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## BMS

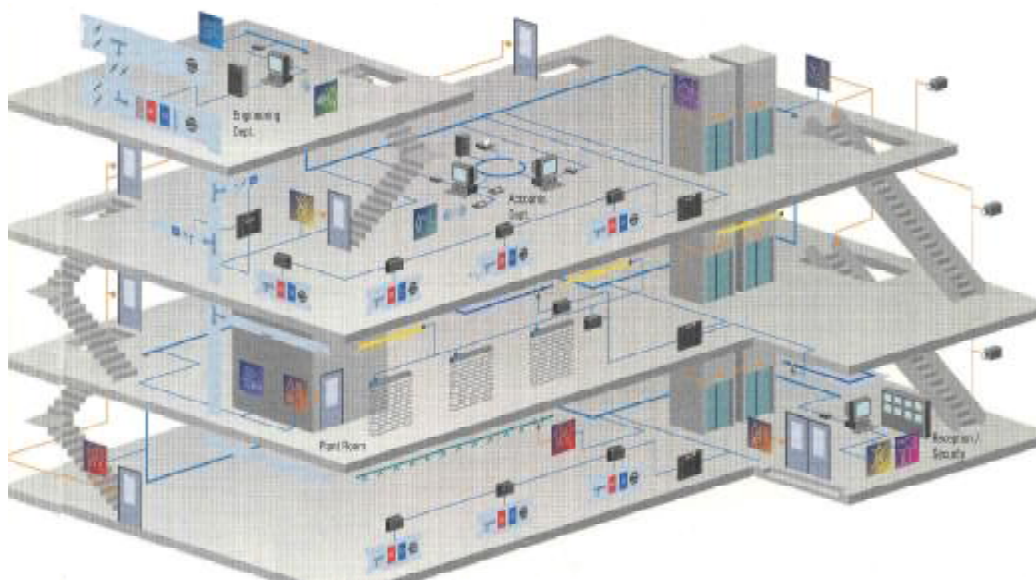
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### Abstract:

BMS (Building Management System) is our future. And why can't we live like that now? In future we should live in a more comfortable environment and that is why techniques should become cleverer and powerful, for example cars with navigation devices and self parking. The same way intelligent building systems make our lives easier, since it overtakes many functions. BMS provides wide range of possibilities that help to house systems, increase comfort level, security and to saves resources (electricity, heating, conditioning, water and so on). For example, if you have left open window in the house and it starts raining, then the system shuts the window. The system can be connected with many home appliances and devices, but lights, heating and climate control are the intelligent system more frequent use. Definite temperature regime can be fixed in each room and you can change this temperature on a definite day. For example on the days that you are not at home or in the middle of working days in winter you can automatically reduce heating temperature.

### Introduction:

Building Management Systems (BMS) (also called Automation or BAS) are used in buildings for automatic monitoring and control of services such as lighting, plumbing, fire services, heating and air conditioning systems. The term refers to a system that uses sensors, controls and activators. All these use an electronic digital processor to implement control algorithms and have the capability of communicating with other controls. The BMS term covers all control elements, including hardware, controllers, any linking network and central controllers.



### Control elements:

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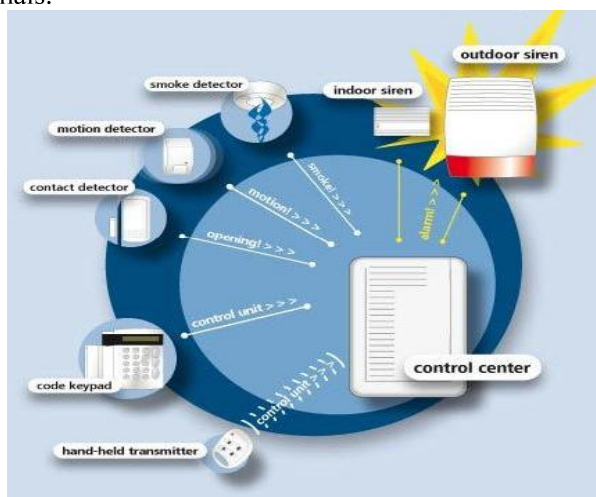
Generally, a control system consists of three basic elements: a sensor, a controller and a controlled device. The organization of these various control elements into a comprehensive BMS is termed the system architecture. Each component in this architecture is connected with each other via a

communication system. The communications network is characterized by two essential parts:

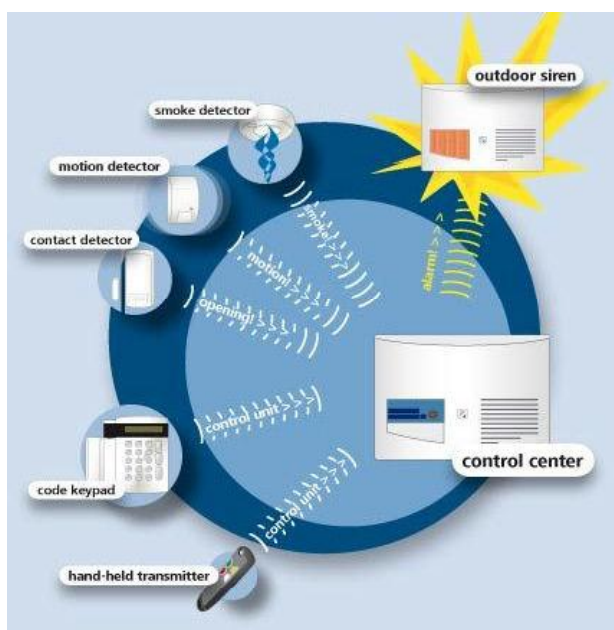
- Physical medium - that transports the signals, e.g. wire, optical fiber, radio.

- Protocol - a set of common language rules for the communication signals.

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۲- Wired alarm system



۳-Radio alarm system (anson, ۲۰۰۸)

Several protocols have been developed but not all of them have been exploited for use in BMSs. Historically, manufacturers have developed their own proprietary protocols, but there is now a strong move for standardized protocols. A major advantage of using a BMS network with a standard operating protocol is the degree of compatibility that may be achieved between different pieces of control equipment; it is the benefit of using a “single seat workstation”. BACnet is one the most high level protocols used in the BMS industry that can be used to integrate building automation and control products from different manufacturers into a single cohesive system.

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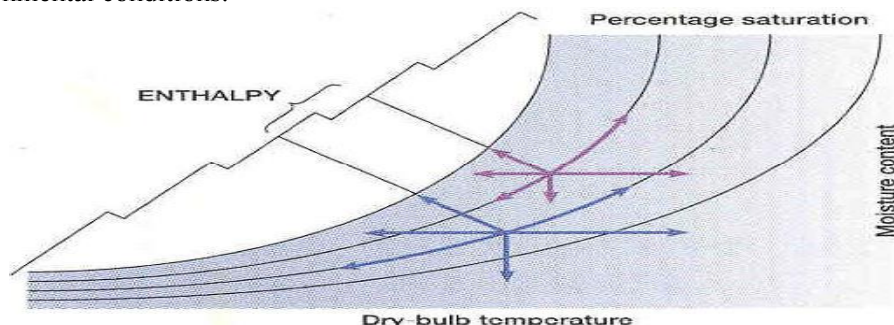
### Primary Functions of Building Management Systems:

Building management systems provide a variety of functions.

These are listed below:

#### ۴-۱- Automatic ON/OFF switching of plant:

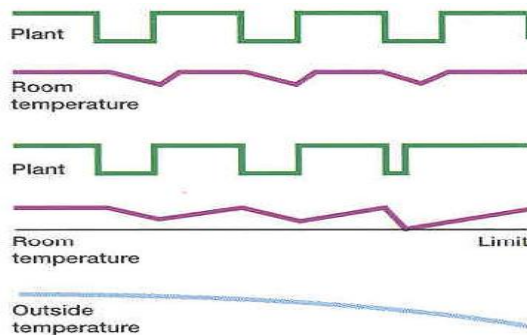
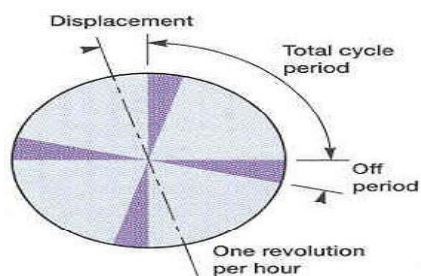
This can be based on time, type of the day and/or environmental conditions.



۴-Enthalpy control changes building operation mode based on total energy in the outside air

#### ۴-۲- Monitoring of plant status and environmental

Building personnel can be alerted to alarm conditions in time to take remedial action. A good BMS will allow a pro-active rather than a reactive approach to the management of service faults.

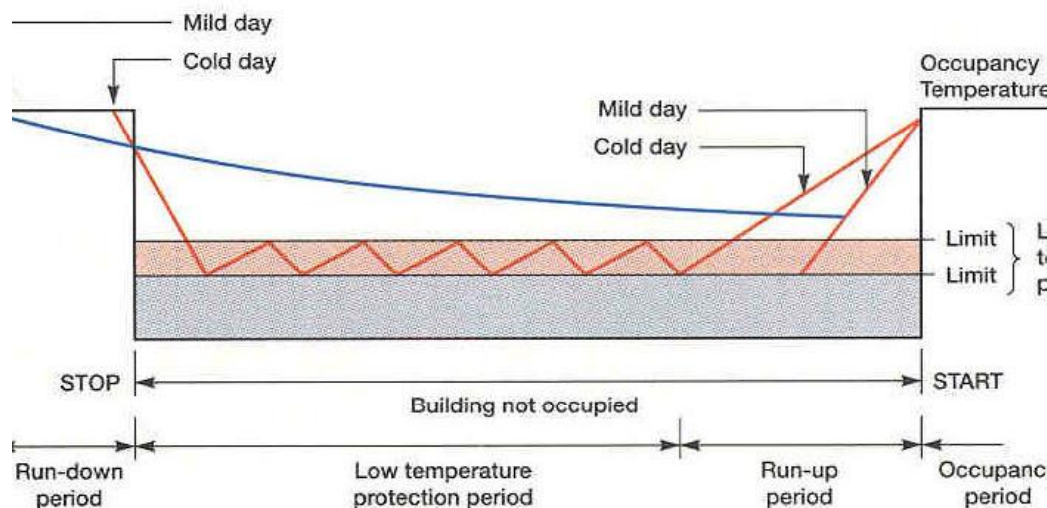


۵-Load cycling provides cycling of electrical loads within established values, offering saving in electricity

### ۴-۳- Energy Conservation Tool

Along with good building design and efficient HVAC plant, the BMS plays a vital role in the prevention of energy waste and reducing the environmental impact of the building.

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۶-Optimization starts/stop the building's system at the latest possible times to provide a stable, controlled environment using minimal energy.

### ۴-۵- Building Services Management Tool

BMS provides a wide variety of summaries, logs and reports. This provides useful information for forward services and costing. This information can also provide value added services to tenants so that the perceived worth of the tenancy is increased. For example, after-hours air conditioning use can be accurately monitored, recorded and automatically invoiced where applicable.

### ۴-۶- Remote Monitoring Capabilities

BMS provides a building centralized monitoring and control. From a single location one can obtain information such as temperatures, pressures and equipment status, indicating how well the building is running. Moreover, this central location is not limited geographically.

### ۵-Benefits of BMS:

#### ۵-۱-Building owner:

- Higher rental value
- Flexibility on change of building use
- Individual tenant billing for services





## ۵-۲-Facilities manager:

- Central or remote control and monitoring of building operations
- Low operating cost
- Efficient use of building resources and services
- High productivity
- Rapid alarm indication and fault diagnosis
- Good plant schematics and documentation

## ۵-۳-Building tenant/occupants:

- Effective monitoring and targeting of energy consumption.
- Good control of internal comfort conditions
- Possibility of individual room control
- Increased staff productivity
- Improved plant reliability and life
- Effective response to HVAC-related complaints

## ۵-۴-Maintenance Companies:

- Ease of information availability problem diagnostics.
- Computerized maintenance scheduling
- Effective use of maintenance staff
- Early detection of problems
- More satisfied occupants

## ۶-Choosing the right BMS:

Buying and installing a BMS is a significant investment. Systems are complex and expensive, and installation can cause disruptions to operations. Facility managers can take several steps to ensure that the BMS they buy is the best system for their facility needs. These considerations are discussed briefly below.

### ۶-۱- BMS Capabilities:

The ability of BMS to control energy cost and to modify the



operation of equipment from remote locations reduces energy waste and labor costs, while improving tenant comfort. Also, integrating building functions and operations in one system is one of the most important features of today's automation systems .

#### ۶-۲- Selecting a system

The selection process of a BMS should be considered in view of the following factors:

- Supplier reputation in similar projects,
- How long the system has been on the market
- Training package provided by the supplier to the operation and maintenance staff
- Supplier after sale technical support and supplier guarantee of spare parts availability for a reasonable future period.

#### ۶-۳- Identifying automation needs

BMS can identify the shortcomings of the existing operations. Typical deficiencies that motivate facility managers to consider installing a new building automation system include:

- High energy use
- Low maintenance productivity
- Unorganized maintenance activities
- Inability to adapt building systems to changing occupant requirements
- Lack of coordination among various building systems

#### ۶-۴- System ability to adopt future trends

Selected BMS should be capable of accommodating future trends in the industry easily, so that facility managers in the future can adopt new features into their systems without facing huge bill. It is simply the ability of upgrading systems.

### ۷-BMS Future Trends:

#### ۷-۱-World Wide Web:

The internet allows BMS to become integrated with enterprise functions, eliminating geographic restrictions, easing access to all data from any site and, accordingly making it easier to use and support building systems operation.

#### ۷-۲- Wireless Revolution:

There is a great potential in the wireless technology e.g. wireless sensors, wireless monitoring. Field service technicians will be able to take advantage of this technology through handheld computers wirelessly connected to the Internet.

#### ۷-۳- Software Development:

The most significant changes taking place in the BMS industry



بمایش تخصصی معماری، دکوراسیون داخلی و منظر (اصفهان - ۱۳۸۹)



are software related. Manufacturers are seeking ways to use wide range of information now available within the systems. Also, the user interface will continue to become easier to learn and use. Future systems will be even more graphical and intuitive than presently available.

#### Conclusions:

With the advent of microprocessors, computer-based control systems have become the rule in most commercial and industrial buildings, generating significant energy savings while improving system performance, operability and reliability.

۷۰ | کمیته علمی No doubt Integrated and interoperable building systems are the wave of the future. It includes lighting controls, security, elevators and even fire safety. The Internet will further play a significant part in this process.

Now is the time to begin preparing for an interoperable future, which will create the communication infrastructure that features open-architecture and standard protocol as much as possible. This open platform for systems to communicate on will open the doors for the intelligent building age.(۱)

Reference:

۱- Meisami, "BMS in home manegment", ۲۰۰۷, international retrofitting center