

Guidelines for preparing IBMS BOQ

Lecture 6

Targets of Lecture

- Introduction to preparing Bill of Quantities and BMS, Access Control and Video Monitoring proposals
 - Knowing the required documents
 - Understanding required steps to prepare a BoQ and complete IBMS proposal
 - Introduction to calculation tool
- Duration: 2 hours

12 steps to prepare IBMS Bill of Quantity

1. Review all drawings to understand the project
2. Find connected systems and I/O points for connected systems
3. Place systems to different locations/automation panels
4. Add locations and required spare modules to automation panels
5. Add automation panels and related accessories
6. Add required field devices (sensors and actuators)
7. Add FCU, VAV, Lighting controllers, Hotel Locks and required field devices
8. Add Access Control components
9. Add Video Monitoring components
10. Add right control room software and equipment
11. Check summary (green cells)
 - layers should match with typical percentages
 - price per I/O point and FCU should match guideline price
12. Filter the BoQ sheets

Required documents to prepare an IBMS proposal

- BMS specification (if exists)
- Mechanical drawings
 - Equipment schedules
 - Control schematic drawings or I/O-point lists
 - BMS riser diagram (if exists)
- Electrical drawings
 - Amounts of systems shown in the control schematic drawings
- Low Current drawings
 - Amounts of readers, locks, exit buttons, door contacts, sensors
 - Amounts of cameras (indoor/outdoor, dome/box/bullet/PTZ)

From mechanical equipment schedule

- Amounts of:
 - Chillers/Heat Exchangers (HEX)
 - Chilled water pumps (primary, secondary, tertiary)
 - Pressurization Units
 - Fresh Air Handling Units (FAHU, AHU)
 - Fans (Make-up, Exhaust, Garage, Stairwell, Smoke)
 - Water Tanks (under ground, over head)
 - Pumps (Transfer, Booster, Sewage, other)
 - Amounts of Fan Coil Units (FCU)
 - Communicating (=BMS connected)
 - Stand alone
 - Other (lighting groups on/off and dimmed)

From control schematic drawings or I/O-point lists

- Add amounts of I/O-points per system and location to **Substations** worksheet:
 - Digital Inputs (DI)
 - Digital Outputs (DO)
 - Analog Inputs (AI)
 - Analog Outputs (AO)
 - Counters for pulses (DIC)
- Add locations and tool calculates minimum quantity of required M10 modules per location [**Substations**]
- Add spare modules, if required per location [**Substations**]
- Add time schedulers, routers and installation boxes [**Substations**]

From control schematic drawings or I/O-point lists

- Amounts of field devices per system to **Field Equipment** sheet:
 - Sensors (to Analog and Digital Inputs, AI and DI)
 - Temperature (room, duct, pipe, outdoor)
 - Humidity (room, duct, outdoor)
 - Pressure sensors and switches (duct, pipe)
 - Pressure difference sensors and switches (duct, pipe)
 - CO (room, duct)
 - CO₂ (room, duct)
 - Lux (room, outdoor)
 - Light switches, PIRs
 - Actuators (from Analog and Digital Outputs, AO and DO)
 - Valves and actuators
 - Damper motors (continuous, on/off, spring return)

From equipment schedule and control schematic drawings or I/O-point lists

- Amounts of BMS connected Fan Coil Units (FCUs) and VAV controllers to **Rooms** worksheet
- Add required modules, boxes, sensors and actuators per FCU/VAV
- Lighting Control (if included)
 - Calculate amount of controlled lighting groups (on/off, dimmed) and add required relays, special relays and dimmers (600W, 2 kW) [**Rooms**]
 - Calculate sensors (occupancy detectors and switches) [**Rooms**]
 - Add required U10 modules [**Rooms**]
 - Add suitable enclosures [**Rooms**]
- Add required Hotel Locks and accessories
- Add required routers (LON-router per 50 modules) and Modbus-IP Gateways (32 devices per serial port) and power supplies

From Low Current system design

- Amounts of Readers, lock, exit buttons, door contacts, power supplies to **Access Control** sheet
- Add required Access Control Panels to cover readers, indication and control points
- Add required Network controllers (V1000), if V100 panels are used

From Low Current system design

- Camera types from specification
- Amounts of Cameras to **Video Monitoring** sheet
- Add required Digital or Network Video Recorders (DVR/NVR) to cover cameras
- Add required DVR/NVR computer and display hardware

From BMS specification and riser diagram

- Control room equipment and COBA software license to **Monitoring** sheet:
 - Add needed computers/server
 - Add needed printers
 - Add needed network adapters (LNI)
 - Add COBA software license to cover the calculated total amount of Information point (=I/O points)
 - Add required network interface drivers (Modbus, M-bus, Bacnet)
 - Estimate needed amount of graphical user interfaces
 - Add special integration work, if required (to be confirmed by COBA ME FZCO or Lonix Ltd)

Check pricing summary sheet and correct BoQ sheet

- Check green cells which show the calculated cost share of each layer of system and compare to guideline (if large deviations check the calculation)
 - Monitoring ~10%
 - LON-network ~3%
 - Modules ~32%
 - Field equipment ~27%
 - Work cost ~20%
 - Panels and accessories ~8%
- Check calculated price per I/O-point and per FCU
 - Price should be close to guideline price
 - If big deviations check calculation
- Filter BoQ to include all included field devices

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