Introduction

Meggering of Signalling cable is done to test the continuity and insulation of the cable conductors. The Meggering should be carried out at initial stages, before and after cable laying. For maintenance purposes these tests shall be performed periodically.

Low insulation of cable leads to inadvertent energisation or de-energisation of circuits. Check for insulation values periodically enables to ensure integrity of circuits.

If a sudden fall in the value of insulation is observed during the test, the cause should be investigated and immediate action should be taken to repair or replace the defective cable.

Preparatory steps

- Before commencement of cable meggering, obtain necessary disconnection from traffic or observe precautions as per the extant rules in division/zonal railways.
- Disconnect all working circuits and power supply from the cable at both ends.
- Establish communication between the ends of cable under test by magneto telephones with other cable which is not under test if possible, otherwise by VHF sets/CUG phones.
- Ensure availability of competent staff, required instruments and material at both the ends.
- Carry out meggering only when conductors and insulated parts like terminal blocks are clean and dry.
- Short/earth the cable conductors momentarily to discharge the accumulated charge, if any, before the commencement and after the end of Meggering.

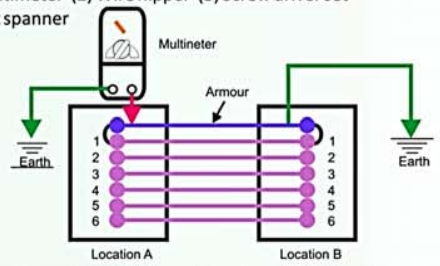
Procedure of cable meggering

Following tests are performed for Meggering of Signalling cable:

(A) Continuity test

Tools & Equipments required

(1) Multimeter (2) Wire nipper (3) Screw driver set
(4) Box spanner



This test is carried out to confirm that the core under test is either showing break between both ends or continuous. Testing can be commenced as per the following procedure:

- Set the knob of multimeter to check resistance at 200 ohm range. (At Location A)
- First test the continuity of conductor no.1 with respect to earth. For this connect one probe of multimeter to earth and other probe to the end of the cable conductor to be tested, as shown in above figure.
- Instruct staff at the other end (at Location B) to connect earth to same conductor of the cable.
- If earth is light at both ends, connect earth to armour also at both the ends. Deflection of multimeter needle shows that the conductor under test is OK; otherwise there is a break in the conductor.
- Then test continuity of all other conductors with respect to this tested conductor. For example to test conductor 2, connect the one probe of the multimeter to conductor 2 and other probe to the tested conductor (at Location A). Instruct the staff at other end (at Location B) to short conductor 2 with the tested conductor.
- Test continuity of all other conductors as above.

(b) Insulation test

Tools and Instruments required

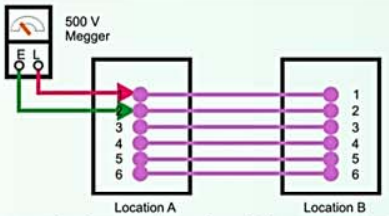
(1) Insulation Tester (Megger) 500V DC (2) Wire nipper
(3) Screw Driver set. (4) Box spanner

This test is carried out to measure the insulation resistance of the cable under test. Insulation resistance is measured between
(I) Conductor to conductor, called cross insulation, and
(II) Conductor to earth.

Procedure is as follows:

(I) Conductor to conductor (Cross Insulation)

(i) A 500 V Insulation Tester (Megger) shall be used for this test and kept at one end of the cable under test.



(Ii) Connect the first conductor for which cross insulation is being measured to Line terminal of the megger. Connect Conductor 2 to Earth terminal of megger as shown in figure. Conductors at the other end are left free.

(Iii) Now rotate the handle of megger or press push button of megger. The reading of meter will show the cross insulation between conductor 1 and 2. Insulation reading shall be recorded after applying the test voltage for about a minute till a steady reading is obtained.

(Iv) Now keeping conductor no.1 connected to line terminal, connect conductor no.3 to earth terminal of the megger and take measurements as per procedure II & III.

(V) Similarly test next conductors i.e. 4, 5, 6 and so on up to the last conductor of cable with respect to conductor No.1.

(Vi) Repeat the procedure to test subsequent conductors with respect to conductors 2, 3, 4 etc.

Record the measurements in the prescribed format *Proforma for cable testing* given at last page.

(II) Conductor to Earth Insulation

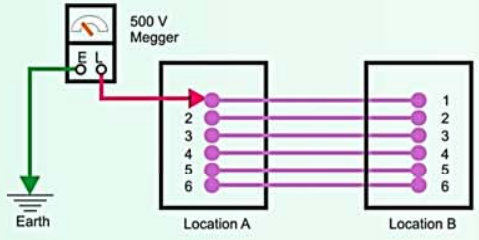
By this we can measure insulation of conductors w.r.t. earth. Procedure is as follows:

(i) Connect conductor under test to the Line terminal of the megger.

(Ii) Connect earth to the earth terminal of the megger. Rotate the handle of megger or press push button of megger. The reading of meter will show the insulation resistance of the conductors. Insulation reading shall be recorded after applying the test voltage for about a minute till a steady reading is obtained.

(Iii) Replace the conductor at Line terminal of the megger by another conductor under test and repeat the process as in (i) & (ii) above.

(Iv) Record the measurements in the *Proforma for cable testing* given on page 7.



Insulation Resistance for a new cable should not be less than 200 Mega ohm /km at 20 C.

For converting measured value of Insulation resistance at any temperature to that of 20 C, a table of multiplier constants is to be referred.

Periodicity of testing

(i) First measurement of insulation of the cable should be carried out after laying of the cable and after first monsoon for all the conductors.

(ii) Thereafter the periodical testing of insulation should be carried out as:

For Main cables - once in 12 months
For Tail cables once in 6 months

Preventive measures

If during periodical testing, insulation resistance of cable is found between 5 and 1 mega ohm/km at buried temperature, the subject cable should be programmed for replacement.

DISCLAIMER

The information given in this pamphlet does not supersede any existing provisions laid down in S.E.M., Rly. Board and RDSO publications. This document is not statutory and instructions given in it are for the purpose of guidance only. If at any point contradiction is observed, then S.E.M., Rly. Board/RDSO guidelines or Zonal Rly. instructions may be followed.

Proforma for cable testing

CABLE INSULATION RESISTANCE TEST SHEET

_____ Railway Station _____

Main/Tail* Cable
1. Location: From . . . . . To . . . . . .
2. Cores: . . . . . .
3. Size: . . . . . .
4. Grade 250/440/650/1100V
5. Length: . . . . . .
6. Type: Unscreened/Screened. . . . . .
7. Insulation: PVC/Paper *. . . . . .
8. Date of installation/Commissioning . . . .
9. Name of the manufacturer: . . . . . .

Core No. Date of Test ..... Temperature.....
or Designation and whether Remarks.....
..... wet, damp or dry. Signature.....

*Strike out whichever is not applicable.

CABLE MEGGERING CHART

	1	2	3	4	5	6	7	8	9	Earth	Remarks
1	×										
2	×	×									
3	×	×	×								
4	×	×	×	×							
5	×	×	×	×	×						
6	×	×	×	×	×	×					
7	×	×	×	×	×	×	×				
8	×	×	×	×	×	×	×	×			
9	×	×	×	×	×	×	×	×	×		

Signature

NOTE : These measurements shall be recorded in two copies. One copy each shall be kept in SSE(Sig.) office and Sr.DSTE's office.

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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Testing & Meggering of Signalling Cables

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