

HOW CAN WE SAVE OUR TRANSFORMERS

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We are the employee of power sector. There are many equipment which is used in power system. transformer is main equipment which is used in maximum quantity. Now a day's damaged rate of distribution Transformer in Uttarakhand Power Corporation is very high. if we can decrease the rate of damaged of transformer then we can decrease most challenging problem of our corporation and can decrease the losses of energy and revenue. So I want to give some point for decreasing the damaged rate of Transformer.

When we charging a transformer:

After complete fitting of accessories of transformer and after proper drying out of transformer and filtration, following precautions, care is required to be taken.

- 1) Radiator valves should be open.
- 2) Conservator tank oil level should be as per marking.
- 3) Breather should have blue Silica Gel and oil at the bottom cup.
- 4) Jumper connections on both H.T. & L.T. sides should be properly connected.
- 5) L.T. cable if provided should be tested.
- 6) Neutral connection should be proper as per rules.

7) For Distribution Transformer:

- (a) There should be separate earthline for Dist. box body and Main switch body and it should be firm.
- (b) Neutral of incoming and outgoing cables should be connected to each other.

(A) After confirming the above things.

- 1) Provide proper capacity D.O. fuses, Keep L.T. Main switch off and charge the transformer. Check humming of the transformer to be normal.
- 2) In the Main switch: Voltage between phase to phase and phase to neutral should be tested by Voltmeter or Avometer and it should be proper as per rating.

B) Following tests should be conducted prior to charging of new transformer.

- (1) I.R. values (2) Continuity Test (3) Insulation Test (4) Ratio Test (5) Short circuit Test (6) Polarity Test (7) Phase sequence (8) Phasing out.

1) **Megger Test:** While carrying out megger tests, leads of Megger should be properly insulated. For this purpose 7/20 SWG copper PVC coated wire is adequate. Do not use aluminium wire for lead connections. Do not touch leads to transformer body.

Note: - In cloudy or rainy weather, Megger results may not be correct.

2) **Continuity Test:** Megger results for a healthy transformer should be as follows.

H. T. Phase to Phase i.e. R-Y; Y-B; B-R	=	0
L.T. -do- i.e. r-y; y-b; b-r	=	0
L.T. Phase to neutral i.e. r-n; y-n; b-n	=	0
Neutral to body (if earthed)		

3) Insulation Tests: - I.R. values should be as follows:

H.T. Phase to Earth

L.T. Phase to Earth Normally above 500 Mega ohms

H.T. Phase to L.T. Phase

Body to neutral when not earth should be above 500 Mega ohms.

Note: With every 10°C to 15°C rise in temperature; I.R. values decrease up to half.

Causes of failure of transformer: Transformer requires minimum maintenance. But the minimum required maintenance and inspection is also not carried out and transformer fails due to negligence in maintenance. Following part could be damaged:

- (1) **Damage of Insulation:** Lossening of core laminations or improper insulatin in core, improper or unhealthy insulation in winding or short circuit.
- (2) **Bushings:** Cracking of bushings or tracking of insulatin due to dust.
- (3) **Switching Surge or Lightening Surge:** Due to improper earthing to L.A.; failure of L.A. or non availability of L.A.
- (4) **Unbalancing or overloading:** Unbalancing due to uneven load/phase. Overloading due to improper size of L.T./H.T. fuses.
- (5) **Overheating:** Due to lack of proper protection, fuses loss of oil level or loose connections.
- (6) As per present situatin physical observed by me more than 90% damaged of transformer is due to shortage of oil becuase maximum transformer are at over load. Due to over load. Due to over load temperature of Bushing rod increase and result leakage of oil. When supply off then temperature decrease resultant oil level go down. After some time when supply ON at that time due to low level of transformer oil Transformer will damaged.

Following points should be carefully observed while carrying out maintenance.

- (1) Oil level should be check on regular interval only at the time when Transformer temperature is not high and if oil level is low then it should be filling up to level immediately.
- (2) **Oil leakage:** There can be number of oil leakage sources. After tightening of Nuts & Bolts of the flages or plates, if the leakage does not stop, gaskets should be replaced. If there is leakage through welding joints; it should be attended by welding.
- (3) **Oil Temperature:** Transformer temperature rises abnormally due to overloading. In such case, transformer should be switched off and cooling fans should be made on for cooling.
- (4) **Bushings:** Bushings should be maintained clean and polished. Cracks/Chipping if any found should be made up with M-seal putty. Joints, connections should be maintained tight.
- (5) **Breather:** Silica gel in the breatehr should be maintasined blue as well as hole at the bottom of the breather should be maintained through.