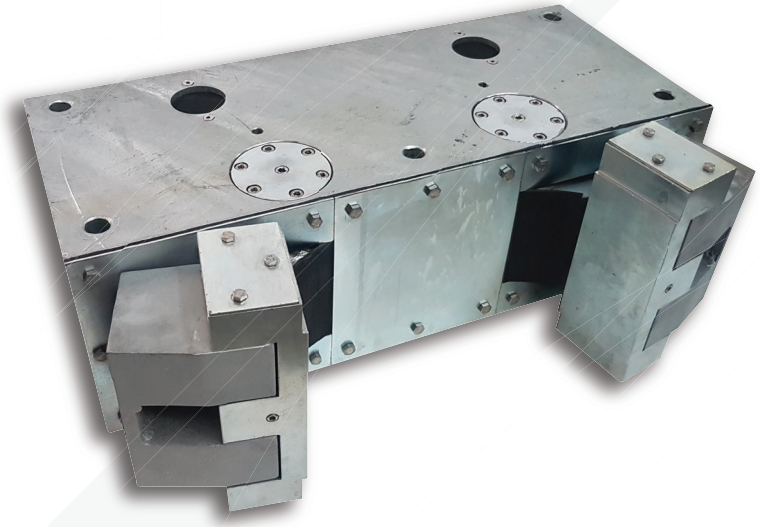
DEEBAR
ELECTRICAL & MECHANICAL ENGINEERING

LOCK 'N' LOAD
CONVEYANCE CHAIRING SYSTEMS



SHAFT CAGE CLAMPING SYSTEM

The Lock N Load consists of a power pack and clamps which hold a conveyance steady during the loading of men and / or material. The clamps release their grip at a controlled rate to allow the rope stretch to be taken up smoothly.

HOW IT WORKS

When the cage is in position, the station air supply quick coupler is connected to the Lock N Load connection on the conveyance. The power pack (air/oil intensifier) boosts the hydraulic pressure up to the required pressure. The pump stalls and clamp force is maintained indefinitely. This operation usually takes about 10 seconds for the pump to boost the pressure to full clamping force.

When loading or unloading of the conveyance is completed, the station air supply is removed, resulting in a rapid loss of air pressure in the power pack. This starts the decompression cycle, which takes about ten seconds. As the oil pressure drops, the clamps release their grip at a controlled rate and the conveyance slides smoothly to its new position in the shaft. The clamp arms will then fully retract, thus allowing the conveyance to be moved.

BENEFITS

- Safe loading of men and material
- Time saving, as re-decking of the cage will not be necessary during loading of men and material
- Quick and easy to use; single person operation
- The system can be complemented with an EFA System
- Can be used equally well on steel, rope, rail and wood guides
- No Shaft obstruction

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LOCK N LOAD FACTS

Why should I consider using the Lock N Load Cage System?

- It permits safer loading and unloading of both men and material.
- Damage to equipment is prevented.
- Time and labour are saved as the onsetter / cage tender is able to lock the conveyance in position in a short time after it comes to rest.
- Installation is simple and no structural modifications are normally required to either the bridle, cage or shaft.
- Either electrical or air supply is required to power the unit.
- One system on a conveyance can be used to clamp the conveyance at any level.
- The system can be used with multi-deck cages.
- Clamp units can be supplied for any desired load, providing there is sufficient guide contact area.
- The clamp system can easily be interlocked with the shaft bell and winder safety system.
- No extra labour is required to operate the system at each station.
- Inspection and maintenance are minimal and the recommended spares holding is reasonable.
- Heavy loads can be loaded or unloaded safely.

What happens if the driver pulls away when the clamps are still clamped?

An interlock system is essential to prevent the driver from trying to raise or lower the conveyance while the clamps are in operation. The design of the interlock system can vary from mine to mine, due to individual preferences, but the interlock system is normally arranged to isolate the hoist brakes until pressure has been released from the clamp system. A shaft communication unit with I/O in both direction through the rope can be used to send a clamp release signal to the driver from the clamp limit switches. . The clamps can also be released from the Winding engine driver via this system. We therefore have no standard interlocking system but we do put forward suggestions and recommendations.

What force is applied to the guides?

The clamping force on each guide is approximately 4 times the total mass to be supported divided by the number of guides. Thus if two clamps support a 10 tonne load, the clamp force on each guide would be 20 tonnes. The guide also has to be capable of supporting a vertical load equal to half the holding capacity of the clamps.

How long does it take for the clamps to operate?

Typically with a 9 tonne system, the time from the plug in of the air supply to fully clamped is approximately 6 to 7 seconds, but with a larger capacity unit the time will increase slightly.

Initially the clamp arms move into contact with the guide at low pressure and pressure is then built up by the action of a reciprocating pump until a stalled condition is obtained at the set pressure. The decompression period is adjustable by means of the metering pin and it has been found that a period of 4 seconds provides good results and does not give an excessive amount of rope oscillation when the clamps release.

The 4 seconds refers to a rope stretch of 600mm or more when material is being handled but where greater stretch is experienced and when men are being carried, the period may need to be lengthened.

How are the clamps fitted to the cage?

The clamps are normally fitted on top of the cage in place of the bridle roll brackets and the latter are bolted on top of the clamps.

Fitting clamps to the bottom of the cage is not recommended. If a load is added to the cage, the bridle channels are put into compression, a condition for which they are not usually designed.

In attaching the clamps to the bridle, adaptor plates may be required if holes do not match up, but in any event, all holding down bolts should be able to support the maximum clamp load with the required factor of safety. When fitting bridle roll brackets above the clamps, care must be taken to ensure that there is sufficient clearance between the wheels and the clamp arms, as on some installations, brackets have had to be modified.