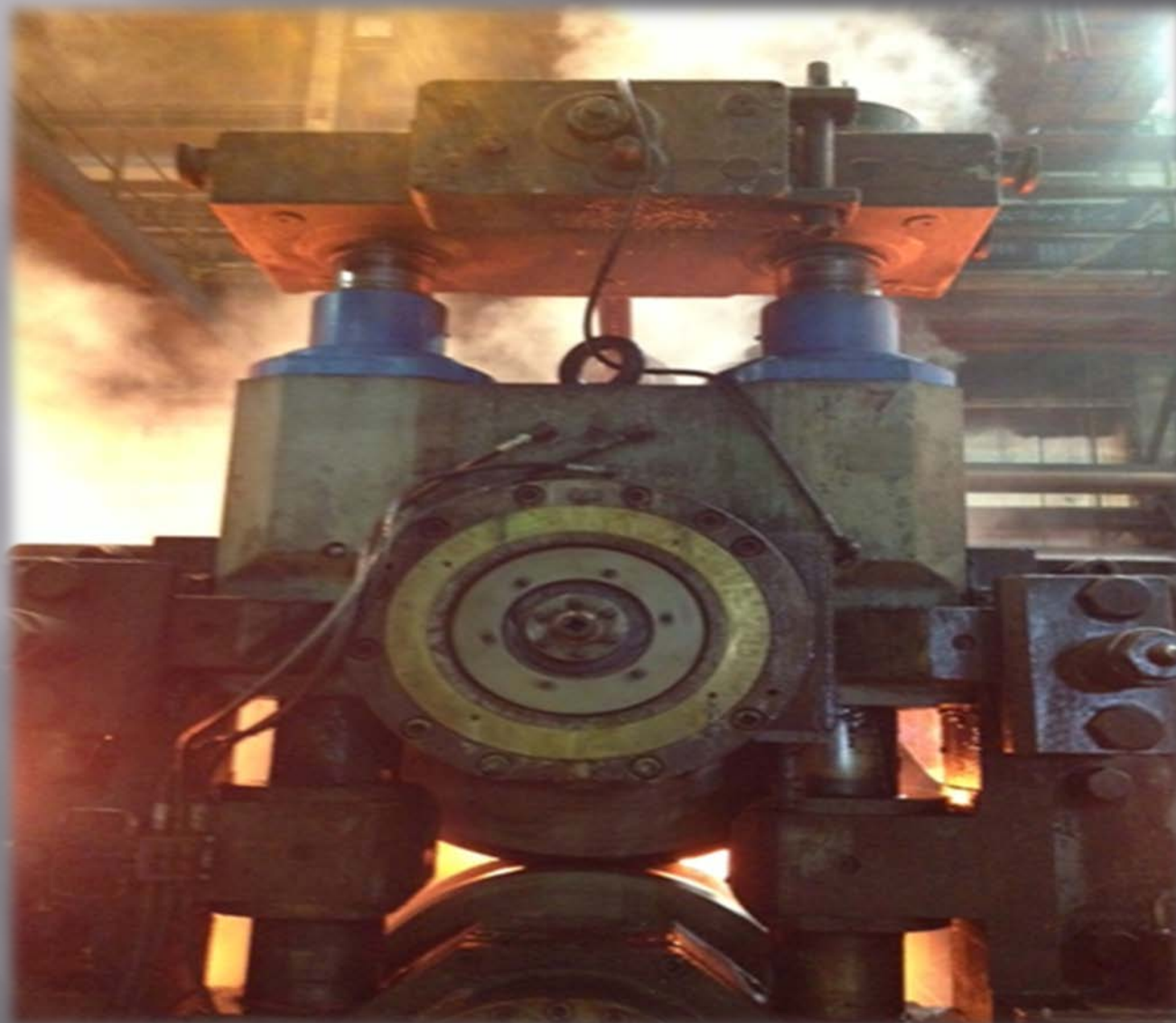
Installing the cap to the HYSON Springs



Compressing the assembly



Putting it to the test!!





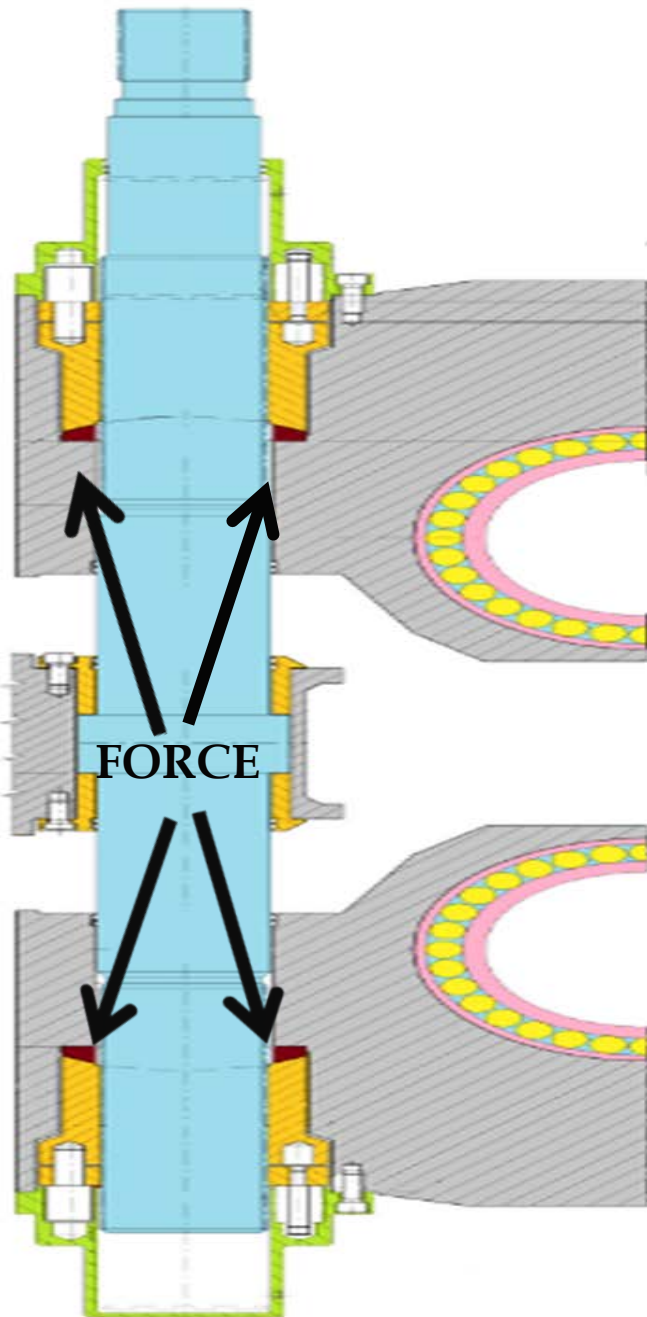
HYSON's Steady Stand Springs Provide:

- ❑ Dimensional consistency between cylinders.
- ❑ Ability to know exactly how much force is generated by each cylinder.
- ❑ Ability to infinitely adjust the force of each cylinder.
- ❑ Eliminates labor cost of assembling and adjusting individual Belleville stacks.



HYSON's Steady Stand Springs Provide:

- ▣ Reduced cobbles by improved gap control
- ▣ Increased uptime between maintenance events
- ▣ Consistent and repeatable force values that result in improved finished beam quality.



Where forces are generated during the rolling process.

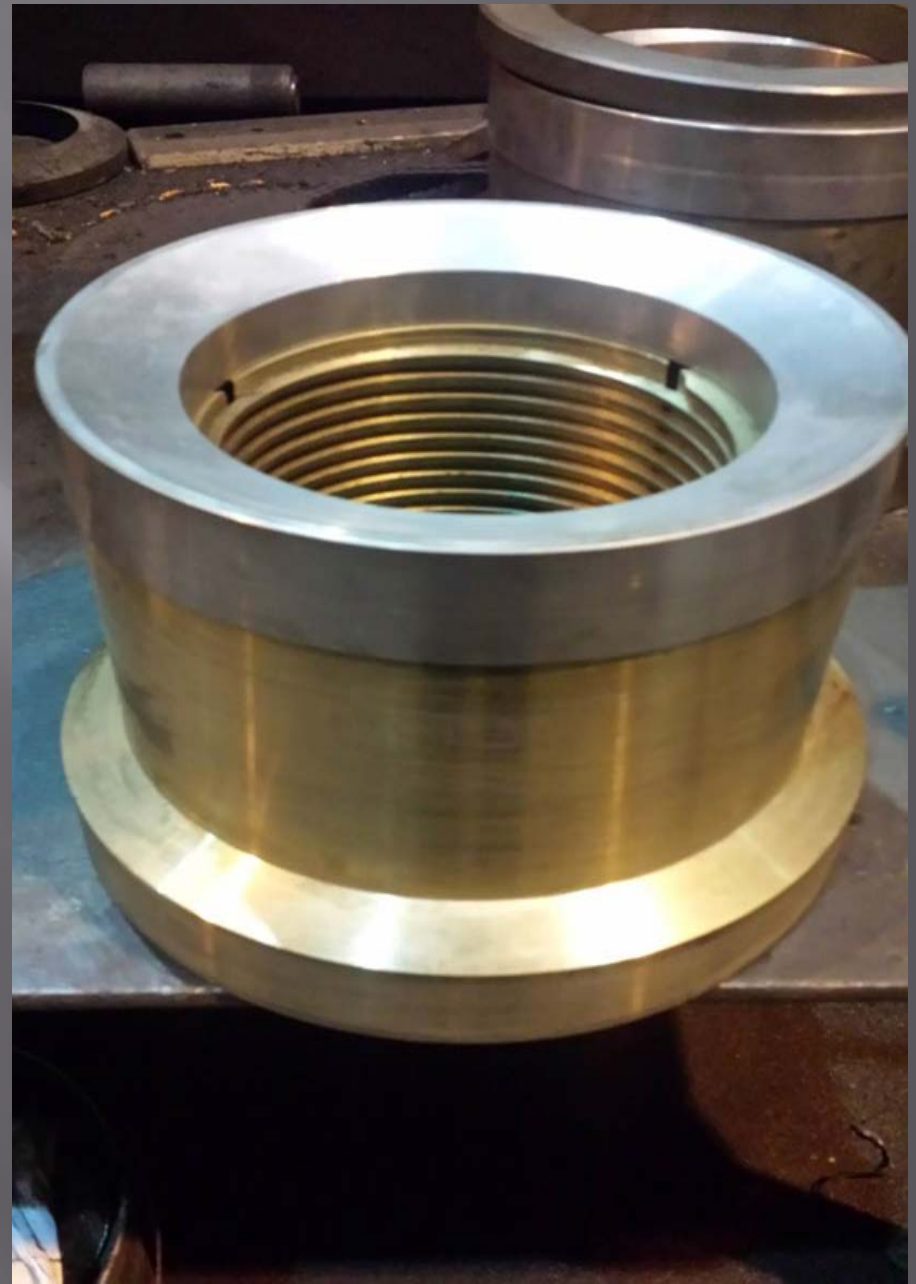
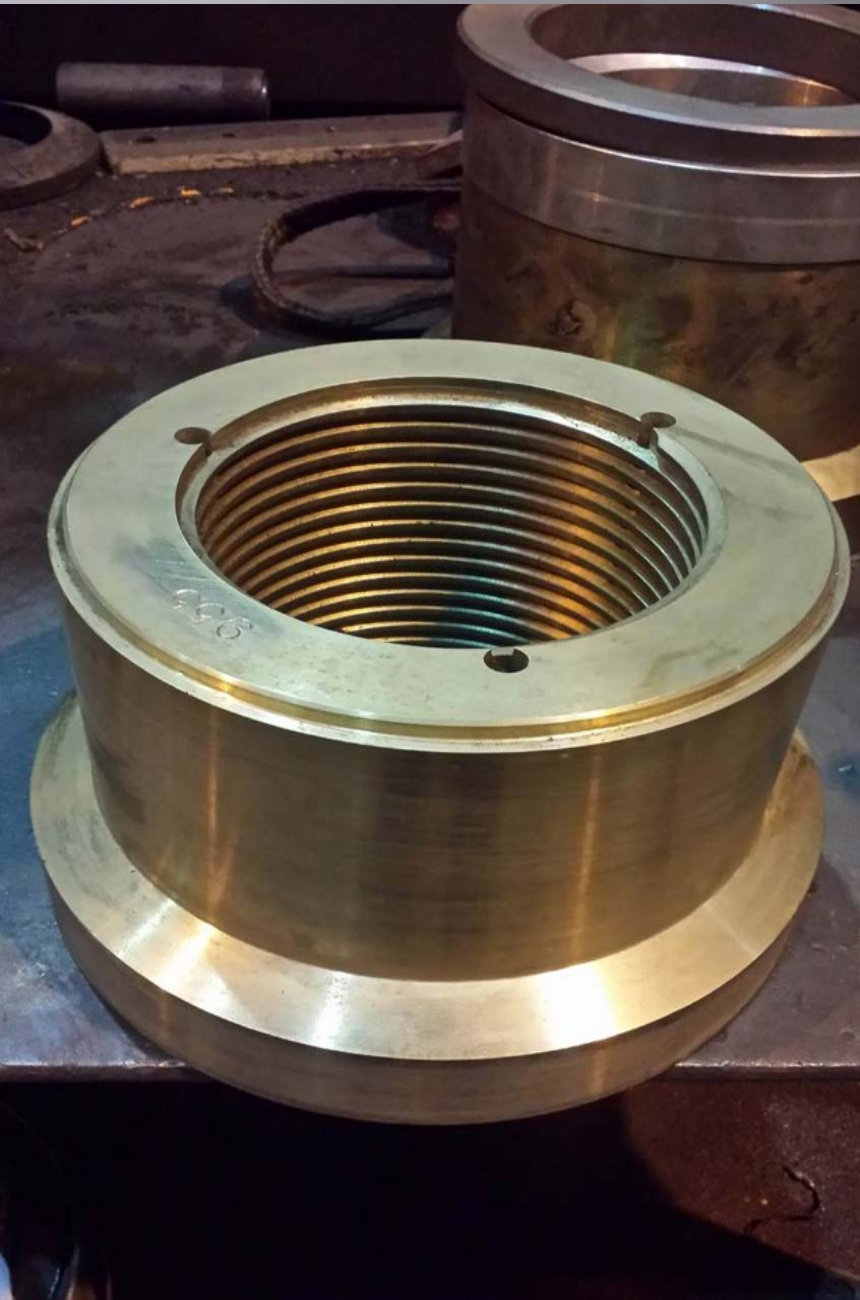
Bronze nut failures



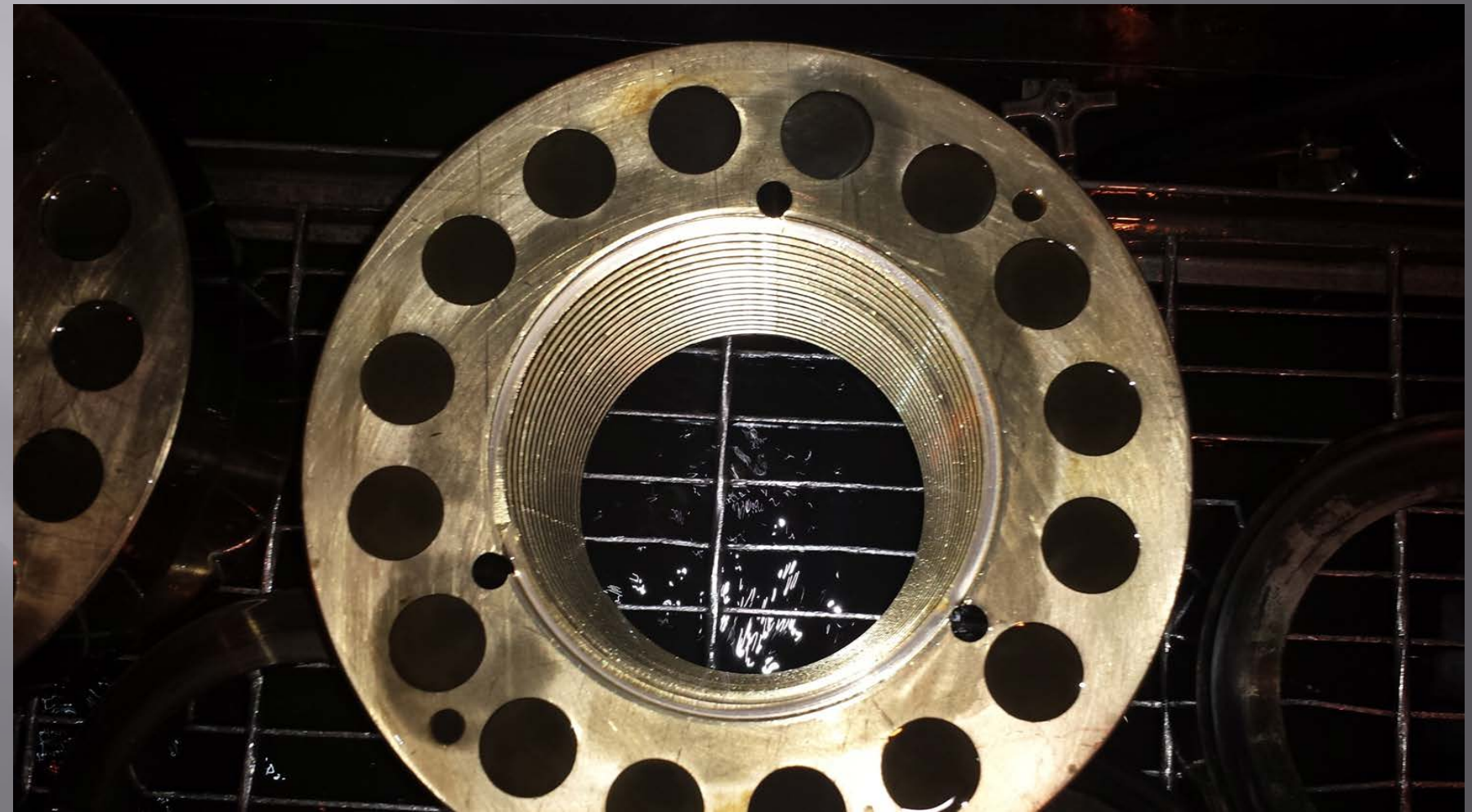
Nuts failing at lube ports



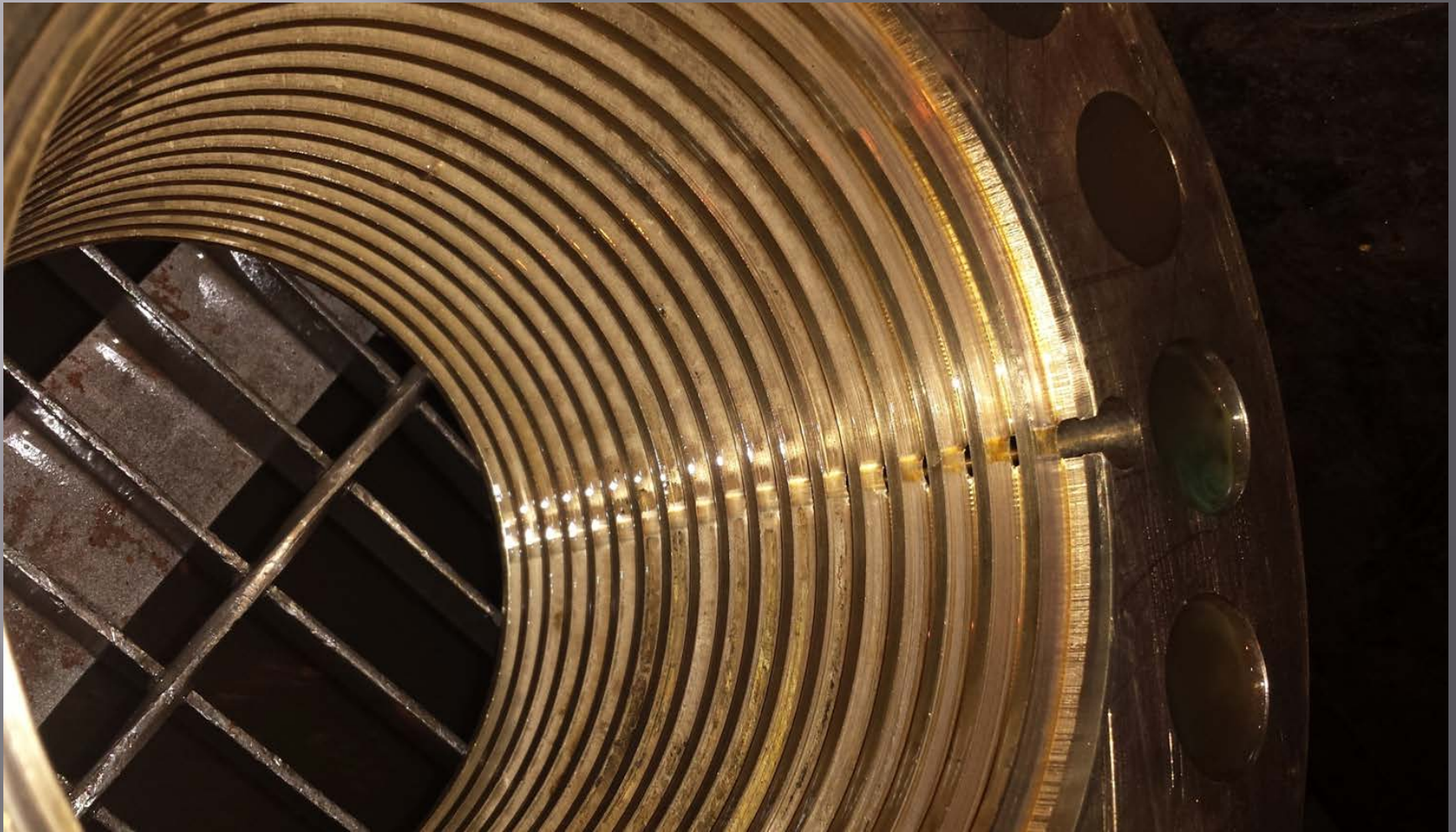
Solution



Six month trial a success



No indication of stress fractures at lube ports.



Minimum wear and discoloration



Questions?

HAVE A SAFE DAY!

NUCOR

