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## Mechanically operated automated guided vehicle

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### Abstract

Automatic guided vehicle is the concept which deals with the transfer the jobs or material handling. There are various methods to transfer the material or material handling for ex. Conveyor system, conveyor system is used to convey the materials industrial jobs from one section to another section. Conveyor section is quite expensive and it is mostly preferred for the large scale industries. Also it is quite electromechanically built, so it is quite power consumable.

The automated guided vehicle is the project in which it is self-energy consumable that is it is an active device, it doesn't require external power supply to deliver that materials. This project is mostly used for the small scale industries, because it is used to carry small distance or minimum location transfer of materials.

This project contains four shock-ups at the four positions that are used like legs of this system. This machine also contains the rack and pinion arrangement to absorb the energy that is comes from the weight and stores the energy into the system and delivers the material to that position.

**Keywords:** Automated Guided Vehicle (AGV), Robots, Industry, Automation

### 1. Introduction

Advancements in manufacturing technology allow companies to rapidly produce products. This has provoked a trend to reduce bulk inventory in favor of short term supplies. Although this allows corporations more financial freedom, it requires warehouses to accommodate temporary, selective storage. Improved product handling and speed can be achieved with the implementation of an Automated Guided Vehicle, AGV.

In a traditional warehouse, human safety governs the productivity. With the help of intelligent computers, the AGV can safely achieve higher speeds. Precision turning allows it to accurately navigate in tight spaces.

The AGV is highly flexible as a result of remote communication. Its ability to communicate with other autonomous vehicles provides a seamless operation. Continuous coordination between vehicles delivers money saving efficiency.

The introduction of unmanned vehicles onto a warehouse floor has favorable effects on safety. With the aid of environmental sensors, the AGV can detect objects in its collision path. Automation eliminates vehicle traffic jams and their potential for accidents.

In the industrial environment, it is quite common to carry raw materials and semi-finished products from stores to different work cells to perform a variety of tasks and finished products to warehouse. These movements of goods and materials add to the cost of production. In modern industries nearly 30 to 40 % of the manufacturing cost can be attributed to material flow. In order to remain competitive, modern manufacturing industries have been forced to re-examine material handling systems in order to bring real economic gains. The material-handling element needs to be synchronized with workstations and different operations under a hierarchical computer control systems, capable to applying decision logic to the movement of material. Material handling system includes the movement, storage and control of material with considerable emphasis placed on control.

The term "automated guided vehicle" is a general one that encompasses all transport systems capable of functioning without driver operation. Automated guided vehicles are used to reduce the costs of manufacturing and increase the efficiency in a manufacturing system. Automated guided vehicles can tow objects behind them in small trailers which they can autonomously hook up to. These trailer is used to move raw materials into line to get them ready to be manufactured.

For companies building new warehouses, there are many monetary benefits to investing in intelligent machinery. The workforce required to run the warehouse and the additional

overhead (e.g., insurance) required to support that overhead will be drastically reduced. Increased product turn-around and faster shipping will result in more satisfied customers. Also, automation reduces the risks of personal injury.

## 2. Working of Automated Guided Vehicle

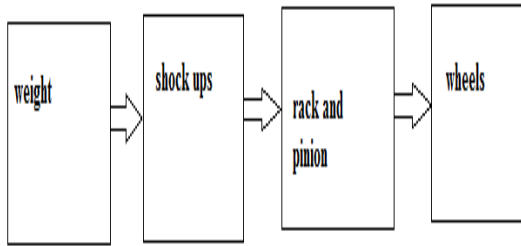


Fig 2: Block diagram of AGV

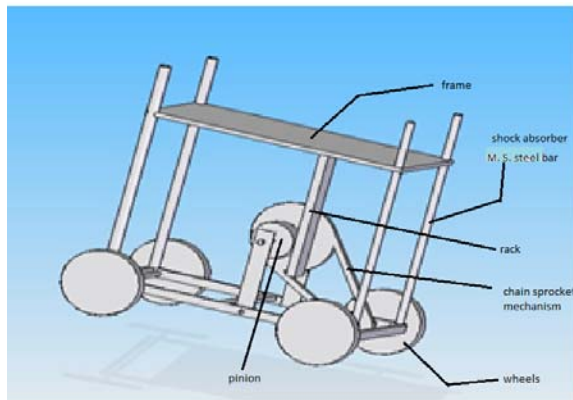


Fig 3: working diagram of AGV

Operating procedure of project

1. AGV is the concept used to drive vehicle automatically, this vehicle is used for the 'material handling purpose'.
2. AGV runs automatically, and its working is depends upon the weight of material that is to be inserted on to the vehicle or trolley.
3. We have designed trolley for that purpose, this trolley is contained of four shock-ups used at four side of vehicle to run vehicle automatically depending upon the rack and pinion mechanism.
4. When weight is puts into the vehicle, depending upon the weight the trolley pushes itself in downward direction.
5. Then, depending on the weight putted on to the trolley rack and pinion movement starts and it goes up to some distance.
6. Then when weight is removed from the trolley, it returns to its original position. When trolley reaches up to that position, trolley unloads the material on to the station.
7. When trolley unloads it returns up to the original position.
8. Same procedure is followed another weight of materials.

### 3. Functions of AGV

1. GUIDANCE: The vehicles follow a predetermined path route, which is optimized for the material flow pattern of the given application.
2. ROUTING: Routing is the vehicles ability to make decisions along the guided path depend on the weight of material placed on the trolley.
3. LOAD TRANSFER: Load transfer is the pickup and delivery method for an agv system, which may be simple.

### 4. Advantages of AGV's

1. Construction is simple.
2. It has high reliability.
3. It do not require any external power supply.
4. Maintenance is easy.
5. It has low cost.
6. It has Stable system.
7. It is easy to operate
8. Self-contained energy utilization
9. Low lubrication requirement and easy to lubricate.
  - a. Reduction in man-hours and working.
  - b. It has Reduction in inventory.
  - c. It has Low life cycle operating costs.
  - d. It has System operating flexibility.
  - e. It is Useful in hazardous area.
10. It works continuously.
11. Improves industrial production and profit.
12. Fast ROI (less than 2 years)
13. Optimal stock and transport planning leading to higher operational efficiency
14. More timely deliveries
15. Increased safety and quietness on shop floor.

### 5. Disadvantages

1. Not utilized for heavy weights greater than 60kg.
2. Not applicable for large distance travelling or material handling applications.

### 6. Application

1. In hospitals
2. Food manufacturing
3. Raw material delivery in paper mills
4. In shops
5. Textile industries
6. Books & Library system
7. Airport
8. Beauty products
9. Dairy
10. Refrigerator and Freezer Applications.

### 7. Conclusion

Hence we have conclude that by using mechanically operated automated guided vehicle the various disadvantages of automated guided vehicle can be minimized. The mechanically operated automatic guided vehicle is very simple in construction and use full for the small scale industry. It is mechanically operated hence does not required any external power source and also it is driverless .hence it reduces the human efforts in the industries.

### 8. Acknowledgment

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