CONVEYORS

By Assistant lecturer: Omer H. Kanam
College of Petroleum and Mining Engineering
Mining Department-III-CLASS
University of Mosul
LEC. NO. 4 ,5,6

CONVEYORS
LECTURE-5
PART-III

4. CABLE CONVEYORS

- These conveyors form a distinct group of materials handling equipment to transport people and bulk materials in load carrying buckets, using overhead moving cables and/or wire ropes and are composed of one or more spans from the loading point to the discharge point/points covering long distances up to several kilometers. These conveyors are also known as **ropeways** or **aerial tramways.**

4. CABLE CONVEYORS

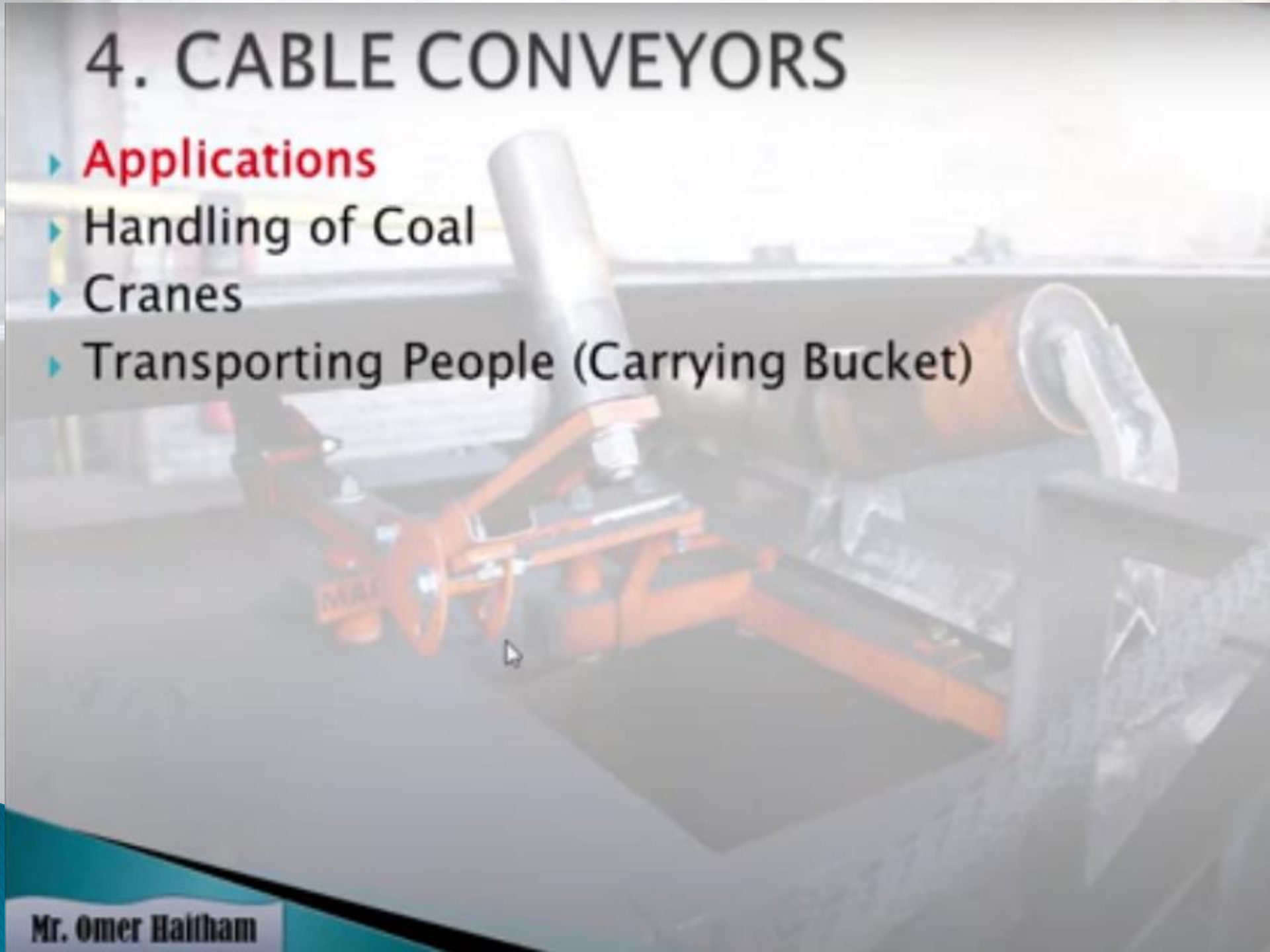
- **Characteristics**
- Handling from the ground to a substantial height with shortest route
- Wide varieties of materials including human passengers may be transported.
- Carrying minerals from mines to their processing stations.
- Cost is less
- No need of re-handling between points

4. CABLE CONVEYORS

- Types
- 1.Tramway
- 2.Ropeway
  - a. Bicable
  - b. Monocable

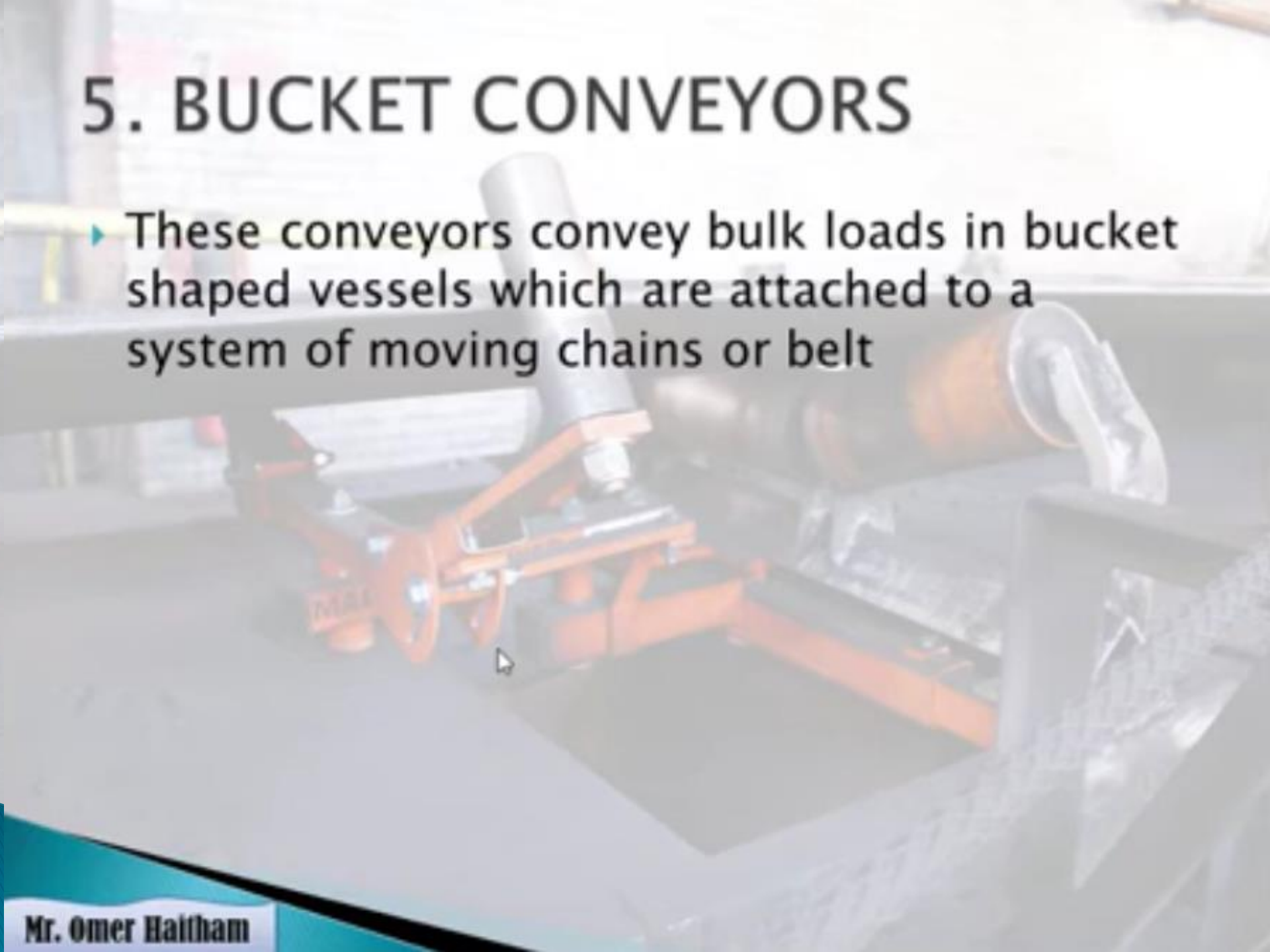
4. CABLE CONVEYORS

- **Applications**
- Handling of Coal
- Cranes
- Transporting People (Carrying Bucket)



5. BUCKET CONVEYORS

- These conveyors convey bulk loads in bucket shaped vessels which are attached to a system of moving chains or belt



5. BUCKET CONVEYORS

- **Types**
- (*a*) Gravity discharge bucket conveyor (V-bucket conveyor)
- (*b*) pivoted bucket conveyor (Suspended Conveyor)
- (*c*) bucket elevator (used for conveying bulk materials from a lower level to a higher level)

5. BUCKET CONVEYORS

CENTRIFUGAL DISCHARGE ELEVATORS

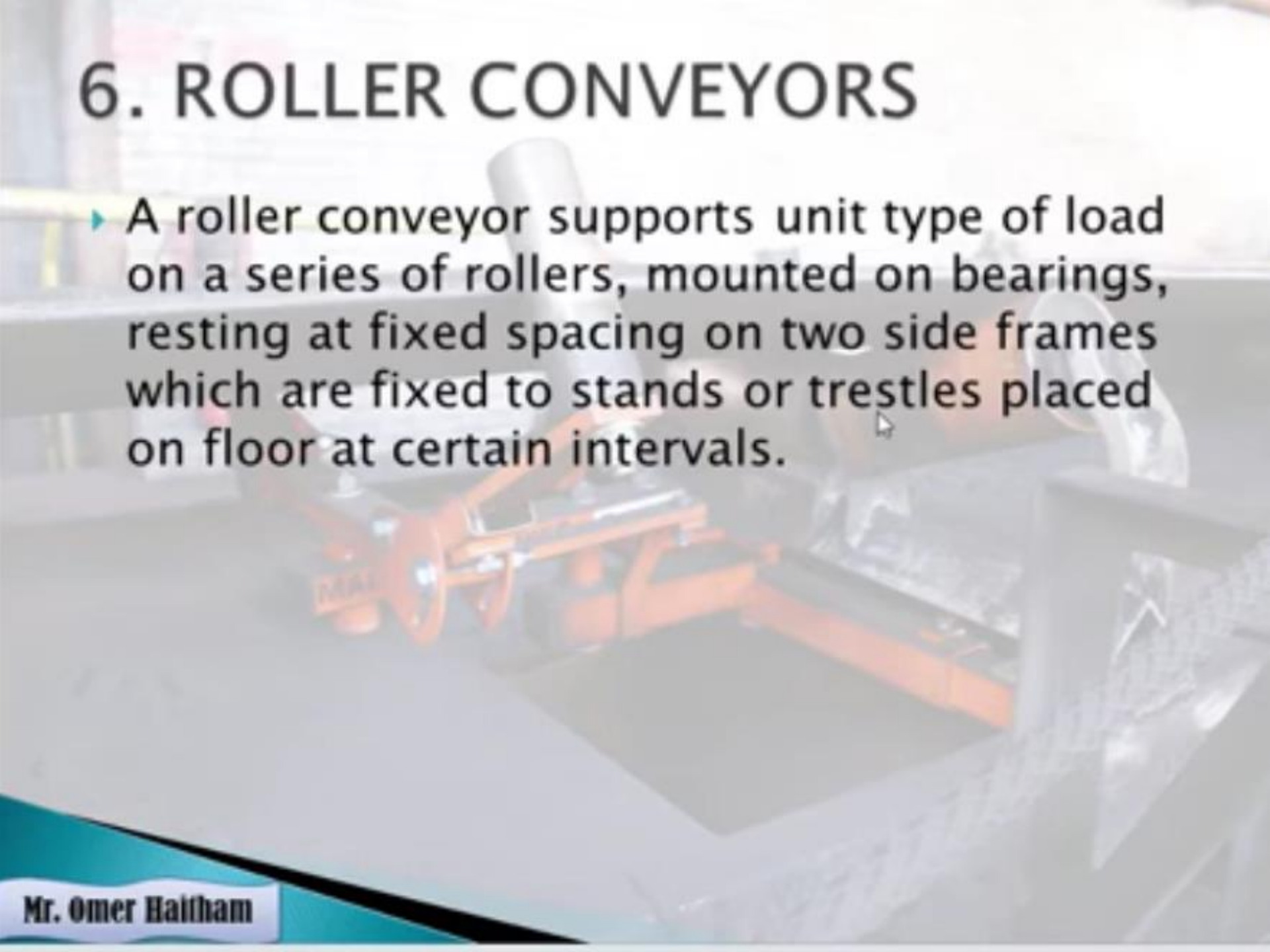
POSITIVE DISCHARGE ELEVATORS

CONTINUOUS DISCHARGE ELEVATORS

TYPES OF BUCKET ELEVATORS

6. ROLLER CONVEYORS

- A roller conveyor supports unit type of load on a series of rollers, mounted on bearings, resting at fixed spacing on two side frames which are fixed to stands or trestles placed on floor at certain intervals.

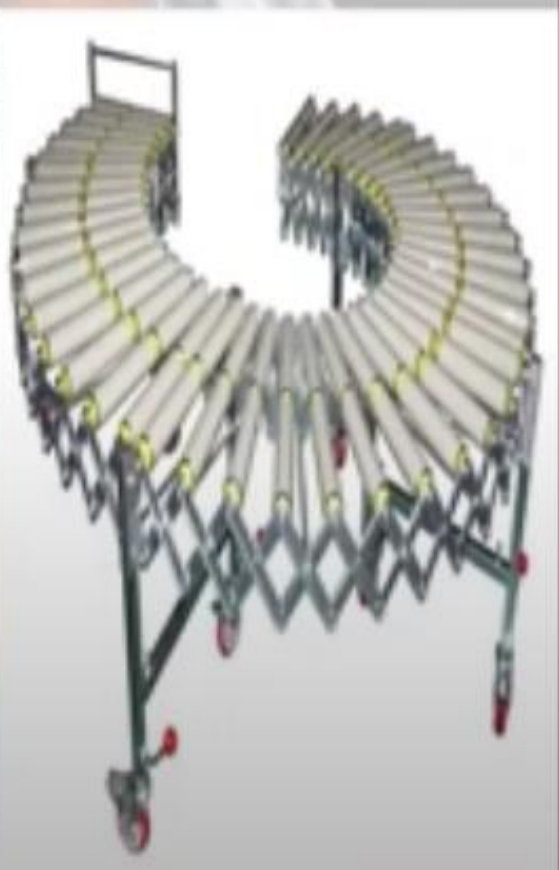


6. ROLLER CONVEYORS

- **Characteristics**
- Coveys unit loads ,like ingots, plates, rolled stock, pipes, logs, boxes, crates, moulding boxes etc.
- The spacing of rollers depend on the size of the unit loads to be carried

6. ROLLER CONVEYORS

- **Types**
- 1. Unpowered or Idle Roller Conveyor.
- 2. Powered or Live Roller Conveyor.
- 3. Portable Roller Conveyor.



6. ROLLER CONVEYORS

- **Applications**
- used for conveying almost any unit load with rigid riding surface
- used between machines, buildings, in warehousing as storage racks, docks, foundries, rolling mill plants, manufacturing, assembly and packaging industry.
- used for storage between work stations and as segment of composite handling system.

6. ROLLER CONVEYORS

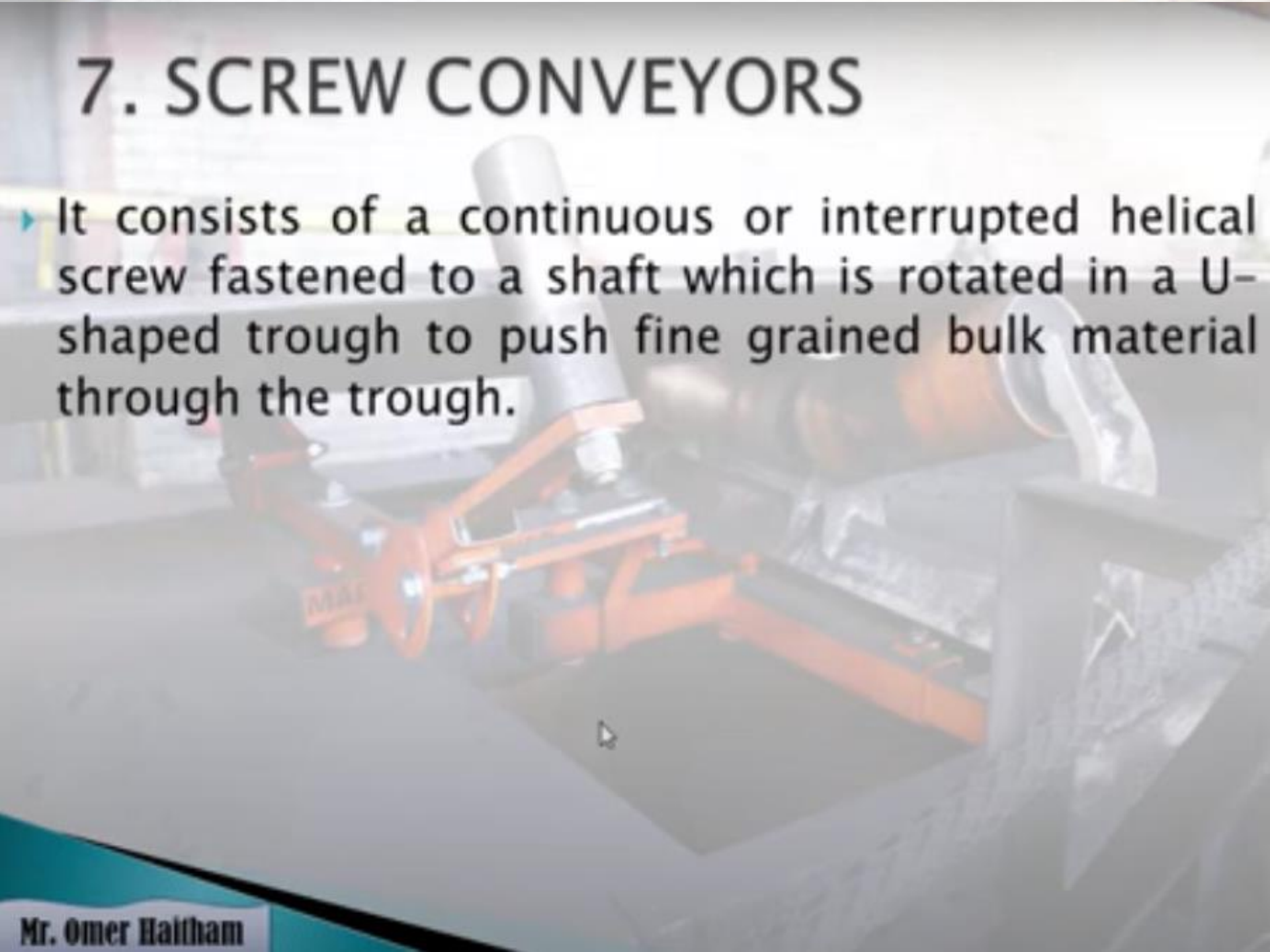
- Aspects of Design
- Unpowered Roller Conveyors
- The force resistance
- 1. Frictional resistance in the roller bearings.
- 2. Resistance due to sliding of the load on the rollers
- The angle of inclination

6. ROLLER CONVEYORS

- Aspects of Design
- Powered Roller Conveyors
- Transport conveyor
- Rotated continuously in one direction irrespective of loads being on the conveyor or not.
- Reversing conveyor
- The direction of rotation of the driven rollers are changed frequently.

7. SCREW CONVEYORS

- It consists of a continuous or interrupted helical screw fastened to a shaft which is rotated in a U-shaped trough to push fine grained bulk material through the trough.



7. SCREW CONVEYORS

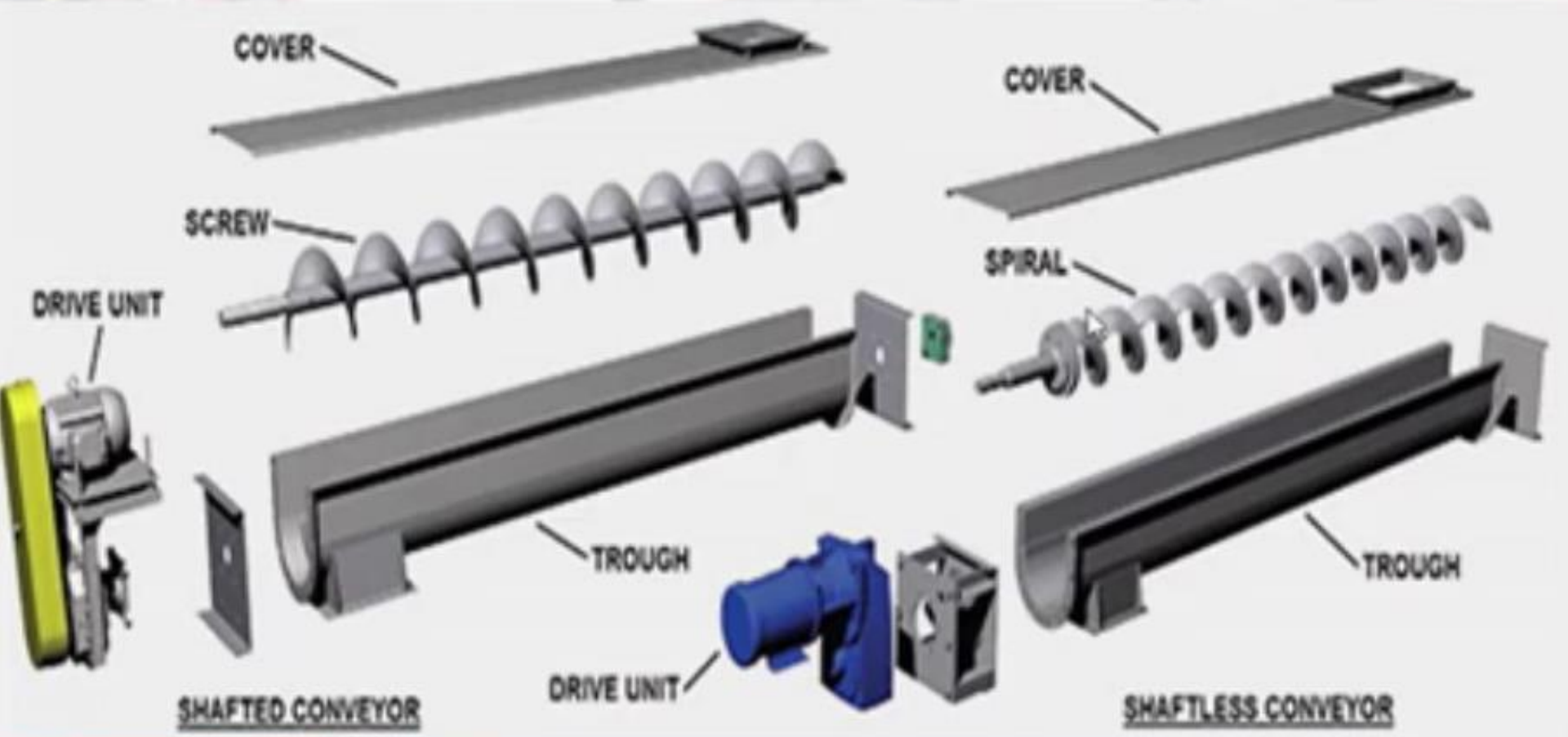
- **Advantages**
- Shorter distance,
- Totally enclosed from atmosphere,
- Cheap Initial Cost,
- Simple and Compact,
- **Disadvantages**
- High Power Consumption
- Length is limited up to 30m
- High Maintenance

7. SCREW CONVEYORS

- **Applications**
- Granular non viscous material, or even with High temperature,
- Suitable for mixing or blending more than one materials during transportation,
- Controlling feed rate of materials in a processing plant
- Not suitable for brittle and high abrasive materials
- Not suitable for large-lumped, packing or sticking materials

7. SCREW CONVEYORS

- **STRUCTURE (PARTS)**



7. SCREW CONVEYORS

- **Aspects of Design**
- 1. Recommended Dimension of a Screw Conveyor
- (Nominal Diameter$_{\text{helical screw}}$, Pitch$_{\text{Screw}}$, Diameter$_{\text{Shaft}}$, Gab between trough and screw, Hight$_{\text{Trough}}$, Thickness$_{\text{Trough}}$)
- 2. Effect of Lump Size
- a. The conveying capacity
- b. The lump size
- 3. Capacity of Screw Conveyor
- a. screw diameter
- b. screw pitch
- c. rotational speed

7. SCREW CONVEYORS

- Aspects of Design
- 4. Power Requirements of Screw Conveyor
- PH = power necessary for conveying the material

$$P_H = \frac{QL'}{3600}\lambda g, kW = \frac{QL'\lambda}{367}, kW$$

- PN = driving power of the conveyor at no load

$$P_N = \frac{DL}{20}, kw$$

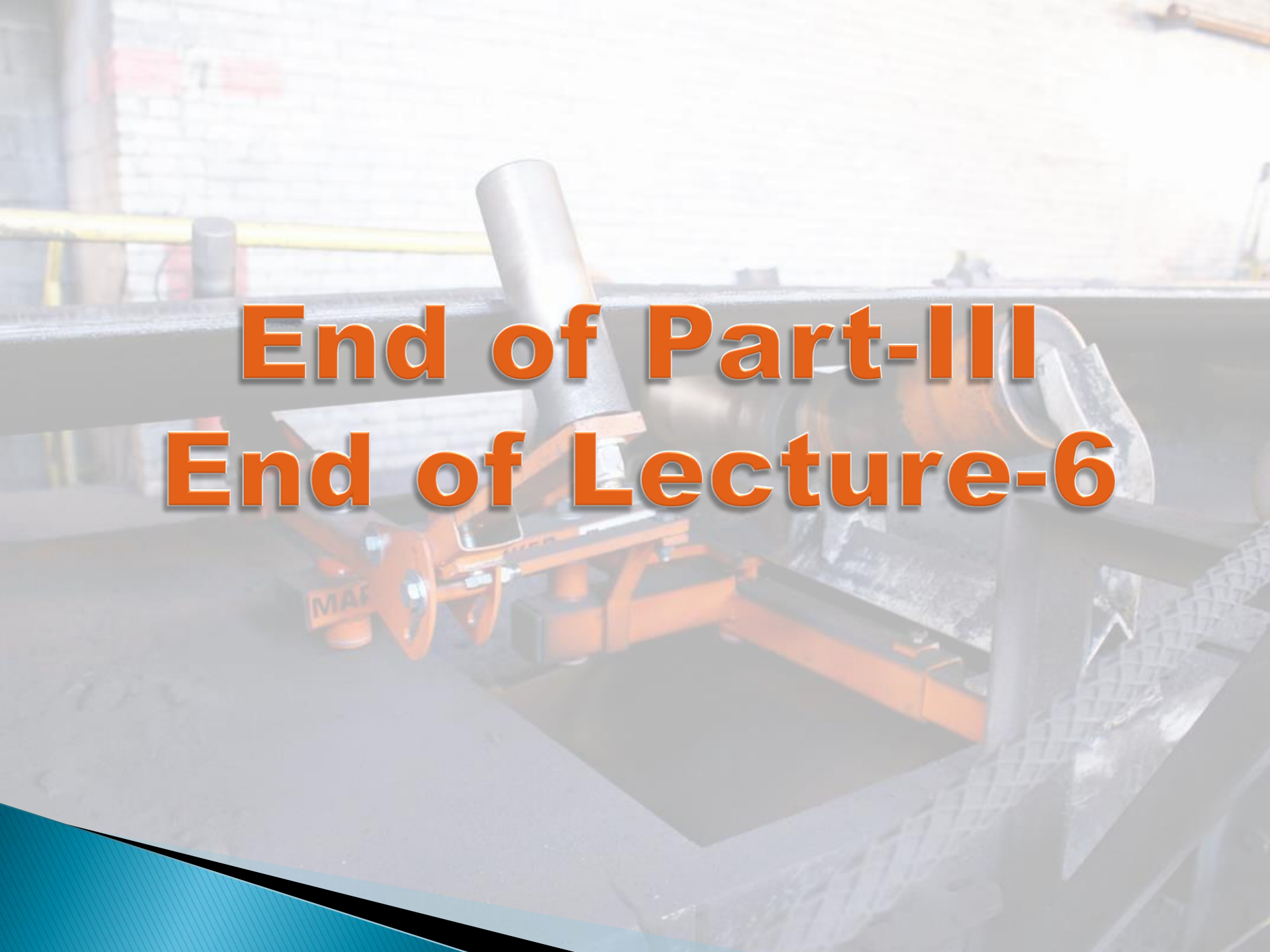
- Pst = power requirement for inclination of the conveyor

$$P_{st} = \frac{QHg}{3600} = \frac{QH}{367}, kW$$

7. SCREW CONVEYORS

- Q = mass flow rate in t/hour.
- L′ = length of material movement in conveyor in m.
- λ = progress resistance coefficient.
- D = Nominal screw diameter, m
- L = Length of screw, m
- H = height in m.

$$P = P_H + P_N + P_{st}$$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