SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF MECHANICAL ENGINEERING

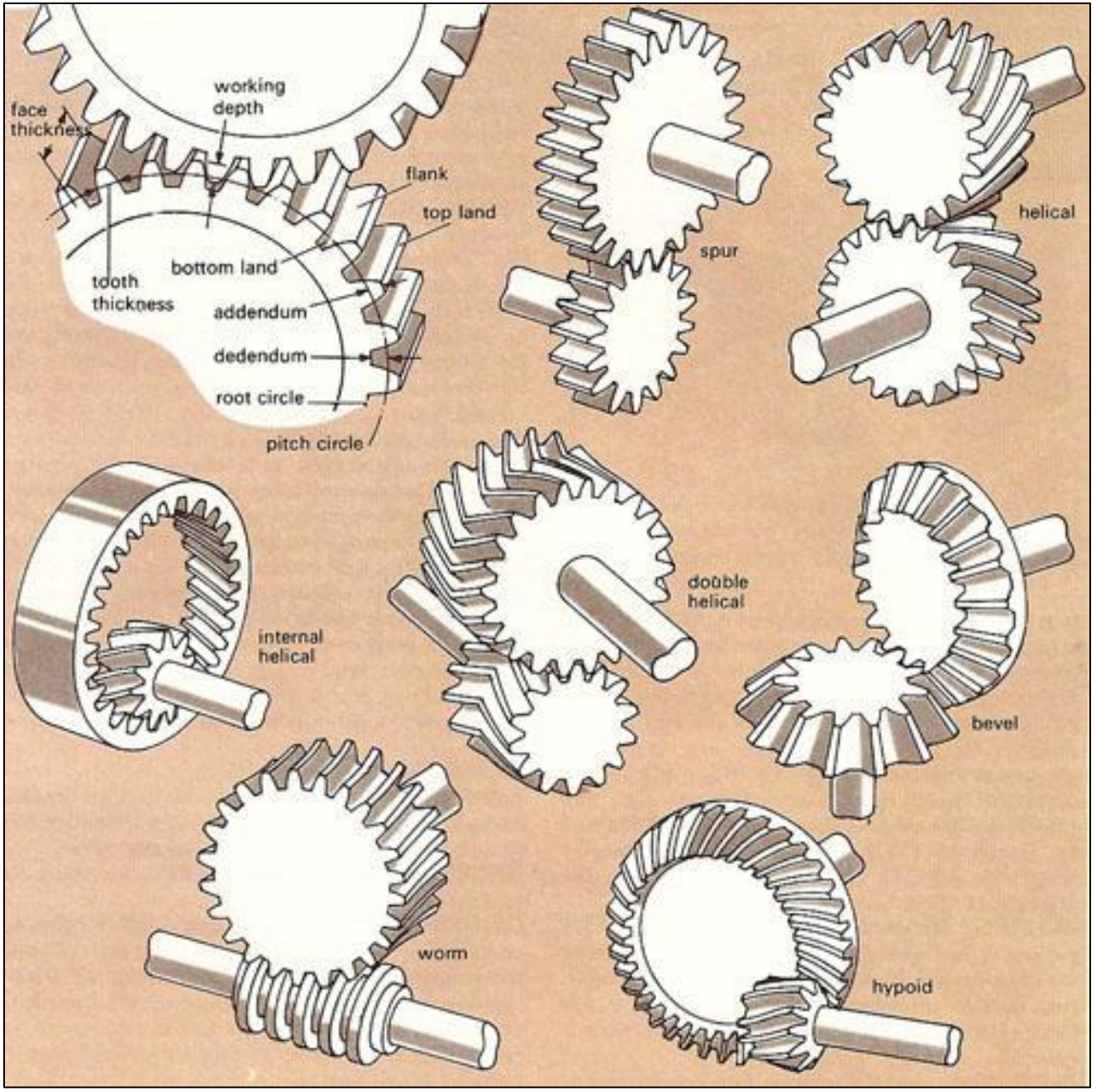
19MET303 – DESIGN OF Transmission System

III YEAR VISEM

UNIT 3-Worm and Bevel Gear

TOPIC:Worm Gear

GEAR TYPES


working depth
face thickness
flank
top land
bottom land
tooth thickness
addendum
dedendum
root circle
pitch circle
spur
helical
internal helical
double helical
bevel
worm
hypoid

WORM GEAR

1. Used to connect non parallel and non intersecting shafts – hypoid, crossed helical gears
2. Quiet and noiseless operation – more teeth are in contact
3. High speed ratios for overall small dimensions- Gear ratio of 100 can be possible. For spur gears 3 stages are required and gear ratio is less than 7 and space requirement is higher.
4. Irreversibility or self locking capability – ability to make movement in only one direction
5. Motion cannot be transmitted from wheel to worm
6. Mainly used in load hoisting applications
7. When the lead angle of the worm is greater than the friction angle – drive is reversible

WORM GEARS - INTRODUCTION

Worm gears resemble screws, and can be used to drive gear wheels (spur gears or helical gears).

They allow two non-intersecting shafts at right angles to mesh with each other.

Worm drives provide a large reduction in speed. For one rotation of the worm gear, the gear wheel moves by a distance of one tooth.

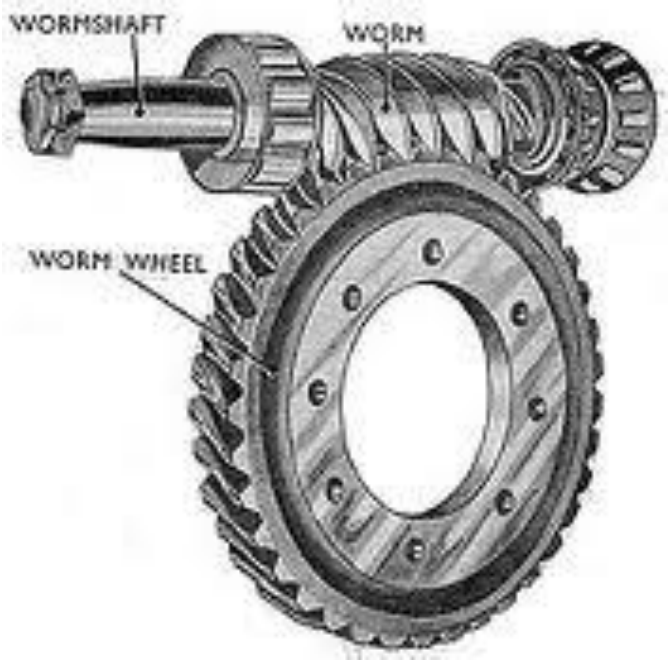
They are typically used in gearboxes, where large reductions in speed, for example 300:1, are required.

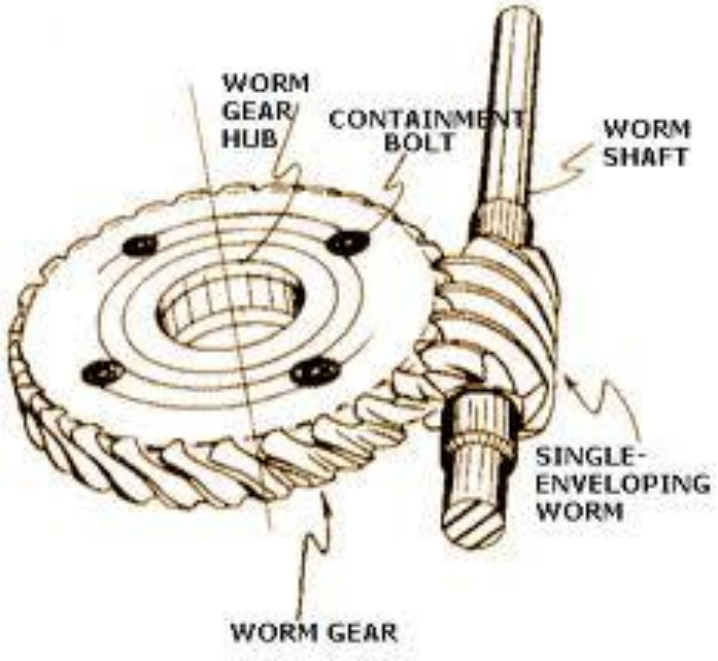
Worm gears

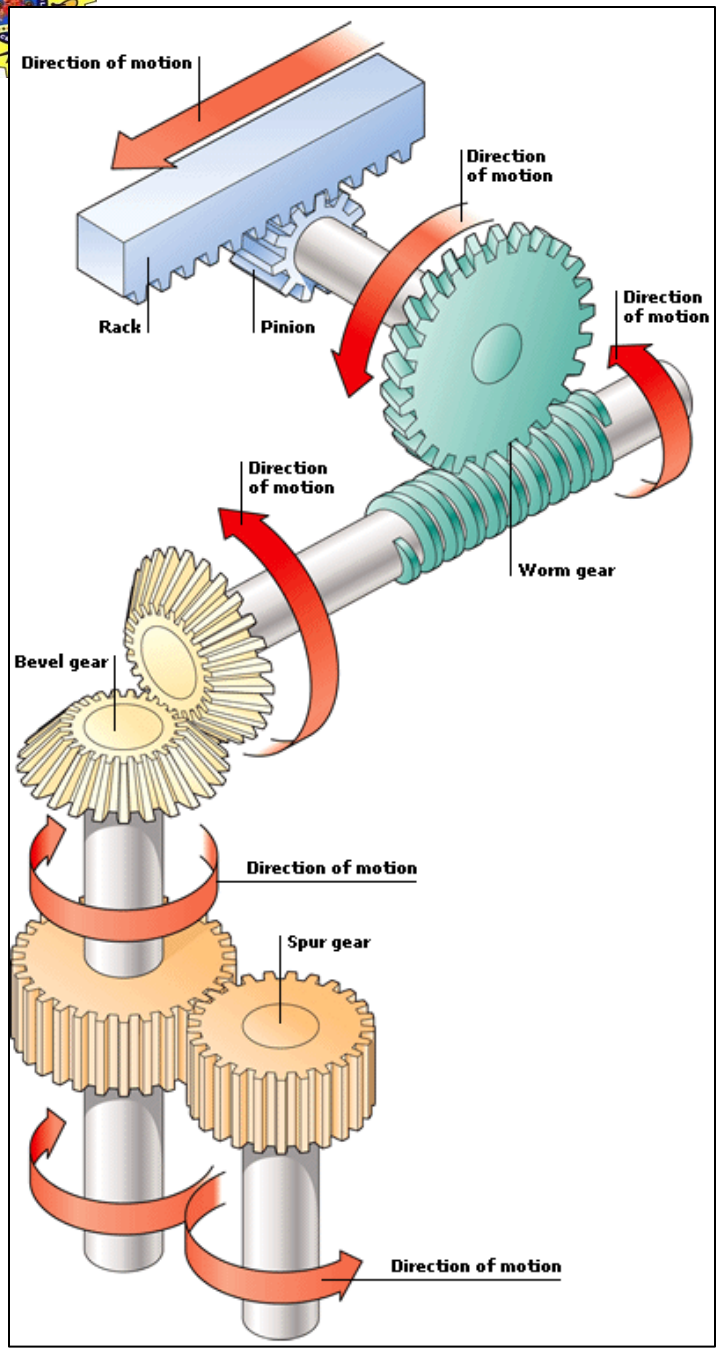
Spur gears

Helical gears

WORM GEAR


WORMSHAFT
WORM
WORM WHEEL


WORM GEAR HUB
CONTAINMENT BOLT
WORM SHAFT
SINGLE-ENVELOPING WORM
WORM GEAR



1. Gears are pairs of wheels with teeth around their edges that mesh and turn together.
2. Gears are machines because they multiply turning force or speed.
3. If one gear wheel drives another that has more teeth, the wheel with more teeth turns more slowly but with greater force than the other.
4. If a gear wheel drives another with fewer teeth, the wheel with fewer teeth turns with less force but faster.

WORM GEAR

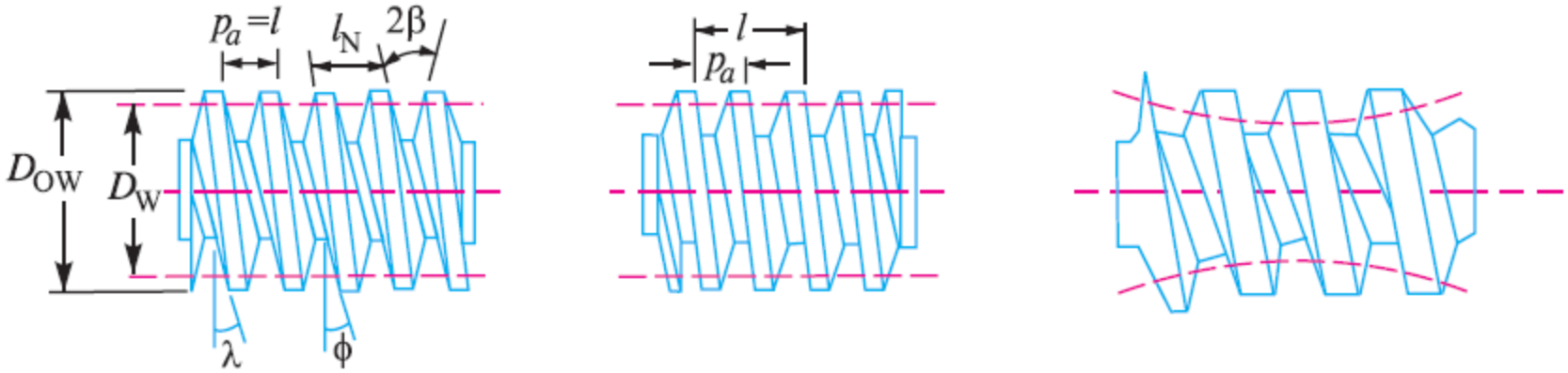
WORM GEAR

TYPES OF WORM GEAR

CYLINDRICAL OR STRAIGHT WORM GEAR :

The shape of the thread is in volute helicoids of pressure angle 14 ½° for single and double threaded worms and 20° for triple and quadruple threaded worms. The worm threads are cut by a straight sided milling cutter having its diameter not less than the outside diameter of worm or greater than 1.25 times the outside diameter of worm.

CONE OR DOUBLE ENVELOPING WORM

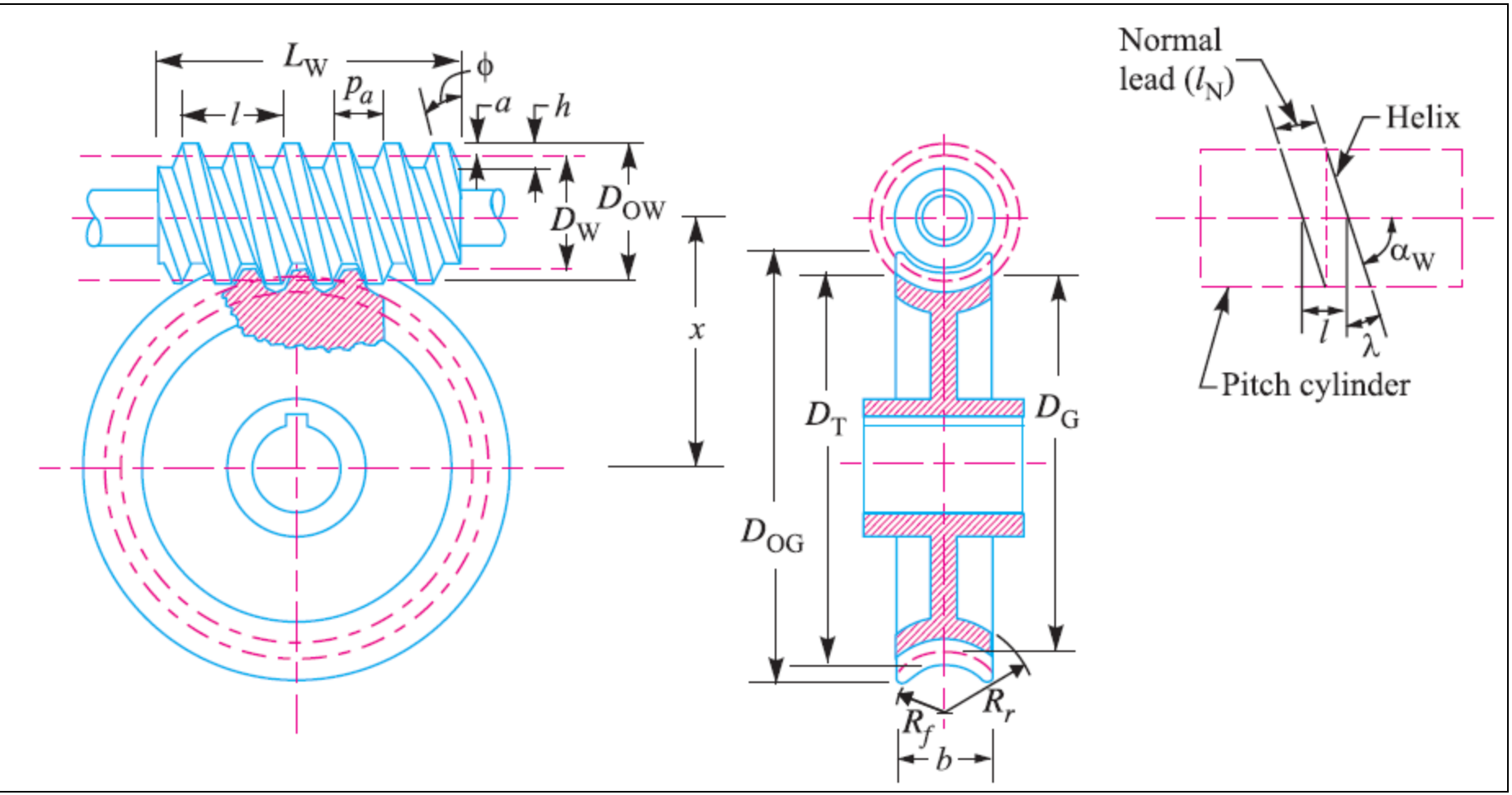


Single threaded. Double threaded.

(*a*) Cylindrical or straight worm. (*b*) Cone or double enveloping worm.

WORM GEAR

WORM GEAR - NOMENCLATURE



WORM and WORM WHEEL

LEAD ANGLE (γ) – ANGLE BETWEEN TANGENT TO THE PITCH HELIX AND THE PLANE OF ROTATION

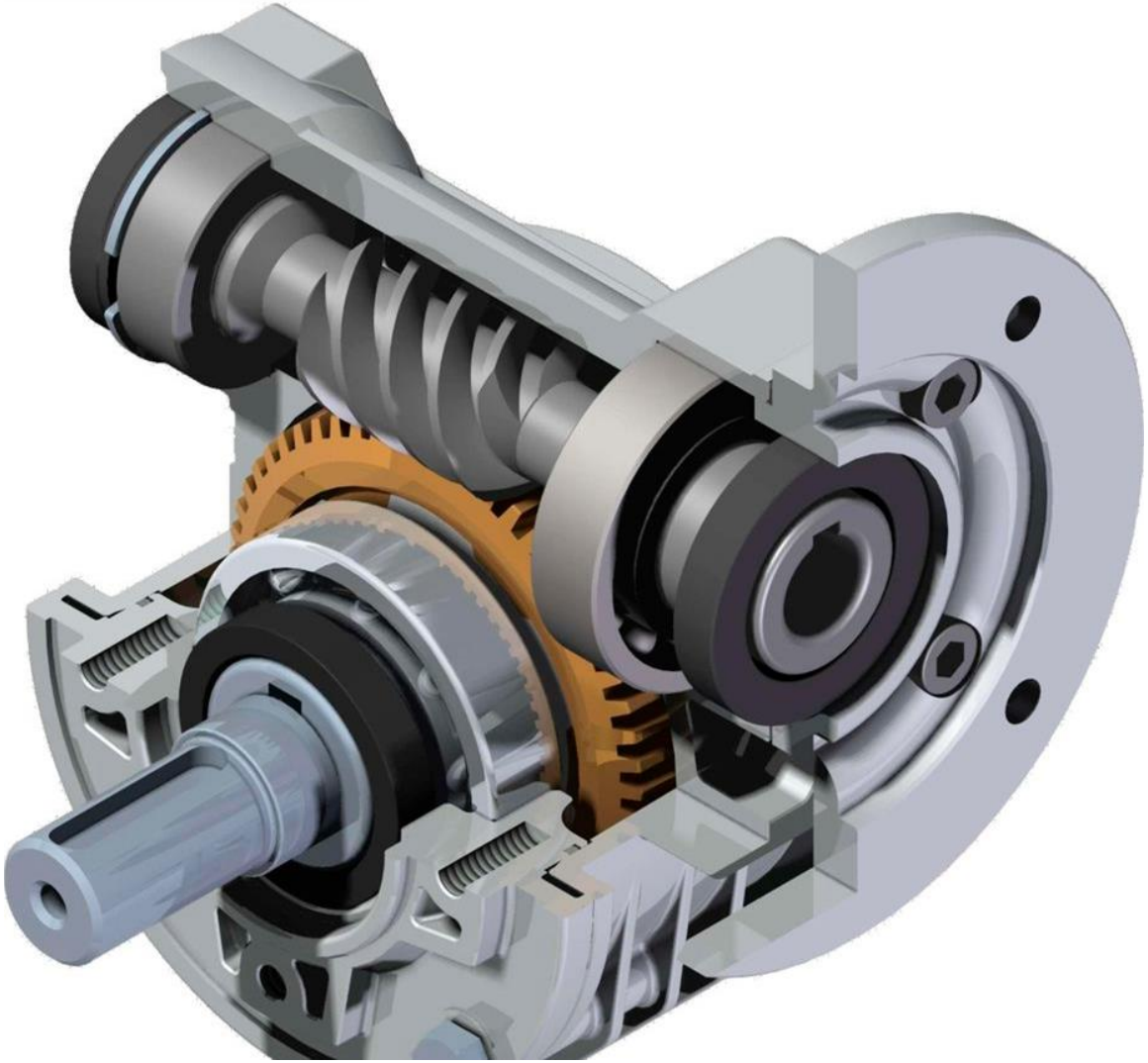
AXIAL PITCH – DISTANCE BETWEEN A POINT ON A WORM THREAD AND A CORRESPONDING POINT ON THE ADJACENT THREAD MEASURED PARALLEL TO THE AXIS

LEAD = NUMBER OF THREDS IN THE WORM * PITCH

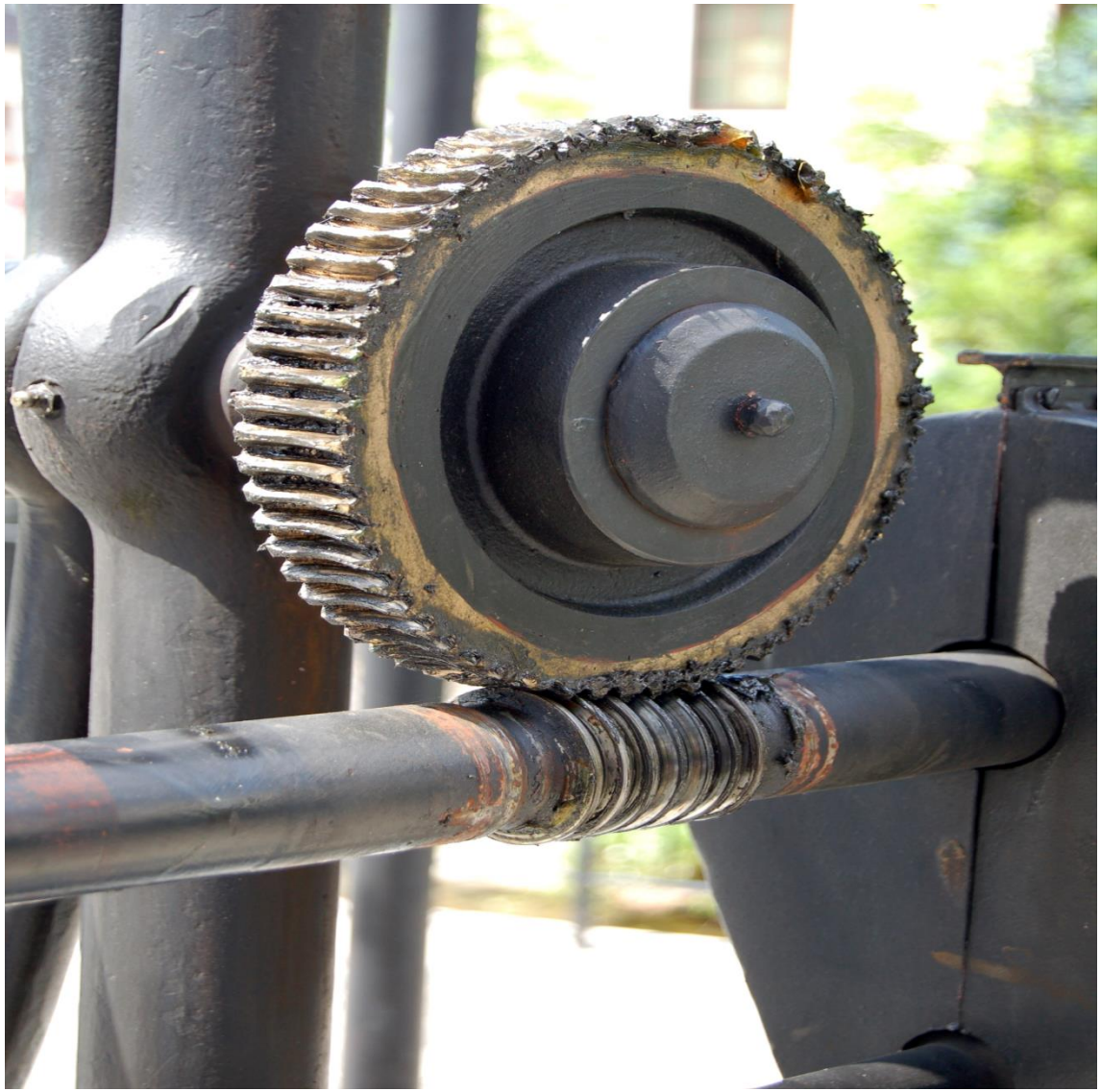
GEAR RATIO = NO OF TEETH ON THE WORM WHEEL/ NO OF STARTS OF TH WORM

WORM and WORM WHEEL

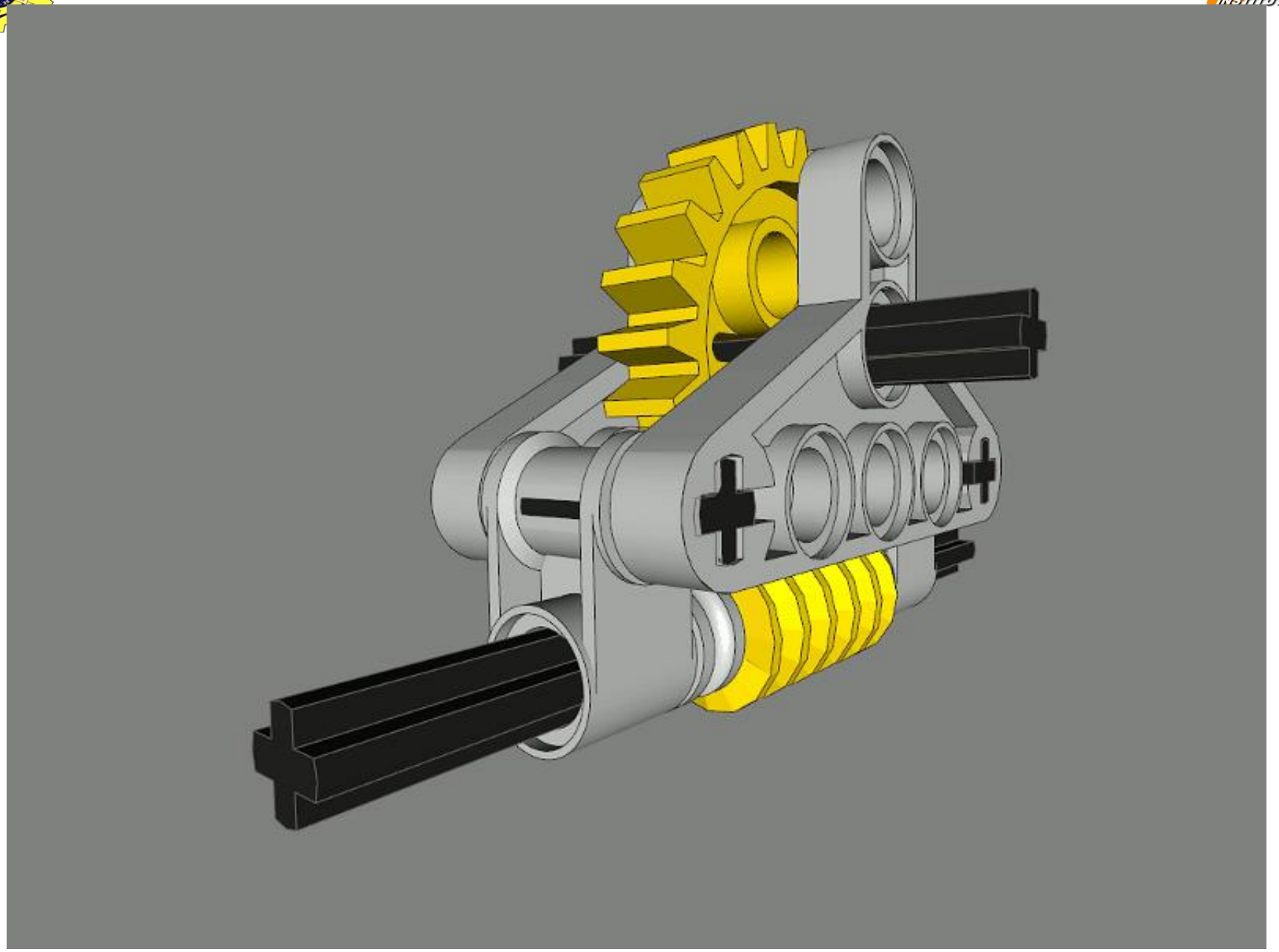
WORM GEAR BOX



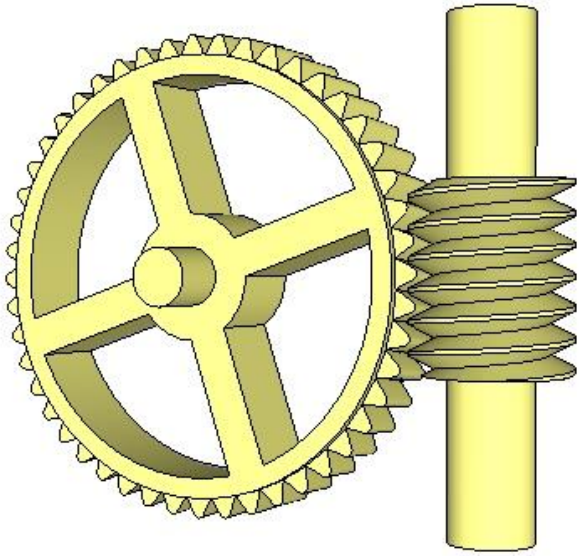
WORM and WORM WHEEL



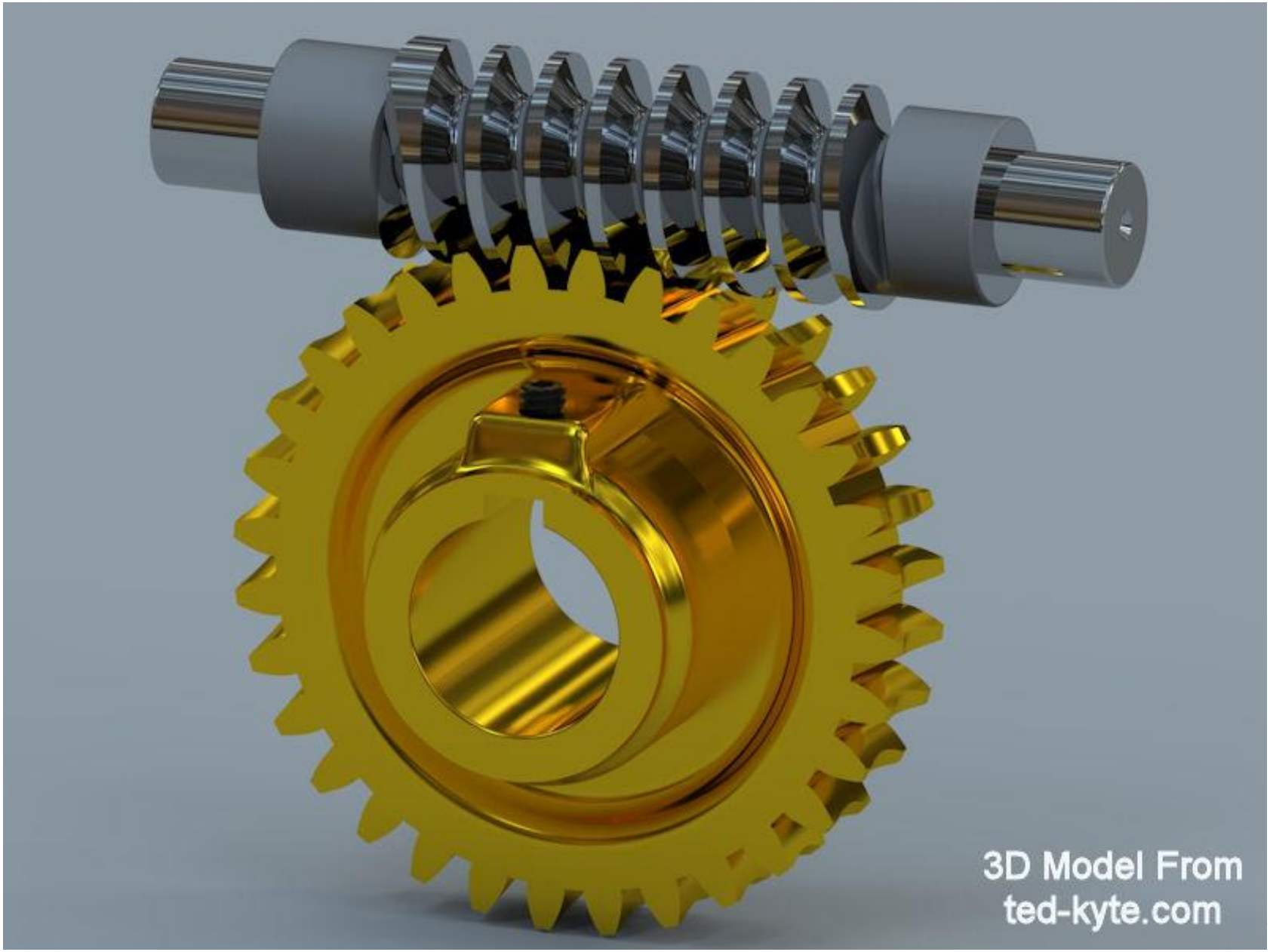
WORM GEAR



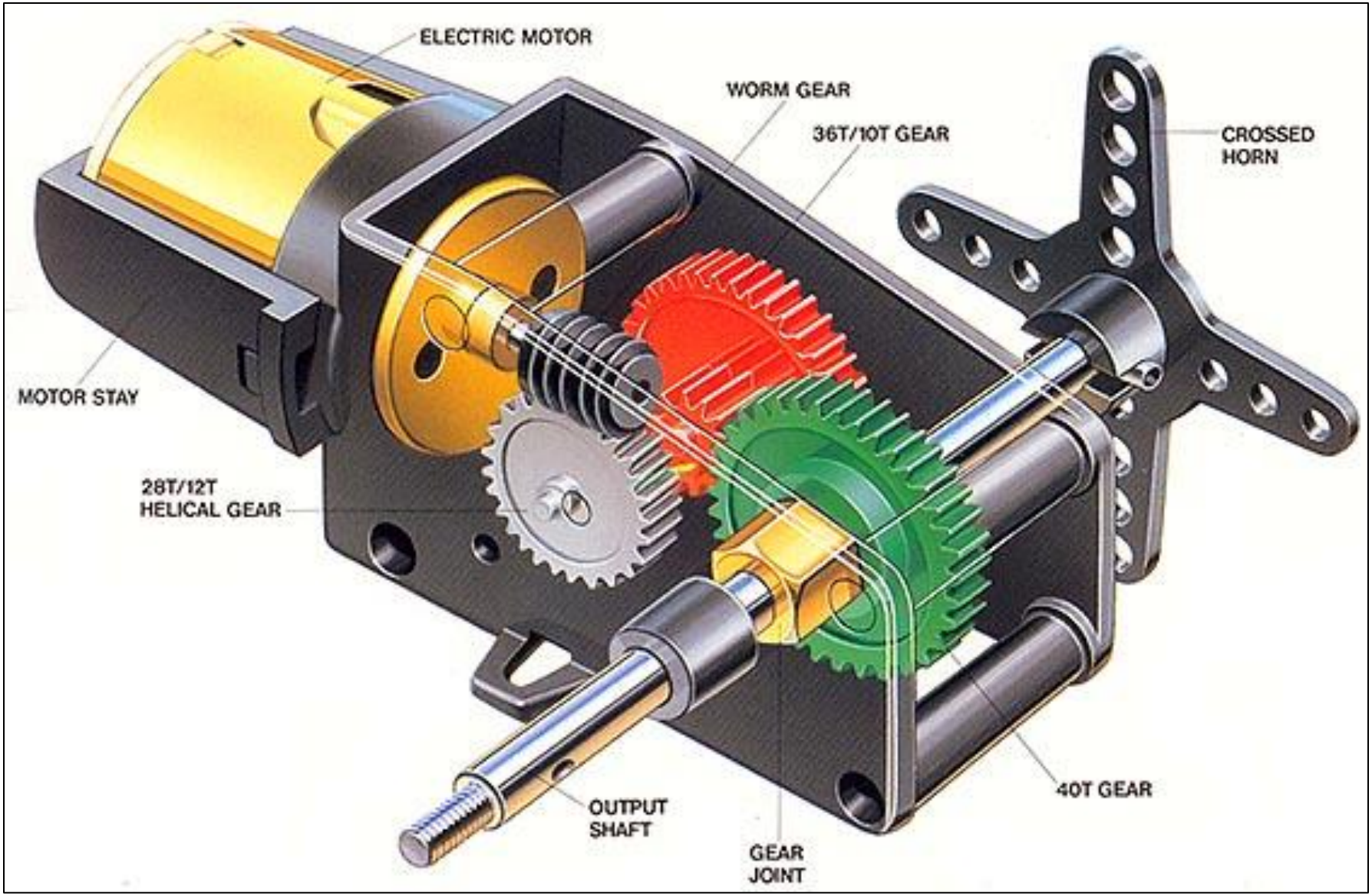
WORM and WORM WHEEL



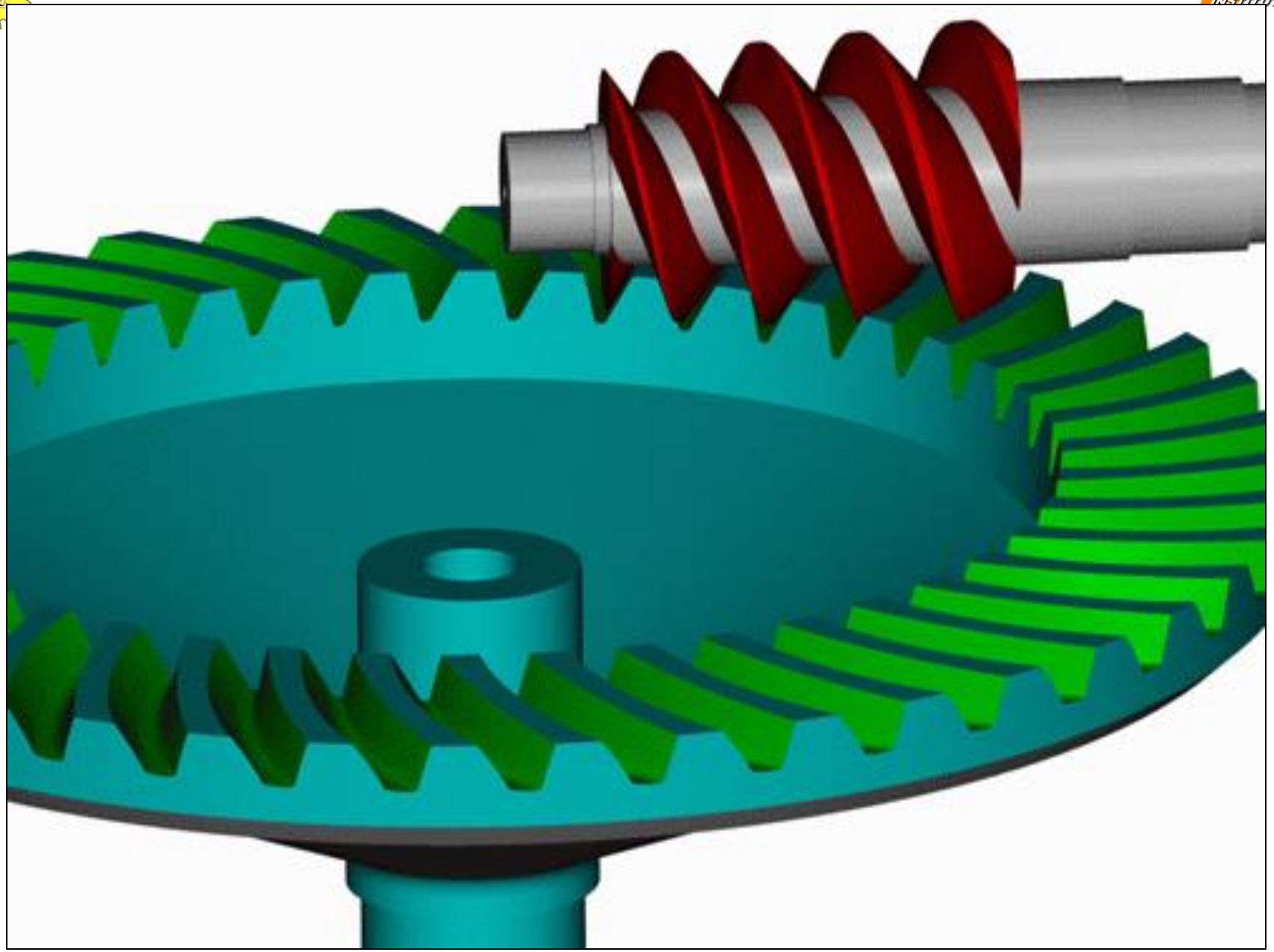
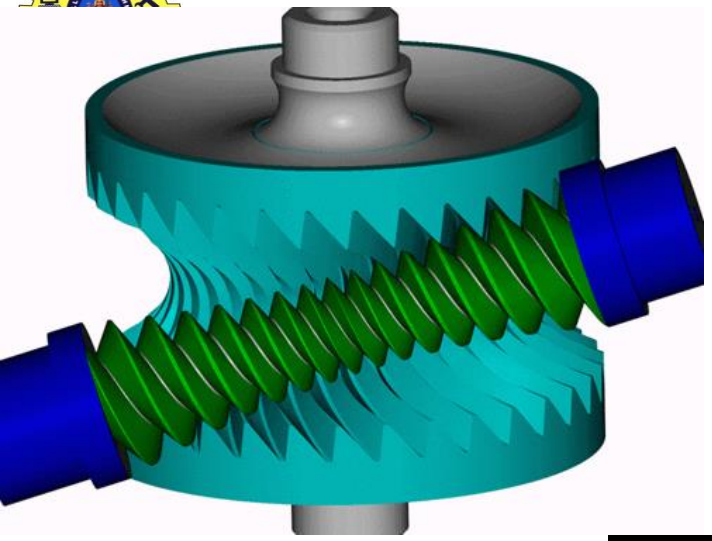
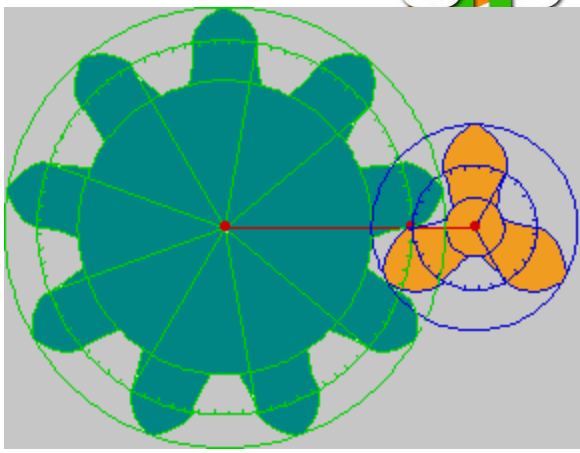
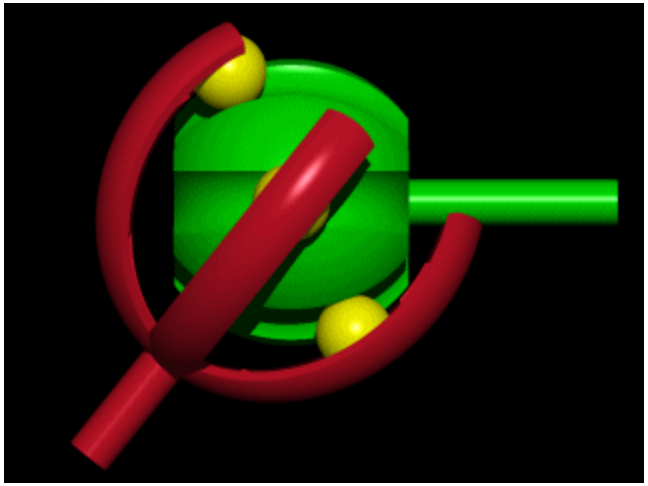
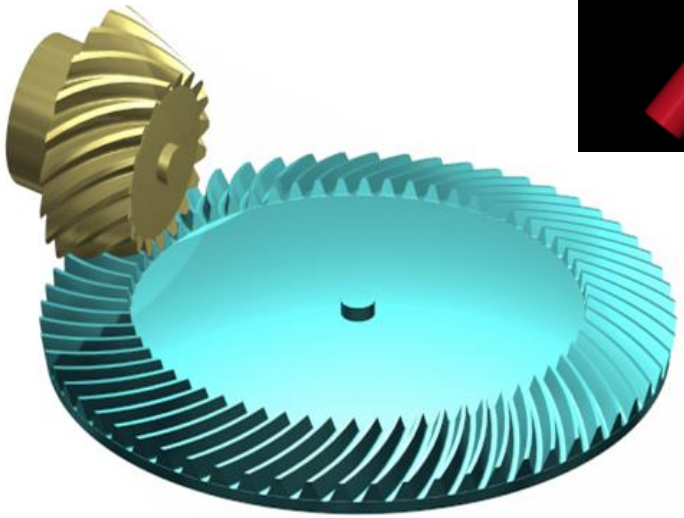
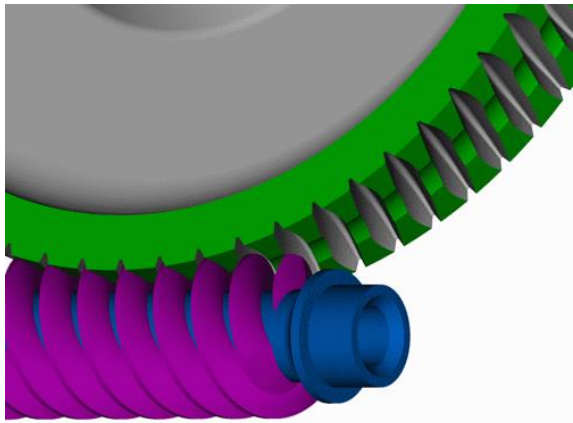
WORM and WORM WHEEL



WORM GEAR BOX



SPIRAL BEVEL GEAR



BEVEL AND WORM GEAR