UNITS-2- REVERSE ENGINEERING AND CAD MODELING

Reverse engineering has advanced significantly in recent years as a result of advancements in software, scanning technologies, and greater demand produced by 3D printing. Scanning and obtaining the 3D model is a simple process. Modifying the model or converting it to feature-based CAD takes the most time. Geomagic Design X is the greatest software available for producing CAD from scanned data.

It comes with all of the tools needed to execute any reverse engineering assignment. The sole disadvantage of Geomagic Design X is the price, but if you have frequent reverse engineering needs, it is worthwhile to invest in a full-fledged package. Space Claim is a good alternative to Geomagic Design X, and the price is equally reasonable. If you already have the CAD software SolidWorks or Rhino3D, Xtract3D and Mesh2Surface are also viable options.

Reverse engineering simplifies the design process by utilizing existing knowledge and building on it. It eliminates the need to start from scratch. The procedure starts with an existing part, measures its surface, and then uses that data to build the new design. It entails obtaining a better knowledge of how and why the original part was designed in the manner that it was (known as design intent). When designing the new part, use this intelligence to your advantage. It lowers product development costs and shortens the design cycle.

What is Reverse Engineering?

The act of creating a geometric CAD model from data obtained by scanning an existing physical model is known as reverse engineering. The measurements are in the form of 3D point clouds that correspond to points on the surface of the re-engineered object. Using CAD models to represent scanned objects is very significant in many sectors since it helps to enhance design

quality and productivity. Furthermore, they accelerate the manufacturing and analytical processes. Constraints are discovered and maintained automatically. Constraints convey design intent while also ensuring resilience.

Reverse engineering is when a product or system is deconstructed to figure out how it was built. In computer-aided design (CAD), a model is usually built the opposite way – from an original design to a final prototype.

Traditional methods can be used, such as measuring and drawing the object's dimensions by hand, but using CAD scanning techniques is a better option when trying to capture complex information.

When using CAD to reverse engineer a product, it has to be scanned and measured using rapid surfacing and solid modeling techniques. 3D scan data is the most efficient way to generate a CAD model from a physical object. It is the most critical step in the process of reverse engineering a product.

During the process, both hardware and software are used. The hardware measures the object and the software is used to reconstruct it, much like a new design would be created. The hardware that can be used in capturing the object includes a laser scanner, a structured light digitizer, or a measuring machine.

Once the information from the physical object is captured, the data needs to be analyzed and deconstructed so that a new design can be created from it. That's where CAD software comes in.

Applications of Reverse Engineering

Reverse engineering is useful for the following purposes:

- ➢ Enhancing or altering the design of current products
- ➢ Components for construction that are entirely compatible with existing items
- ➢ Parts that have become worn or broken must be repaired

- Creating a CAD file for legacy parts that do not have drawings or CAD.
- Surfaces or features that are extremely difficult to replicate without reverse engineerings, such as organic-shaped portions