इरिसेट
आउट डोर सिगनलिंग प्रयोगशाला
इरिसेट / ओ डी एस - 12

IRISET
OUT DOOR SIGNALLING LABORATORY
EXPERIMENT NO.: ODS – 12

नाम
Name   :   _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

अनुक्रमांक   प्राप्तांक
Roll No   :   _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   Marks Awarded   :

पाठ्यक्रम
Course   :   _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

दिनांक   अनुदेशक के आद्यक्षर
Date   :   _ _ _ _ _ _ _ _ _ _ _ _ _ _ _   Instructor Initial   :

STUDY OF DOUBLE WIRE VERTICAL ROTARY DETECTOR:

1. To detect the correct position of switch rails with respect to the stock rail, and to detect that the points are securely locked.
2. To prove the correct setting of the route.
3. To lock the points in the last operated position when the detector is operated or when the detector transmission is broken.
4. It should be capable of being used in a single transmission.

There are two types of D.W. vertical rotary detector:

1. Double wire vertical rotary detector --Single wheel.
2. Double wire vertical rotary detector --Double.

The single wheel vertical detector is used when a pair of points is to be detected only in one position (NORMAL OR REVERSE) . The double wheel vertical rotary detector is used when a pair of points is to be detected in both the positions (NORMAL OR REVERSE).Notches are cut in the point and lock slide so that will allow the detecting or control rim to pass through when the points are properly set and locked. In point slides the notches are 5/8 inches (15mm) wide and in lock slide it is ¾inch (22mm)wide. A shallow notch is that notch which allows only the detecting rim to pass through and its depth is ½ inch (12mm). A deep notch is that notch which allows the control rim to pass through and its depth is 1 inch(25mm). When a point is to be detected only in one position the single wheel vertical rotary detector is used and the notch cut is shallow notch.

When a pair of points is to be detected in both the positions a double wheel vertical rotary detector in a coupled push-pull transmission is used.The two detector wheels move in opposite directions when when a lever is operated and therefore require one deep and one shallow notch (say with normal positions of the points) and when the second lever is operated with the first Lever in the normal position (with reverse position of the points) the movement of the detector wheels are are in the opposite directions such that the detector which requires a deep notch when the first lever was the detector which required a deep notch when the first lever operated require, a shallow notch now.

The construction of IRS single wheel vertical rotary   detector (FPS) is different from S&F single or double wheel vertical rotary detector where the detecting rim is 29 ¾ inch, but the

construction of IRS double wheel vertical rotary detector are similar to the S&F double wheel vertical rotary detector. A neutral point is that point in the transmission the position of which is not affected by the variations in length caused by temperature changes. This is that Point in the D.W. transmission where the length of pull wire is equal to the length of the return wire. Exception this point every other point on the transmission moves either, way from the compensatory when the temperature falls or towards the compensatory when the temperature raises. Therefore any gear placed at a position other than the neutral point will move a distance equal to variation in the position of the length of wire between this gear and then neutral point.

The bottom rim is 6 ¾ inch(176mm), the space occupied by two point slide and one lock slide of ½ inch each is 1½ inch(30mm).We are left with 5 ¼ inch (140mm), the detector is placed in such a manner that the space on both sides of the point slides to the nearest locking and detecting rim is equally divided at the mean temperature of 100degree F ,hence it is kept 2 5/8 inch (70mm) at 100 F. A detector may not be located at the neutral point specially when it is connected in a transmission. Hence it will move due to variation in length of wire due to change in temperature for a distance equal to variation in length of wire between the detector and the neutral point . The maximum movement of the detector that can be permitted without holding the point is 2 5/8 inch (70mm) as the detector is placed centrally at the mean temperature of 100 F. The minimum temperature taken as 45degree F , the this means that the change of temperature that is expected is 55 above or below the mean temperature.The linear expansion of the material is 0.2 inch for 10 degree F for 100 yards(o.01mm Per degree centigrade for one meter temperature range 65C).

$V = L * \alpha * T$ where V is the variation in length,

        Is the co-efficient of linear expansion,

        T is the change in temperature and

        L is the length of the trnsmission.

$$L = \frac{V}{\alpha * T} = \frac{21 * 10 * 100}{8 * 55 * 0.2} = 238.6 \text{ yards.}$$

$$= \frac{70 * 1 * 1}{0.01 * 32.5} = 215 \text{mts.}$$

Which is rounded off to 240 yards(215mts). This is the distance at which a detector can be provided from the neutral point. A detector connected in a signal transmission moves due to temperature variations. Therefore, the movement of detector wheel due to wire breakage various at different temperatures. The movement of detector wheel under the most adverse case of wire breakage should not be either more that 5 ½ inches (135mm) , i.e., the initial idle stroke on the signal mechanism or less than 31inches (825mm) i.e., the total pull through strokes , so that the signal arm remains on return to on after being momentarily taken OFF.

The functions of the detector rims are:

BOTTOM RIM:

A. This rim permits the operation of the point when the detector is normal.

B. It permits the detector to be located at 215 mm from the neutral point.

DETECTING RIM:

A. It detects the correct relation between the switch and stock rail.
B. It locks the point in the last operated position when the detector is operated.
C. It locks the point in the last operated position when the detector transmission wire opposite to this rim breaks.
D. It permits the detector to be installed in a signal transmission.

LOCKING RIM:

A. IT establishes correct relation between switch and stock rail.
B. It locks the point in the last operated position when the wire breaks.

CONTROL RIM:

A. It proves the route i.e., normal and reverse setting of points.
B. It acts as a limiting stop in the event of wire breakage and thereby.
C. Helps the locking or detecting rim to keep the point held in the last operated position.
D. Ensure the tripping of lever.

Answer the following :

1.The circumference of the detector wheel at its wire rope way   mm.
2. Diameter of the wire rope =   d =
3. Mean circumference at the centre line of the wire rope   mm.
4.Lengths of the bottom rim, locking rim, control rim and detecting rim of the single and double wheel detectors.

NAME OF THE RIM	(FPS) SINGLE WHEEL ANGLE LENGTH	SINGLE WHEEL(METRIC) ANGLE LENGTH
BOTTOM RIM		
LOCKING RIM		
CONTROL RIM		
DETECTING RIM		

5. Thickness of the three, point and lock detector slides:

6. DIMENSIONS OF RIMS:

NAME OF THE RIM	THICKNESS	HEIGHT WITH RESPECT TO THE BOTTOM RIM
LOCKING RIM		
DETECTING RIM		
CONTROL RIM		
BOTTOM RIM		

7.DIMENSIONS OF NOTCHES:

| NAME OF THE SLIDE | WIDTH | DEPTH | |
		LOW NOTCH	HIGH NOTCH
POINT SLIDE			
LOCK SLIDE			

8. **Write the functions of the rims:**

   a.Bottom rim:

   b.Detecting rim:

   c.Locking rim :

   d. Control rim:

9.Distance between the nearest point slide and locking detecting rims at mean, highest and lowest temperatures considering that detector is laid at maximum permissible distance from the neutral point.

	Nearest point slide and detecting rim	Nearest point slide and locking rim
Mean temperature		
Highest temperature		
Lowest temperature		

10. Calculating of the maximum distance between the neutral point and the place where the detector can be connected ?

11. Reasons for the limitation of distance between detector and neutral point?

12. The magnitude of rotation of detector if the wire breaks, at "A" and "B" as given in figure?

	Breaks at "A" single wheel	Breaks at "B" single wheel
Mean temperature		
Lowest temperature		
Highest temperature		

13. Ways and means of keeping the figure in the above table either 5inches or above 31 inches?
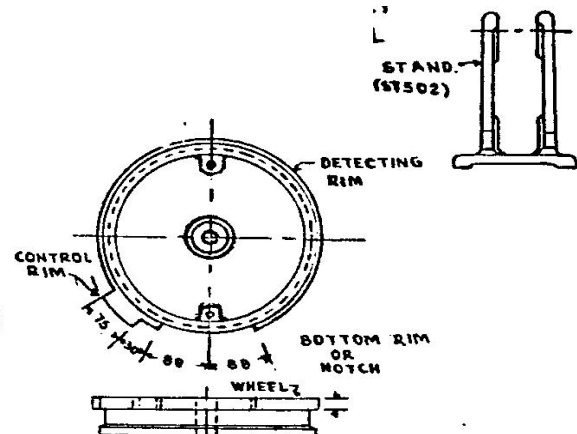
14. The effect of : Increasing the length of locking rim by:
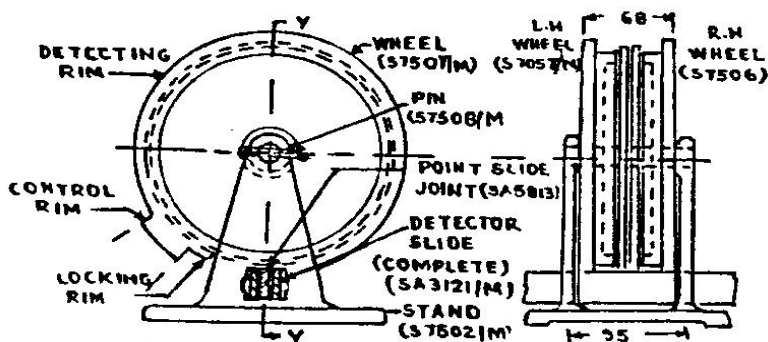   A. Decreasing the length of control rim.

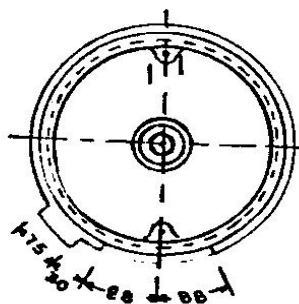Date;   Signature of trainee
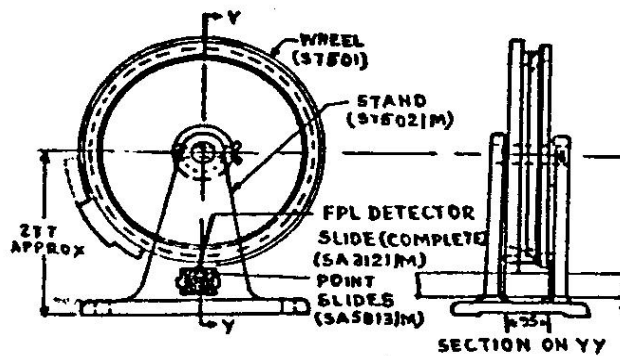
(a) VERTICAL ROTARY
DETECTOR SINGLE WHEEL
(SA7500|M)

(b) ROTARY DETECTOR WHEEL
(ST501) (L.H.)

(a) VERTICAL ROTARY DETECTOR
DOUBLE WHEEL (SA7504/M)

(b) ROTARY DETECTOR DOUBLE WHEEL (LH.)
(ST507) (R.H)