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Automated Manufacturing System

Topic 3: Factory Automation

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Factory Automation (FA)

- FA technology is indispensable for integrating manufacturing sites and becomes the crucial parts in Computer Integrated Manufacturing (CIM).

- The FA technology can be broadly divided into:

    - FA information processing technology,

    - FA specific technology,

    - FA design evaluation technology.

FA computer

- At the manufacturing site, the FA computer is an important equipment to:

    - communicates the production management information to the operator,

    - send NC data to the machine tool,

    - give feedback to the supervisor for the operating status and failure situation

- FA computers can be classified as:
    - personal computer type,
    - minicomputer type
    - exclusive type.

Requirement for FA computers:

- Simplicity of system construction
- Connectivity of various equipment
- High-speed real-time processability
- Hardware reliability

Simplicity of system construction

- In order to start factory automation effectively, it is good to have the system that free to expand or change the system.

- A system also must be a simple software that can be handled by any person in charge of production technology and not by specific employees.

Connectivity of various equipment

- The system must be easy to connect to control equipment of heterogeneous computers and machine tools.

- Since MAP is set as a standard protocol as FA-LAN, it can be easily connected to the MAP network, and since the data amount becomes larger year by year and the high speed of equipment is required, the system must be able to cope with the flexibility.

High-speed real-time processability

- In the production process, production instruction changes and machine troubles occur frequently, and a lot of interrupts come in to the operating FA computer.

- For this reason, the system need to be able to deal with these as much as possible, so it is necessary to process multitasking processing and interrupt processing in real.

Hardware reliability

- At the production site, there are many dusts and vibrations, hot and humid, and many facilities such as electric discharge machines generate noise.

- For this reason, severe environmental characteristics are required compared with Office Automation equipment.

- In addition, since many facilities operate for the 24 hours, reliability to withstand full operation is required.

- This is evaluated by the RAS function where RAS means Reliability, Availability and Serviceability.