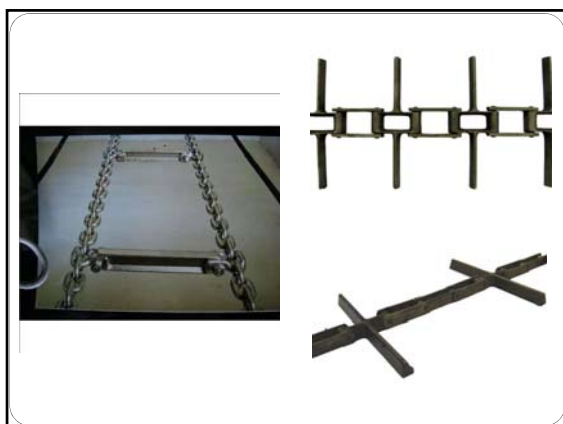
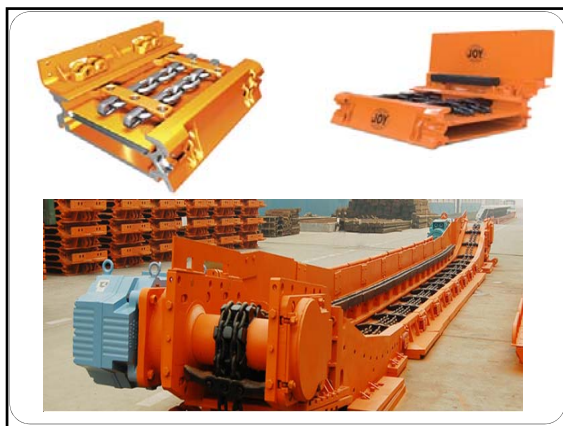


Chain conveyor



Chain conveyor

- Scraper chain conveyor consist:
 - Stationary steel trough (1- 2m) connected together end to end
 - An endless chain with flight moving in the troughs,
 - Supporting structure of iron frame to support the trough

Chain conveyor

Important parts of scraper-chain conveyor

- Trough
- Endless chain
- Flights
- Motor with drive head
- Reduction gear
- Tensioning device
- Driving sprocket

Chain conveyor

- Main application of scraper-chain conveyor is transportation at the face and adjoining short working where they are required to withstand rigorous mining conditions.
- Where every time required to be extending the conveyor.
- Where inclination is exceeding 10 degree.

Chain conveyor

- Trough are jointed to each other by nut and bolts and from a rigid assembly.
- The chain consists of links and after every 3-4 links a flight is attached. links are provided with shear pins at intervals.
- The shear pin provides a safety measure against overload.
- The return and tail end of the conveyor is enclosed with sprocket drum.
- Capacity in 30 to 40 tph.
- Moving speed of Chain is 35 m/min

Chain conveyor

- Advantages
 - Gradient upto 1 in 3 or more
 - Stronger and handled rough material
 - Strudy and durable construction
 - Small loading height
 - Possible of loading by blasting
 - Shifting during operation
 - Easily assembled and dismantled
 - Easily moved, extented or shortned.

Chain conveyor

- Disadvantage
 - High cost
 - High power consumption
 - Large weight
 - Rapid wear of toughing and chain
 - Noisy
 - Degradation of mineral
 - High maintenance as high moving parts
 - Length limitation around 100 - 200 m
 - Inability to handle hard and abrasive material

Chain conveyor

- The feeding of the conveyor may be done at any point along its length and unloading being generally done over the driving sprocket.
- Intermediate unloading can also be be done.

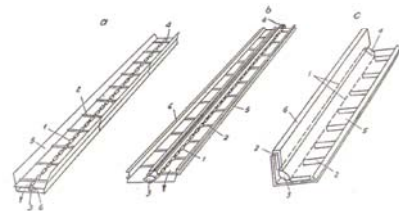
Chain conveyor

There are two types of scraper-chain conveyors depending on the purposes and conditions of operations

- Used for only conveying the material/load
- Used for others additional operations also.
Guide and carries for coal cutters,

Chain conveyor

- Types of chain conveyors depending on conveying and return sides
- Vertical , Horizontal and Inclined



Chain conveyor

- Scraper chain conveyors may have one or two chains.
- Light and simple scraper may have one chain
- Armored and heavy duty conveyor have usually two or three chains.

Chain conveyor

Scraper chain conveyors can two types depending upon moving and shifting

- Rigid:
Dismantled, transferred and reassembled
- Flexible:
Shifted without dismantling

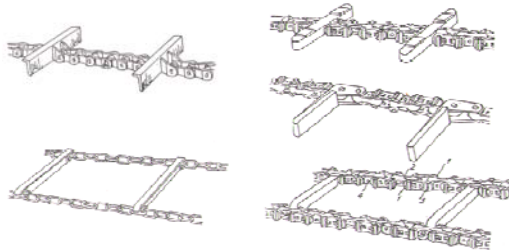
Chain conveyor

- Non-reversible
- Reversible

Chain conveyor

- Trough : length = 1.5 to 2.5 m
Return pan, Detachable spill plates
- Chains: They are used as tractive units.
- It having high breaking strength, long life, ease of assembling, dismantling and changing of damaged links
- Simple flat link
- Punched links
- Round steel links

Chain conveyor



Chain conveyor

- Drive head: An eclectic motor, reduction gear, flexible coupling, shear pin etc.
- The motor and the gear are protected against over load by shear pit, friction or hydraulic clutch or automatic cut off switches.
- Tension end: The tensioning of chain is necessary to obtain reliable contact between it and the terminal sprockets and also prevent it from slipping off the sprockets

Chain conveyor

- Salient features of modern scraper - chain conveyors

Chain conveyor

- Scraper chain conveyor calculations
 1. Size of the pan for a given capacity
 2. Maximum tension of the chains
 3. Required power of the motor
 4. Maximum permissible length of conveyor

Chain conveyor

The power required to run a conveyor empty may be computed from the relation:

$$N'_{\circ} = \frac{2q_0 L f_c v \cos \beta}{102} \quad [\text{kW}] \quad (37)$$

where q_0 is the weight per meter length of chain with flights = 11-14 kg for single chain and 23-24 kg for double chain conveyors;

f_c is a coefficient of friction between the chain and trough = 0.25-0.3;

L is the length of the conveyor in m;

and β is the angle of inclination of the conveyor.

Chain conveyor

Additional power required to overcome the frictional resistance between the load and the trough when the conveyor is loaded over its entire length is given by the relation:

$$N''_{\circ} = \frac{Q L f \cos \beta}{367} \quad [\text{kW}] \quad (38)$$

where f is a coefficient of friction between the coal and trough = 0.45-0.5,

Chain conveyor

Hence the total power required at the driving shaft of the conveyor

$$N_o = kL \left[\frac{2q_s f_s v \cos \beta}{162} + \frac{Q}{360} (f \cos \beta + \sin \beta) \right]$$

where k is a coefficient which takes into account addition resistances at driving and tensioning sprockets = 1.05

Knowing N_o , we can now determine the tractive force using equation (24)

$$W_o = \frac{102 N_o}{v} \quad [\text{kg}]$$

Chain conveyor

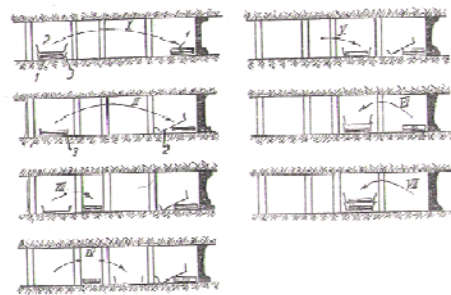
Dismantling and assembling of a conveyor should be carried out

- The drive head is erected
- The lower pans of sections are installed and the chain laid inside them
- The tensioning end is installed
- The lower and upper chains are joined and tensioned so that there is no sag near the sprockets
- The conveyor is subjected to an empty test run before loading it.

Chain conveyor

- Shifting of conveyors where there are no arrangements for mechanized shifting is one of the most laborious operation at the coal face and hence has to be well organized.
- Disconnecting and shifting the upper chain
- Disconnecting and shifting the upper pans
- Disconnecting the lower chain and laying it alongside the lower pans
- dismantling, shifting and reassembling the lower pans
- laying the chains in the lower pans
- joining up the upper pans
- laying the upper chain

Shifting of Chain conveyor Manually



Chain conveyor

- conveyors should be adequate capacity and length depending of face requirements
- high grade steel should be used for pans and chains in order to reduce the weight of the conveyor and increase its life
- attempts should be made to improve existing methods or introduce new methods of mechanized shifting of the conveyors at the faces
- Drives at both ends with fluid couplings to equally distribute the load between the squirrel-cage motors should be used for heavy duty conveyors.
- sequence control should always be adopted
- All measures should be taken to increase the life of the pans and chains

Chain conveyor

Chain conveyor

Chain conveyor

Chain conveyor

Chain conveyor

Chain conveyor