



Case Study

Material Handling System

Client: A Prominent Automobile manufacturer looking for system to transfer components required for Engine assembly from the stores area to assembly area.

Challenges:

Multiple parts to be transferred from Stores to assembly conveyor

Multiple parts to be available on E/a conveyor at every 25 seconds interval to match the speed of production

Store area 25 mtrs away from assembly area

Passage from Stores area to Engine assembly area should be kept clear for man and material movement

Scope of work for GI A&S:

To Design and Manufacture Conveyor system to transfer the Bins filled with Components from Store Area to Engine Assembly Area.

Solution by GI A&S:

KIT BIN (a plastic moulded bin) to accommodate all necessary parts to be used. Suitable size Plastic bins were developed by customer.

GI provided **Complete Man- less Turnkey Kit Bin system** for transfer of Bins from Stores to E/A area and return the empty Bins back to stores area.

The system is comprised of-

- Bin Filling conveyor
- Industrial Lift in Store area
- Overhead Double Decker Conveyor for Kit Bin Transfer
- Industrial Lift in Engine assembly area
- Engine Assembly Kit Bin Loader
- Empty Bin Removal from E/A conveyor



Features of the System

Bin filling Conveyor

- 13 meter Long, Powerized Roller conveyor provided with a specific tack time to fill in necessary components in the Bin.
- The necessary components to be filled in Bin are arranged in flow Racks arranged over 13 meter span from which 2 operators fill Kit Bins in given Time.

Industrial Lift in Store Area

- Electrical geared motor driven Industrial Lift with tact time of 20 seconds (To and Fro) were designed and developed by GII team, which would take Kit Bin from Filling level to ht .of 5 meters
- This is completely and indigenously developed industrial lift, meeting all safety standards, and meets all the functional requirements
- VFD /Brake Motor combination gives perfect stopping accuracy required for the application.
- Chain, Sprocket, Bearing blocks and entire mechanism was developed by GII to meet highest requirement of Productivity.
- A suitable dead weight mechanism provided to balance the trolley.
- The lift is provided with a double Deck Trolley with lower deck for Filled bin and upper one for returning empty Bin.
- Self-Driven special roller modules employed in Trolley with proper sensors to get perfect positioning of Bins inside the trolley.

Overhead Double Decker Conveyor for Kit Bin Transfer

- The overhead conveyor with double deck arrangement is the main part of the system.
- It is 25mtrs in length, suspended from roof Trusses, with Catwalk arrangement and duly certified for Structural Stability from Concerned agencies.
- The bottom deck carried Filled Kit Bins from Stores to Engine assembly and top deck transports Empty Bin from Engine assembly to stores area.
- The bin flow is controlled by a suitable stopper holder arrangement with sensors.

Industrial Lift in Engine Assembly area

- This is a 5mtr height, similar to store area lift with geared motor /VFD control and lowers the Filled bin from OH conveyor to Engine assembly Area.

Engine Assembly Kit Bin Loader

- This main working area of the system is designed and developed in such way that the bin carrying trolley is linked with the main conveyor and transfers the bins simultaneously on to main conveyor while linked.
- All necessary safety interlocks have been incorporated in the system to avoid Bin damage or any other accident.

Empty Bin Removal from E/A conveyor

- This is specially designed flag like mechanism operated by a pneumatic cylinder and bearing-Hinge mechanism, pushing the empty bins on return line conveyor to stores.
- The whole system is completely controlled with Mitsubishi PLC and Is on Modbus communication.

Highlights:

- 1) Modular system developed for man-less handling of kit Bins.
- 2) Man power reduction- 5 persons per shift.
- 3) Smooth handling of Bins without any damage to bins & components.
- 4) Eliminate human errors.
- 5) Bin filling can be modulated as per Engine Model.
- 6) Floor space saving due to overhead conveyor.

Achievements:

- **Customer was extremely satisfied with the system and made it standard for all forth coming lines.**
- **GI implemented 9 such systems at all facilities of BAL**



Industrial Lift



Conveyor System



Overhead Conveyor