

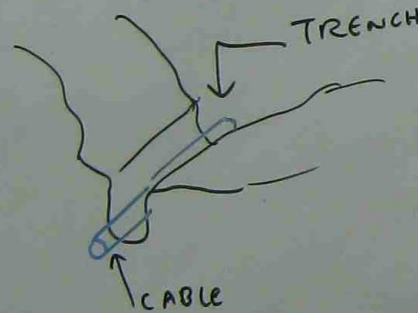
## UNDER GROUND CABLE INSTALLATION METHODS

(1) DIRECT LAYING (2) DRAW-IN SYSTEM (3) SOLID SYSTEM

### DIRECT LAYING

A TRENCH IS DUG. THE CABLE IS LAID IN IT.

THEN IT IS COVERED WITH SOIL.



### DRAW-IN SYSTEM

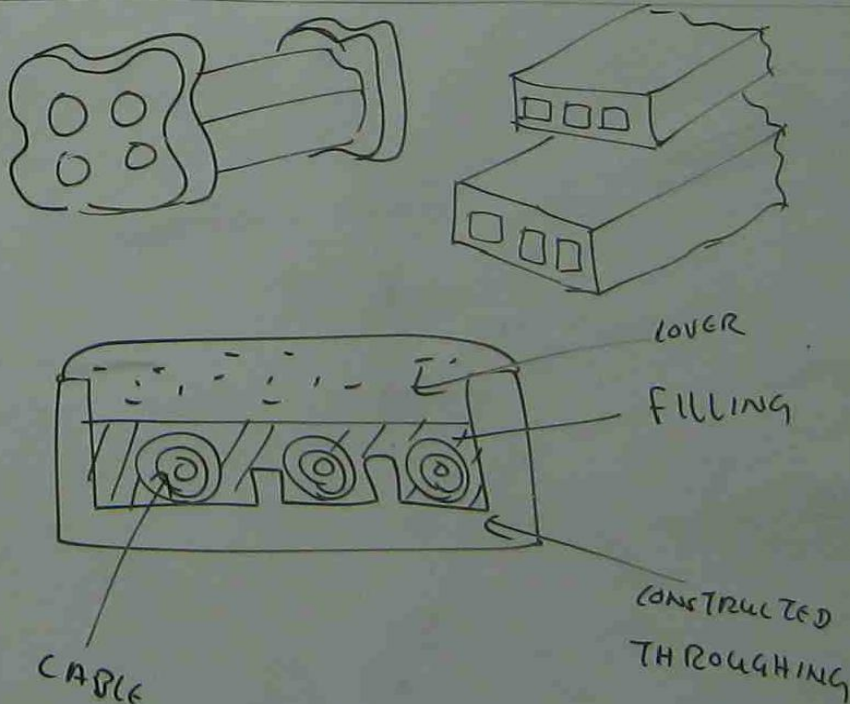
A LINE OF CONDUIT (OR) DUCT IS LAID IN  
TRENCH. THEN THE CABLE IS PULLED INTO  
THE DUCT

## SOLID SYSTEM

THE CABLE IS LAID IN THROUGHING WHICH MAY BE STONE WARE (OR) CAST IRON (OR) TREATED WOOD.

THEN THROUGHING IS PUT IN TO TRENCH.

AFTER PLACMENT, THROUGHING IS FILLED WITH BITUMINOUS OR ASPHALTIC COMPOUND



Pb FIND INSULATION RESISTANCE PER Km OF CABLE  
OF CONDUCTOR DIAMETER 1.6 cm AND INTERNAL  
SHEATH DIAMETER 5.08 cm.

$$\rho = 6 \times 10^{14} \Omega\text{-cm}$$

$$R_{\text{INSULATION}} = \frac{\rho}{2\pi l} \ln \frac{D}{2r}$$

$$= \frac{6 \times 10^{14}}{2 \times 3.1416 \times 10^3 \times 100} \ln \frac{5.08}{1.6} = 1.103 \times 10^9 \Omega$$

$$= 1.103 \times 10^3 \text{ m}\Omega$$

$$= 1103 \text{ m}\Omega$$

Pb IN ABOVE PROBLEM, IF THE CABLE IS SUBJECT TO  
66 KV 3 $\phi$  LINE, FIND DIELECTRIC LOSS

$$\text{DIELECTRIC LOSS} = \frac{E_{ph}^2}{R_{\text{INSULATION}}} = \frac{(66 \times 10^3 / \sqrt{3})^2}{1103 \times 10^6}$$

$$= 1.316 \text{ WATT}$$

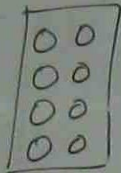
# CABLE DUCTS

Duct Type

COST OF CONSTRUCTION

ABILITY TO RADIATE HEAT

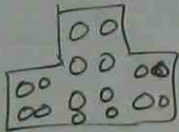
COST OF SUPPORT



EXPENSIVE

BEST

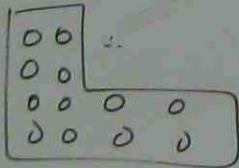
BEST



MODERATE

VERY GOOD

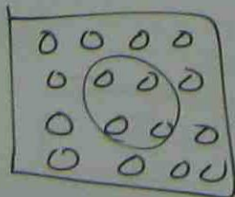
VERY GOOD



MODERATE

VERY GOOD

GOOD

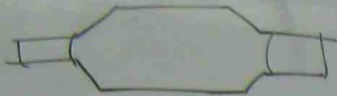


CHEAPEST

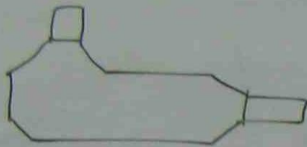
VERY POOR

VERY POOR

## SERVICE BOX



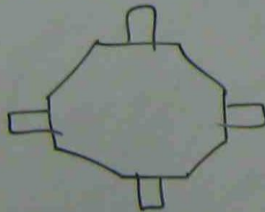
CORNER



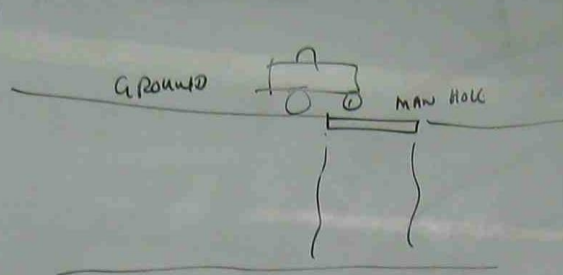
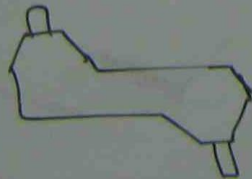
3 WAYS



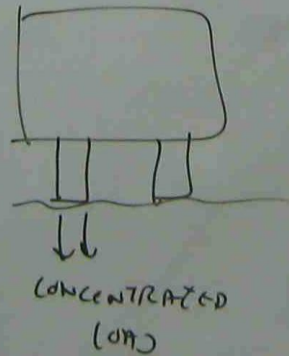
4 WAYS



OFFSET



$$\text{CONCENTRATED LOAD} = \frac{\text{WHEEL LOAD} (1 + \% \text{ IMPACT} / 100)}{\text{WHEEL AREA}}$$



MAN HOLE COVER MUST HAVE  
THE APPROPRIATE MECHANICAL  
STRENGTH TO WITHSTAND  
THE MECHANICAL STRESS CAUSED  
BY CAR WHEEL LOAD

ph

WHEEL LOAD 9576 kg, Impact 50%

FOR HEAVILY TRAVELLED STREET

OVER WHICH TRAFFIC MAY BE

CONCENTRATED. WHEEL IS 15.5 cm x 30.5 cm

CALCULATE CONCENTRATED LOAD ON  
MAN HOLE COVER

$$\text{CONCENTRATED LOAD} = \frac{\text{WHEEL LOAD} \left(1 + \frac{\% \text{ IMPACT}}{100}\right)}{\text{WHEEL AREA}}$$

$$= \frac{9576 \left(1 + \frac{50}{100}\right)}{15.5 \times 30.5 \times 10^{-2} \times 10^{-2}}$$

$$= 303839 \text{ kg/m}^2$$

## ROOFS

MAN HOLE ROOFS ARE DESIGNED AS A SERIES OF STRUCTURAL STEEL BEAM (OR) REINFORCED CONCRETE WITH EXTRA HEAVY REINFORCEMENT (OR) STRUCTURAL STEEL TO SUPPORT MAN HOLE FRAMES

## WALL

MAN HOLE WALL DESIGNS ARE BASED ON THE HORIZONTAL COMPONENT OF THE EFFECT OF BOTH LIVE AND DEAD LOADS ACTING ON WALLS.

## FLOORS

LOAD BEARING POWER OF THE SOIL IS IMPORTANT

## FRAME / COVER

MADE OF CAST IRON, MALLEABLE IRON, STEEL

## VENTILATION

PROPER VENTILATION TO TAKE AWAY THE HEAT PRODUCED BY UG CABLE.

