Headgears: The starting point

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1. Introduction
2. Information required
3. What is a headgear
4. Starting point - Layout
1. Introduction

- Headgear is used for vertical transport of men & material, & ore
- It is the lifeline of the mine
- And governed by legal safety requirements, Industry standards, and operational requirements
- Good initial layout is essential - skills
2. Information required

- Communication between Structural, Mining and Mechanical Engineers

- Frozen designs
  - Mine design and financial analysis
  - Mechanical design of winders, sheaves, rope sizes, size of retention bin, rope changing requirements and rope layout (45 deg initially)
  - Shaft configuration and layout
3. What is a headgear

- Used for vertical transport
- Constructed of steel or Reinforced Concrete (RC)
- Generally, Koepe winders are tower mounted, hence RC
- Recently seen ground mounted Koepe
- Drum winder – steel or RC headgears
4. The starting point

- The end on mining is the start for structural engineers
- First parameter (1) is clearance for conveyance removal.
  - Thus winder duty calculations are crucial (payload)
  - Conveyance size, payload and must be defined
  - Where is the skip removed, it has to be under the bin, and not over the open shaft. One case it has been the other way (odd)
  - This establishes the first level
Distance (2) is the clearance for the conveyor

- This includes space for vibrating feeder, bottom of the bin hopper, chute, radial gate, or spile bars
- Some of this information must be obtained from the mine operations, in terms of their maintenance policy

Distance (3) is height of the retention bin.

- This needs to be defined by client. What retention is needed. i.e. skip loads (1, 2 or 3 skip loads)
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- Distance (4) is the distance to the tip point
  - This is dependant on material properties to determine the chute angle
  - Chute angle must ensure that the material does not hang up

- Distance (5) is the distance from tip point to full tip position.
  - This is dependant on skip selection, door opening mechanism

- Distance (6) is the actual length of skip including its attachment
Distance (7) is the conveyance overrun

- This is a legal requirement
- Allow distance for all the trips and final tarzan wire

Distance (7A) in the case of Koepe winders allow for energy absorption system.

- This is a legal requirement, and jack catches for the full length of arresting system.
Distance (8) is the depth of crash box and supporting beams

- Remember space/ platform for removing people when cage is in jacks

Distance (9) in the distance required to accommodate the attachment

- The distance between the floor to accommodate sheavebeam and clearance to go past without hitting the beams
Distance (10) is the hook height for maintenance crane

✓ This is to remove the sheave wheels
INFORMATION REQUIRED TO DETERMINE HEIGHT - "X"

1. CLEARANCE FOR REMOVAL OF SKIPS.
2. CLEARANCE FOR CRANE, CONVEYOR AND VIBRATING FEEDER.
3. DEPENDENT ON SKIP CAPACITY REQUIRED.
4. DEPENDENT ON Transitional Bin.
5. DEPENDENT ON DEPENDENT ON MATERIAL DISCHARGE PROPERTIES.
6. DEPENDENT ON DEPENDENT ON MATERIAL DISCHARGE PROPERTIES.
7. DISTANCE FROM TIP POINT TO TIP POSITION.
8. OVERBUILD DISTANCE FROM SAFETY DETACHMENT HOOK TO CATCH PLATE.
9. LENGTH OF ATTACHMENTS TO UNDERSIDE OF SHEAVE.
10. CONSIDER MAXIMUM BASKET DEPTH, CATCHPLATE, ROPE ATTACHMENTS.
11. SIZE OF CRANE AND DIA OF SHEAVES TO BE CONSIDERED.
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Thank you