



नाम

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अनुदेशक के आदयक्षर

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### STUDY OF INTERLOCKING OF L.C.GATES

Level crossing gates are generally “Swing type gates” or “Lifting Barrier Gates”.

There are two common methods of Interlocking swing type gates:

- i) The double ‘E’ type lock method.
- ii) The triple ‘E’ type lock method.

In the first method, each gate leaf is provided with two ‘E’ type locks. The key of one lock is chained to the gate post (or the other half of the gate leaf), while the key of the second lock is normally locked in the lock itself. For closing the gate to road traffic, the two-chained keys are inserted into their respective locks and operated, thereby releasing the two (normally locked keys). These two keys are then inserted in a gate lock, which is provided near the gate itself, and operated, thereby releasing the gate lever in the cabin.

In the second method, a triple lock is fitted on the gate leaf nearer to the gate lodge while a double lock is fitted on the leaf away from the gate lodge.

The double lock has one key normally locked in its lock, while the other is chained to the gate post (or the other half of the gate leaf). The triple lock has one key chained to the gate-post (or the other half of the gate leaf), and a second key normally locked in a lock, which has a T shaped plunger. The key for the third lock is the same key, which is normally locked, in the double lock. For closing the gate to road traffic, the leaf, which has the double lock, is first closed. Hence, a definite sequence has to be followed in this method of interlocking.

### LIFTING BARRIER GATE:

This type consists of two balanced booms (each mounted on a main axle supported by pedestal) worked from a winch. The winch consists of a winch gear worked through three pinions and a handle. The smaller of the pinions is called pinion ‘A’ while the larger is called pinion ‘B’. The winch gear also serves as a rope drum.

At the other end of the winch gear shaft a pinion ‘A’ is connected to a winch-locking wheel through a pinion ‘B’. The connection of the handle to the winch gear through a set of pinions is to gain the mechanical advantage. The pinions which work the winch locking wheel are necessary to restrict the movement of this wheel to a value less than 360° for the complete operation of the gate.

The winch-locking wheel has a notch on its periphery. When the gate is closed to road traffic, this notch comes in alignment with the plunger of an 'E' type lock provided above it. The key from this lock can be extracted only in this position. This key is used for releasing the gate lever in the cabin.

While opening the gate, the winch-locking wheel also rotates. To 'E' type lock plunger in the open position of the gate, a mechanical stop is provided. This stop prevents the winch-locking wheel from making a full revolution while the gate is being opened. The wire rope from the winch-gear is connected to the rope drum of each boom in series. This rope drum has a roller fitted on it. This roller works in the same path of a trunnion bracket, which is clamped rigidly to the boom. The trunnion bracket also has a roller, which in the closed position of the gate, rests on a stop provided in the rope drum casting. This stop prevents, the boom from being lifted by unauthorised means.

The rope drum has triangular projections provided all around it. These projections work a link mechanism, which rings a bell. The shape of the projections is such that the bell is rung before and while the boom is falling, but not while the boom is being lifted up. When the gate is being opened, even though the booms attain the vertical position, there is a certain amount of idle stroke provided at the end of this operation. The idle stroke becomes the 'initial idle' when the gate is being closed and thus enables the audible pre-warning to be given.

To identify which barrier is left hand and which right hand – “stand at the weight end, facing towards the stop post, the barrier on the left is called the left hand barrier while the one on the right is called the right hand barrier.

The main left hand and right hand parts are:

- |    |  |
|----|--|
| a) | Rope drum  |
| b) | Trunnion bracket                                     |
| c) | Link assembly for bell                               |
| d) | Pedestal (the one on which the rope drum is mounted) |

#### Pole Locking: (DRG No.SA8158/N)

The positive pole locking is achieved by installation of one lever G.F. Roding is run to both the poles at post. An approved type of lock with plunger is provided. The plunger is driven by an operating bar (fitted on post) connected to roding operated from one lever G.F. After the winch is operated to close the gates, winch is locked and 'E' type lock key is extracted, this key is inserted into lock fitted on one lever G.F. for operating it to lock the poles. Once the poles locking is done by operating the lever to its Reverse position, another key is taken out and transmitted to cabin for, lowering of signal or for releasing the gate control lever in the cabin.

Normally pole is locked by the pawl by means of a notch cut on the side of the locking plunger. When the pole is dropped properly and housed in the pole guide, pawl is lifted up and disengage the locking plunger to allow to lock the pole.

This arrangement will ensure the proper operation of the pole and will not allow to move the plunger to lock the pole unless pole comes to its proper position and rest in pole guide.

#### 1. Swing type gates may be interlocked by:

- a)
- b)

2. Working of triple 'E' type gate locking:

- a) A triple lock is fitted to the gate leaf located on the side \_\_\_\_\_ to the gate lodge, and a double lock of the gate leaf \_\_\_\_\_ from the gate lodge.
- b) For closing the gate, the gate having the \_\_\_\_\_ lock is first closed.
- c) Then the key released from the \_\_\_\_\_ lock is taken to the \_\_\_\_\_ lock.
- d) After closing both the gates, a control key will be released from the \_\_\_\_\_ lock.
- e) Control key is then transmitted to the cabin manually/mechanically/electrically.

3. Explain the double key lock method of interlocking L.C. Gates with the aid of the sketch:

### INTERLOCKING OF LIFTING BARRIERS:

1. Study the winch used for operating the lifting barrier and indicate:

- a) No. of small pinion A used.
- b) No. of teeth in pinion A.
- c) No. of pinion B used.
- d) No. of teeth in pinion B.
- e) No. of teeth in winch gear.
- f) No. of rotation of handle required to open the gate fully to 90 degrees.
- g) No. of further rotation of handle required to lock the gate in the open position.

2. Draw a sketch of winch locking wheel and indicate how it is locked.

3. Why a train of gears are used to operate the winch gear?

4. Why a further set of gear is used to operate the winch-locking wheel?

5. How winch-locking wheel is prevented from making a full revolution in open position?

6. Study the construction of lifting barrier and indicate:

- i) Length of pole.
- ii) The part on which it is mounted.
- iii) The purpose of drum.
- iv) The number of rotation of the drum makes when opening the gate fully.

7. Can you lift the pole when gate is in closed position by exerting pressure?
8. How do you call a lifting barrier R.H. or L.H.?
9. Carefully note the difference between a lifting barrier R.H. and L.H. Are they interchangeable?
10. How Boom locking is achieved? And how the proper falling and resting of the pole in the pole guide is ensured?

Date;

Signature of trainee