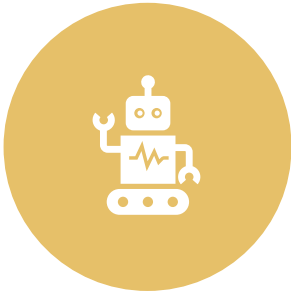


About me | Vivaan Kothari

- Junior in Mechanical Engineering @ UW Seattle with a minor in Business Administration.
- Mechanical Engineering Intern at Autev, Inc.
- Arm-Subsystem Engineer at Husky Robotics.
- Engineering Development Intern at Mahindra & Mahindra Automotive Ltd.
- Passionate about building & designing mechanical systems. Excited to apply hands-on design and fabrication.



Areas of interest



Robotics and
mechatronics.



Integration with other
technical teams such as
(electrical, software,
business).



Prototyping & Iterative
design.



Familiar with Solidworks
& Onshape.

Mechanical Engineering Intern - Autev, Inc (EV Charging startup)

- Designed the **end effector** for the Mach- 2 EV mobile charging robot using Onshape, improving alignment precision by 15% and advancing CAD and design iteration skills.
- Prototyped and tested robotic assemblies using **Bambu Lab X1 Carbon & P1S Printers**, cutting iteration time by 30% and building expertise in **rapid prototyping workflows**.
- Conducted **system testing and live demos** of the Mach 2 **robot** in preparation for the auto showcase, strengthening abilities in **validation, troubleshooting, and technical presentation**.



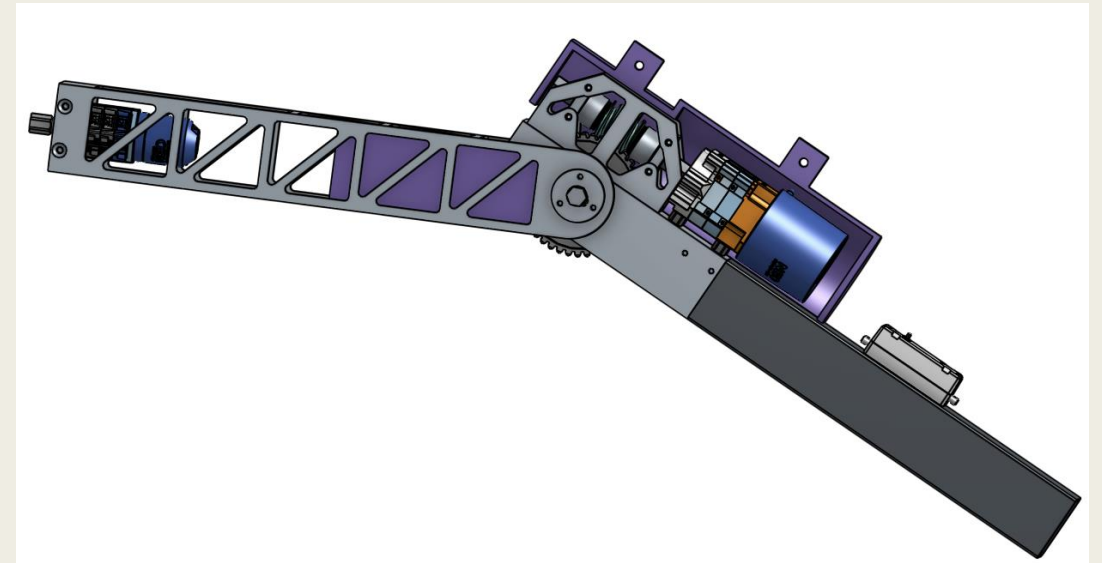
Research Assistant – Novosselov Research Group (NRG Lab)

- Assisted in the **design of the HALT (Hydrothermal Alkaline Treatment) reactor**, developing skills in **reactor engineering and system design**.
- Conducted **HALT and HFC experiments** to degrade PFAS “forever chemicals,” gaining experience in **environmental remediation and high-pressure systems**.
- Installed and validated the **Syringe Pump 260D**, strengthening abilities in **instrumentation, process control, and lab safety**.



UW Husky Robotics - Arm subsystem Engineer

- Building precision mechanics (using Onshape) for a Mars rover.
- Design and fabrication of worm driven shoulders, elbow linkages.
- Familiar with Lathe, mill, and 3D printing.
- Collaborative design reviews & multi-subsystem integration.



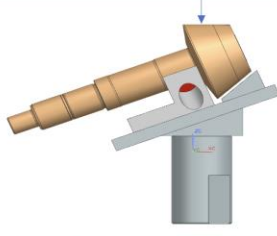
Engineering Development Intern – Mahindra & Mahindra Ltd (Automotive)

- Designed a hardness testing fixture for hypoid pinion.
- Created steering checking gauge for Bolero Pickup Truck.
- Optimized a circlip pressing fixture.
- Siemens –NX.
- 2D-drafting.

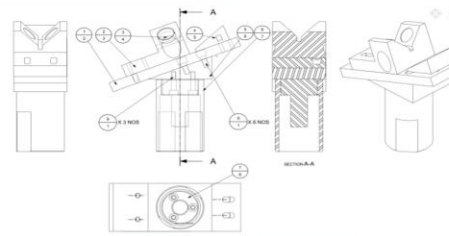
New Fixture For Pinion Hardness Testing (2 Variants)



Existing Fixture



3D Modelling in UG NX



2D Drafting in UG NX

Problem Statement:

1. Pinion has higher chance of falling off the existing fixture due to less support, which can damage it.
2. There are no pot magnets on the existing fixture hence the pinion is less stable due to no magnetic force.
3. The existing fixture does not allow the pinion to be placed at an angle, hence the pinion's tooth face is not perpendicular to the diamond point.

Action Taken:

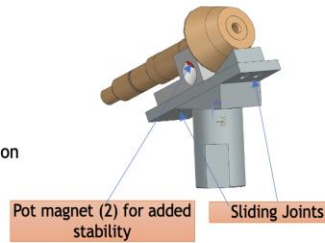
1. Noted the angle (21.7°) at which the pinion should be placed on the fixture.
2. Designed and assembled a V Block, wedge, baseplate, locator, and locator guide along with sliding elements on UGNX.
3. Designed two variants of the fixture with different locators (M42 & M50 External threading); $\phi 19$ and $\phi 25$.

Learning:

1. The significance of tolerance and the awareness of various types of fitting while drafting a 2D drawing.
2. Gained an understanding of how the existing fixture can be improved from interactions with line associates.
3. Learned about internal & external threading along with the functionality of pot magnets.

Benefits:

1. Low chance of pinion falling due to magnets & angled stopper. Due to more support.
2. Same fixture can be used with inter-changeable pinions.
3. Adjusting sliding joints ensures improved fitting of the pinion on the fixture. Locator guide for quicker installation.



Pot magnet (2) for added stability

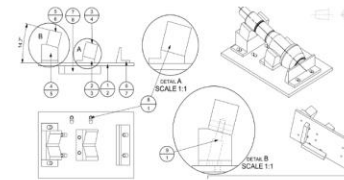
Sliding Joints

Part No- 0708CAK00030H018 ($\phi 19$) &
0708CAK00030H019 ($\phi 25$)

Dot Marking Fix For Supro Pinion At Heat Treatment



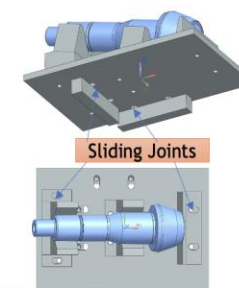
Existing Fabricated Fixture



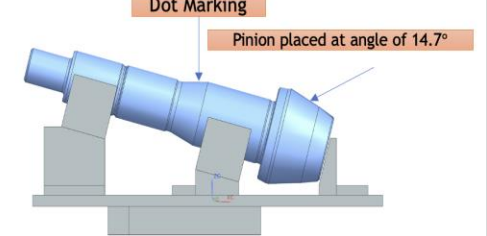
2D Drafting in UGNX

Benefits:

1. Same fixture can be used for pinions with different diameter.
2. Angled (parallel) stopper prevents pinion from falling over.
3. Adjustable sliding joints for perfect fitting.



Sliding Joints



Dot Marking

Pinion placed at angle of 14.7°

3D Modelling of Dot Marking Fixture

Problem Statement:

1. The existing dot marking fixture is locally fabricated.
2. Pinion has the possibility to fall/slide off the existing fixture, which can damage its structural integrity.
3. The existing fixture does not contain any sliding joints, thus making it harder to place the pinion and fixture with maximum accuracy.

Action Taken:

1. Identified the angle (14.7°) at which the pinion should be placed on the fixture to ensure that the diamond pin marker is perpendicular to the face of the pinion.
2. A baseplate, two V blocks, an angled stopper, and two wedges were designed and assembled on UGNX.
3. Sliding brackets were added to the wedge, stopper, and brackets to allow for ease of placement.
4. Common fixture used for inter-changeability of pinion.

Learning:

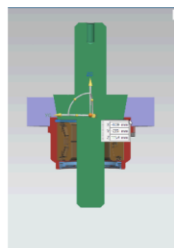
1. Interaction with line associates to understand issues with current fabricated fixture.
2. Understanding of the entire dot marking process and how the pinion should be placed.
3. Measuring various dimensions precisely with the help of a vernier caliper and screw gauge.
4. 3D modelling and 2D drafting in UG NX.

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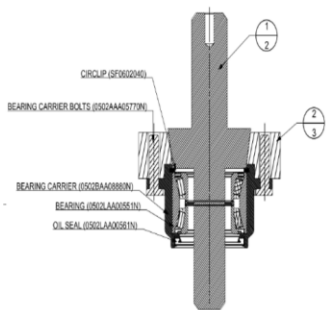
Circlip Pressing Fixture (Re-work)



Visible damage/breakage
Modified dolly (0502AAA08150F014)



Video of Working



2D Drafting in UGNX (Re-Work)



Circlip Locator

Bearing carrier

3D Modelling of Assembly

Problem Statement:

1. Trials were taken with modified dolly 0502AAA08150F014 which failed (non-functioning).
2. Resulting in tilting of dolly while pressing and breakage of circlip. Dolly and bearing carrier were damaged.
3. Identified that in the existing fixture sketch, one of the over-ball's incorrectly has potentially causing an error in functioning of the part.

Action Taken:

1. Increased the lower diameter of dolly for improved coverage.
2. New dolly is designed with decreasing taper from 12° to 10°. Lower taper diameter increased from $\phi 80$ to $\phi 82.5$.
3. Made use of $\phi 10$ over-ball to provide for accurate referencing dimensions.
4. Ensured dimensions are of pin-point accuracy by performing and confirming with a micrometer.

Learning:

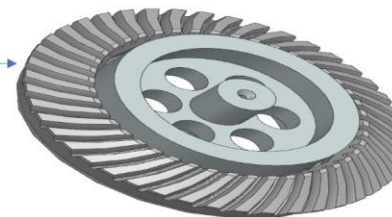
1. Gained understanding into the reasons for non-functionality of the existing circlip pressing fixture.
2. Brainstormed potential solutions to rectify these problems to design a functioning fixture.
3. Studying 2D drawing of Initial fixture to understand technical characteristics of the part.
4. 3D modelling and 2D drawing drafting in UG NX.

Benefits:

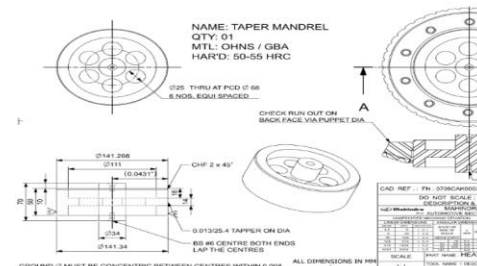
1. Re-worked fixture allows for smooth functioning of assembly parts. Preventing potential damage.
2. Better coverage as lower diameter of dolly is reduced.
3. Modified tapering ensures improved working of the fixture.

New design of Taper Mandrel for Ring Gear Back Face Runout Checking

Ring Gear



3D Modelling in UG NX



2D Drafting in UG NX

Problem Statement:

1. Existing Taper Mandrel is not suitable for runout checking due to excess mass.
2. Needed to reduce the mass of the Taper Mandrel by at least 1.5 Kilograms.
3. Heavier Taper Mandrel can put excessive load on bearing which may contribute to excessive runout and less precision.

Action Taken:

1. Understood ways in which the mass of taper mandrel can be reduced without negatively impacting its functionality.
2. Changed design along both faces of the taper mandrel in effort to reduce weight.
3. Made a circular pattern of six $\phi 25$ circles with 60-degree equally spaced intervals.
4. 3D Modelling and 2D drafting of the weight reduction taper mandrel.

Learning:

1. Gained an understanding of the process of ring gear back face runout checking.
2. Learned about why it is necessary to reduce mass of taper mandrel for efficient functioning.
3. Gained experience in using UGNX; learned how to 'pattern' the weight reduction and activate reports.

Benefits:

1. Improved precision of runout checking on GQP quench press as effects of inertia and vibration are minimized.
2. Cost saving due to reduced material.
3. Initially the taper mandrel weighed 4.98 kg; it now weighs 3.47 kg. Difference of 1.51 kilograms.

Taper Mandrel

Part No. Und

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