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3D CROSS HEAD PATTERN

1.INTRODUCTION: A cross head is a mechanical joint used as part of the slider-clink linkages of long reciprocating engines and reciprocating compressors to eliminate sideways force on the piston. Also, the cross head enables the Conn to freely move outside the cylinder. Because of the very small bore -to- stroke ratio on such engines, the connecting rod would hit the cylinder walls and block the engine from rotating if the piston was attached directly to the connecting rod like on truck engines. Therefore, the longitudinal dimension of the cross head must be matched to the stroke of the engine.
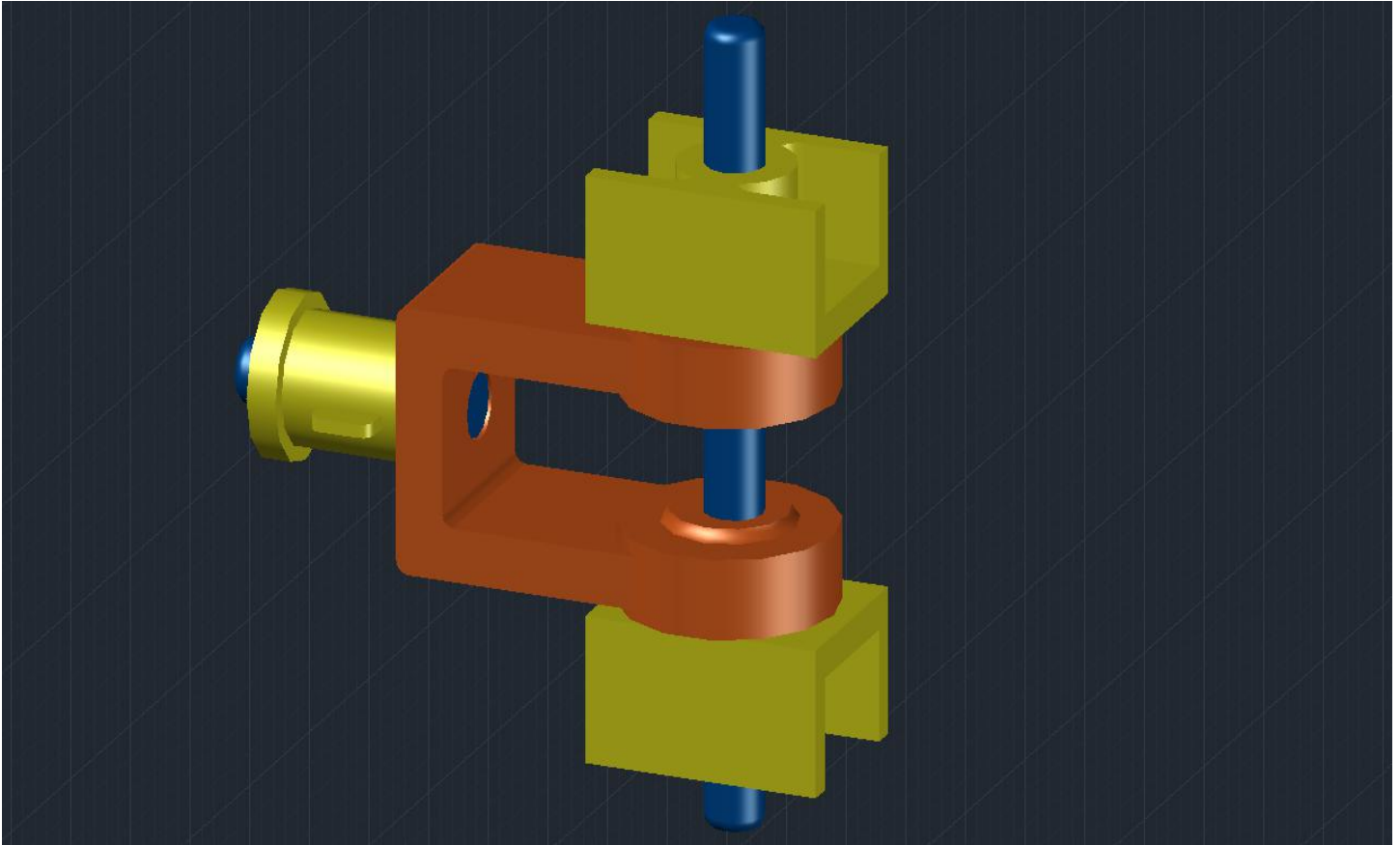
On smaller engines, the connecting rod links the piston and the crankshaft directly, but this transmits sideways forces to the piston, since the crank pin (and thus the direction the force is applied) moves from side to side with the rotary motion of the crank. These transverse forces are tolerable in a smaller engine. A larger engine's much greater forces would cause an intolerable degree of wear on the piston and cylinder, as well as increasing overall friction in the engine

2. AIM: To create the 3 D drawing for Cross head pattern by using AutoCAD commands.

3. OBJECTIVES: Easy to draw the given object.

**4.SOFTWARE REQUIRED:** Auto CAD Software 2024

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5. COMMANDS USED:

- UNITS(UN)
- LIMITS
- DIMSTYLE(D)
- Z Enter + A Enter
- PTYPE
- POINT(PO)
- LINE(L)
- DTEXT(DT)
- OFFSET(O)
- EXTEND(EX)
- COPY(CO (or) CP)
- MTEXT(MT)
- CIRCLE(C)
- JOIN (J)
- FILLET(F)
- ELLIPSE
- MIRROR(MI)
- PROPERTIES(PR)
- MOVE(M)
- ROTATE(RO)
- TRIM(TR)
- MATCHPROPERTIES(MA)
- DIMLINEAR (DLI)
- DIMANGULAR (DAN)
- REGION(REG)
- GRADIENT

6. PROCEDURE:

- Open the Auto CAD window.
- Set the required limits and grids.
- By using the F3 key (OSNAP command), the dialog box will be open and select the end point, mid point etc.
- By using the F8 key, the ortho is ON.
- By using DD CUPS command, the UCS (User Coordinate System) dialog box will be open and select the required view.
- Draw the different parts of the detailed drawing for the cross head by using draw and edit commands.
- By using line command, join all parts of detailed drawing.
- By using hatch command, the required portion of drawing was hatched.

7. RESULT:
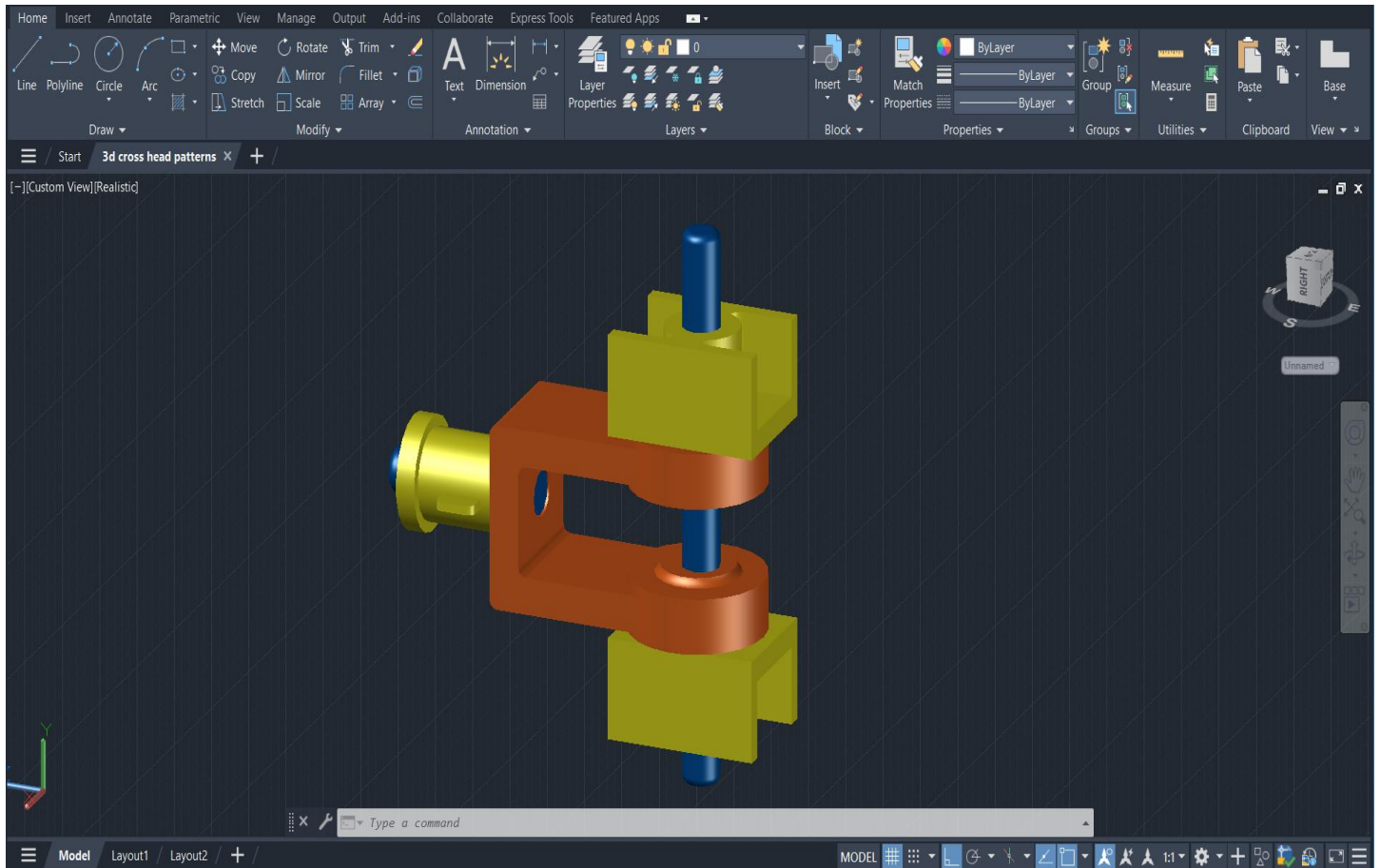
Thus the given 3D Cross Head Pattern is drawn by using Auto CAD commands as per sketch.

8. PRECAUTIONS FOR PERSONAL AND SYSTEM SAFETY:

1. Students are not allowed to move, change or replace any computer peripheral.
2. Students should exit all programs and return to the window desktop before leaving the computer UPS is used.

9. APPLICATION OF THE SKILL IN PROFESSIONAL LIFE:

1. A cross head is mechanism used as part of the slider-crank linkages of long reciprocating engines reciprocating compressors to eliminate sideways pressure on the piston
2. Cross heads are also used in steam engines

10. CONCLUSION:

1. We successfully modeled and assembled the parts of cross head pattern using AUTO CAD SOFTWARE 2024. Rendered a life like image of cross head pattern assembly using photo view 360 adding in AUTO CAD 2024. We also tried to stimulate the motion of 3d cross head pattern.

2. After completion of Auto CAD we have known that how the cross head pattern is useful, and knowing the construction and how the mechanism works. Cross head pattern is made of forged steel, cast steel and white metal

11. REFERENCES :

1. Dr.B.K. Roy Design Analysis and Optimization of various parameters of cross head patterns of steam engine using CAE Software's International Journal of new innovations in engineering and technology October 2012

2. https://grabcad.com/library/crosshead-assembly-30/details?folder_id=10066804

3. https://www.youtube.com/watch?v=wiwHxjHoDDk

4. https://www.youtube.com/watch?v=NQpq_YO0CiE

5. https://grabcad.com/library/crosshead-assembly-25