Comparison of CNC with DNC

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ABSTRACT

The main objective of the paper is to provide a common environment where the evaluation of a given general order and later composition of work orders, and designation of production resources could be done automatically under the operator's supervision. The model is functionally included into the five level computer-integrated manufacturing (CIM) hierarchy. Functions of the model are plugged into the lower four levels by means of technological database management system that supports main functions of information flow, which flows through the backbone of CIM system. CNC stands for computer Numerical Control and been around since the early 1970s.Prior to this. It was called NC, for Numerical Control. While people in most walks of life have never heard of this term, CNC has touched almost every form of manufacturing process in one way or another. If you will be working in manufacturing, it is likely you will be dealing with CNC on a regular basis.

Keywords:- computer integrated manufacturing, numerical control, CNC, technological database management system.

1. INTRODUCTION

The problems of equipment maintenance, online machine tool designation, and control over the production flow forced the integration of formerly distributed tasks between the two levels. The fact is that shop floor data emerge from the production process so they need to be treated at the same time and in the same place as the production data. To deal with this fact in an effective way the DNC concept was broadened to meet the requirements of machine tool and production data acquisition as well as to fulfill some present needs of production environments. These are mainly caused by the more and more important role of maintenance tasks, which are already incorporated into production plans. In this manner the DNC concept was not only broad—it got a completely new meaning, so we can talk about a new DNC concept, the DNC concept of the third generation.

Fig.1 DNC concept of third generation
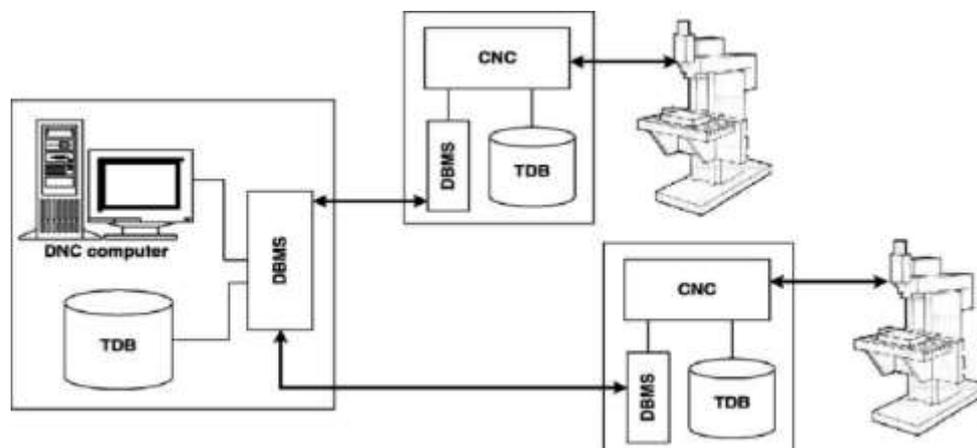
2. WORKING

Working of CNC system involves certain steps which are enlisted below and explained in brief:- All CNC types share this commonality: They all have two or more programmable direction of motion called axes. An axis of motion can be linear or rotary. One of the first specifications that imply a CNC machine's complexity is how many axes it has. Generally speaking, the more axes, the more complex the machine.

CNC SYSTEM:- Think of giving any series of step-by-step instructions. A CNC program is nothing more than another kind of instruction set. It is writing in sentence-like format and the control will execute it in sequential order. step-by-step. A special series of CNC words are used to communicate what the machine is intended to do. CNC words being with letter address. When placed together in a logical method, a group of CNC words makes up a command that resembles a sentence. The CNC control will interpret a CNC program and activate the series of commands in sequential order. As it read the program, the CNC control will activate the appropriate machine functions, cause axis motion, and in general, follow the instruction given in the program.

DNC SYSTEM:- Once the program is developed (either manually or with a CAM system,) it must be loaded into the CNC control Though the setup person could type the program right into the control, this would be like using the CNC machine as a very expensive typewriter. If the CNC program is developed with the help of a CAM system, then it is already in the form of a text file.

Direct Numerical Control: The first attempt to use a digital computer to drive the NC machine tool was DNC, This was in the late 1960s before the advent of CNC. As initially implemented DNC involved the control of several machine tools by a single (mainframe) computer through direct connection and in real-time instead of using a punched tape reader to enter the part program into the MCU, the program was transmitted to the MCU directly from the computer one block of instructions at a time. First of all, DNC isn't of importance to companies that don't have CNC machines. However, if the reader of this document works with or is interested in CNC machines, then DNC can be important.

As a definition DNC is an acronym that can mean Distributed Numerical Control or Direct Numerical control depending upon the application. Another definition for Direct Numerical Control is that it is a data communications system connecting a group of numerically controlled machines to a common computer that has substantial memory for the storage of numerous numeric control (NC) part programs and has provision for on-demand distribution (downloading of NC Programs to the machines). Usually, this type of system has additional provisions for the management, display, and editing of NC part programs.

These days when someone uses the term DNC they are usually referring to Distributed Numerical Control where an NC program is sent from a personal computer (PC) to the memory of a computer numeric control (CNC) machine. The program runs from the memory of the CNC machine.

Fig.2 data flow in DNC system
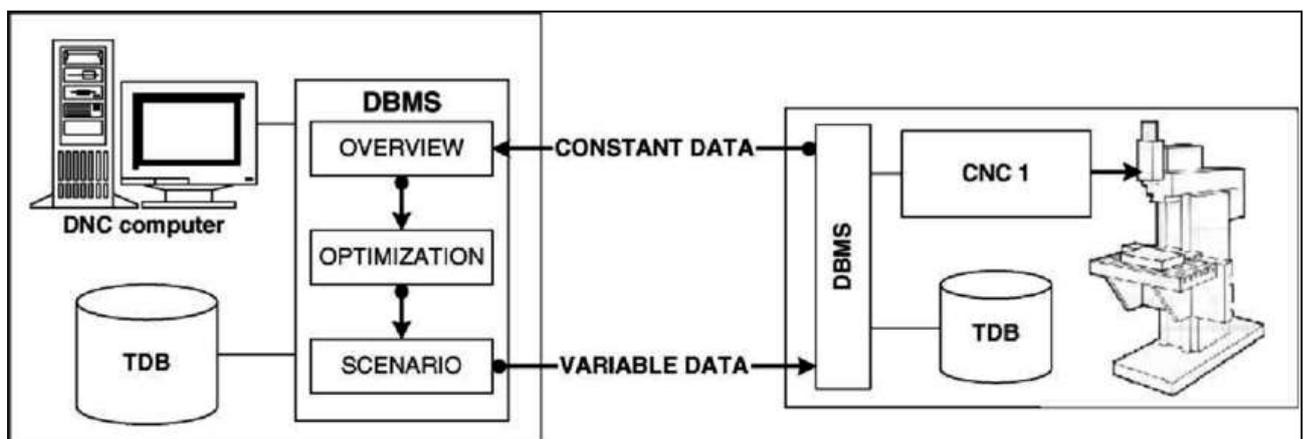
3. ADVANTAGES

1. Nonproductive time is reduced:
2. Grater accuracy and repeatability:
3. Lower scrap rates:
4. Inspection requirements are reduced
5. More complex part geometries are possible:
6. Engineering changes can be accommodated more gracefully:
7. Simpler fixtures are needed:
8. Reduced parts inventory;
9. Less floor space required:
10. Operator skill.

4. CONCLUSION

An effective approach to the production planning tasks is nowadays a crucial factor for a competitive company in a modern global market . A shop floor is a place where a new value is added to the raw material. Therefore, will quality and accuracy of the production process on the shop floor directly affect the costs and indirectly the profits made in the market. The described paper not only gives a possibility for partial automation of time-consuming processes but rather tends to introduce new methods and principles of process planning tasks. The presented idea of the technological database is unique in its structure, which gives a possibility of many different data manipulations that can be used for various automation purposes. It is suitable also to be incorporated into the CNC control device, which gives some new control possibilities to the operator and for the first time enables the production manager to gather the actual production data by a means of simple queries incorporated into the database management system. The wealth of information gathered this way is far beyond the scope of DNC systems known in a nowadays market. The operator can combine different data to get any important conclusion he or she needs. Besides, the technological database is open and can be upgraded with different data sets to give a user the possibility to build his own information frame.

5. REFERENCES

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