UNIT II

CNC MACHINE TOOLS AND COMPONENTS

Numerical control

Numerical control is the automated control of machining tools by means of a computer.

Numerical control (also computer numerical control, abbreviated CNC) is the automated control of machining tools (such as drills, lathes, mills, grinders, routers and 3D printers) by means of a computer

Distributed Numerical Control (DNC)

Distributed Numerical Control (DNC) is an application on a central server. The NC programs are managed directly via a database. DNC is an essential component in production because DNC enables traceability in production. It ensures that every communication between the program and the CNC machine is logged.

The main functions of DNC systems are as follows: A way for computers to store and edit programs for every machine tool connected in the network

Adaptive control system (CNC)

Adaptive control is the continuous monitoring of cutting load and automatic adjustment of cutting feed rate based on the load

Maintenance Of CNC Machines

Daily Maintenance:

Check lubrication levels; replenish if needed

Grease parts that look dry

Check coolant concentration and fill levels

Empty chip hopper

Check levels of hydraulic system

Wipe down all surfaces to keep small metal shavings from building up

Monthly Maintenance:

Clean/replace air filters

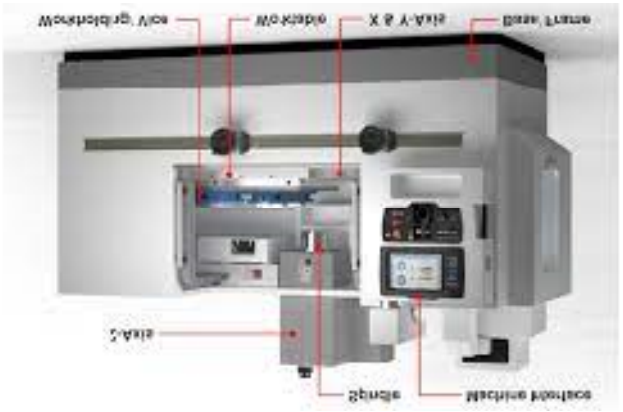
Check and clean coolant filters

Clean radiators and cooling fans

Review oil fill checklists for unusual oil consumption

Remove and clean chuck and jaws

Grease and adjust chains or conveyors



Yearly Maintenance:

Remove coolant tank completely; take out metal chips not caught by the conveyor; check for bacterial growth; inspect and clean the system

Test hydraulic oil for contaminates; replace filters

Drain and clean lubrication unit; change oil

Check headstock for tapering

Check drawbar tension

Inspect chuck cylinder

Run backlash program; replace the X and Y axis gibs if needed

Coolant — Tooling moves quickly, which means heat. Without proper coolant levels and concentration, Parts being machined and tooling will quickly become ruined.

Cooling Oils---spindles move quickly, and often run over 10,000 RPM. which means heat. Thermal problems are easy to avoid with the right cooling system in place, and temperature sensors alert to anything out of the ordinary.

Lubrication — In most machinery, oil/grease keeps things running smoothly. Moving parts get dry and need lubrication to reduce unwanted wear.

Other fluid levels, such as hydraulic fluid, need to be replenished in CNC machines, too. Excessive use of fluids is a red flag that the machine may have a problem.

Surfaces — Shop grime builds up if left unchecked. Wipe down all surfaces — window, door, light, handle, etc. — to ensure visibility, good grip, and an overall clean working environment.