

# **Presentation**

## **6.6 KV VACUUM CONTACTOR PROPBLEM**

**28-12-2005**

**G Blast Furnace**

## 6.6 KV VACUUM CONTACTOR PROBLEM IN 'G' BLAST FURNACE

**BACKGROUND:** It was observed on 8/12/2005 HT pump motor was not getting off from field panel.

### OBSERVATION:

Date	Time	Detailed Observation	Action Taken
8-12-2005	11:00 am	6.6 KV CP 1062 motor did not stop from DCS. IT was tried to stop by emergency push button but it did not .	Started checking the electric tripping circuit.
8-12-2005	11:15 am	All circuit checked and found electrical condition are ok.	Decided to trip vacuum contactor mechanically with all safety measures.
8-12-2005	11:30 am	Mechanical push button (external) operated from panel through operating lever. But VC not tripped.	Decided to take shut down entire 6.6 kv bus for further investigation by opening the panel door.
8-12-2005	2:00 pm	Door opened and mechanical trip button located bottom side of the VC panel which <b>was not accessible in closed door condition was operated</b>	Draw out VC for testing. Normalize the power system.

# External mechanical trip at VCB



Breaker

External lever actuated mechanical trip s/w

# Vacuum Contactor



No External Provision to  
operate mechanical trip

## 6.6 KV VACUUM CONTACTOR PROBLEM IN 'G' BLAST FURNACE ....Contd.

### OBSERVATION:

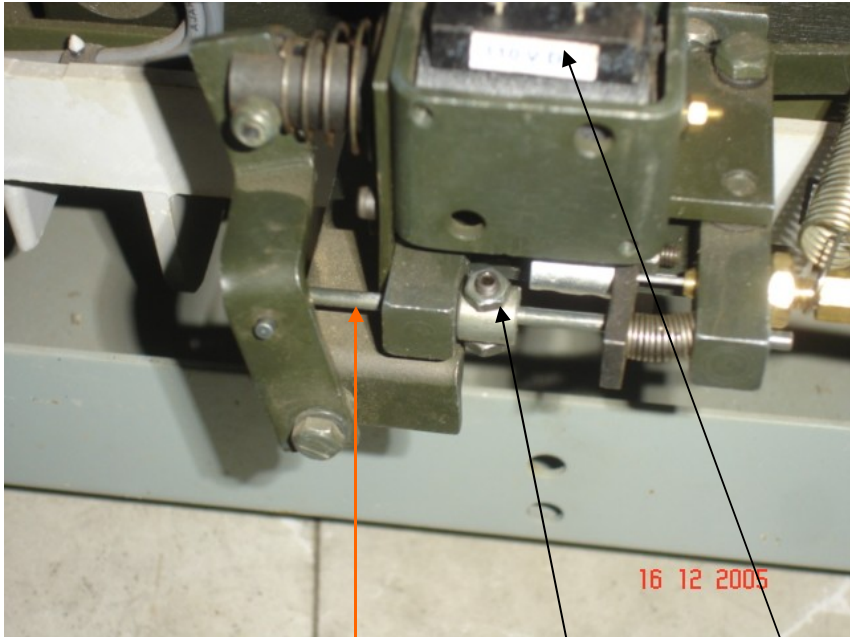
Date	Time	Detailed Observation	Action Taken
8-12-2005	3:00 PM	Vacuum contactor unit tried in test position and found power was available at trip coil terminal. But not operated as coil was already burnt.	New coil to be replaced.
8-12-2005	4:00 PM	Trial taken with new coil and found VC not tripped as its mechanism not worked.	Specialized person called to investigate the the mechanism fault.
9-12-2005	9:00 AM	Understand mechanism and found tripping striker fixed upon a <b>round rod</b> with a grub screw was loose. Same tightened and given in operation. It was observed that external trip (mechanical) is available in Breaker but same lever is used in Vacuum contactor to operate electrical trip.	<ol style="list-style-type: none"> <li>1. Called ETG and explained whole events . ETG accepted weak mechanism of tripping system and risk in operation also.</li> <li>2. M/S AREVA ( ALSTOM) called and explained the case. They agreed to provide mechanical trip facility from out side door.</li> </ol>
16/12/2005	10.00 AM	M/S AREVA Came with a solution of mechanical trip from existing system. Trial taken in spare panel and found working but reliability was not confirmed. It was also observed that trip coil may malfunction if the operating voltage is little low ( in case of total power failure)	<ol style="list-style-type: none"> <li>1. ETG &amp; GBF rejected the solution (mechanical trip) provided by M/S AREVA.</li> <li>2. ETG recommended to provide transparent spring door to operate existing mechanical trip which was not approachable right now.</li> </ol>

## 6.6 KV VACUUM CONTACTOR PROPBLEM IN 'G' BLAST FURNACE ....Contd.

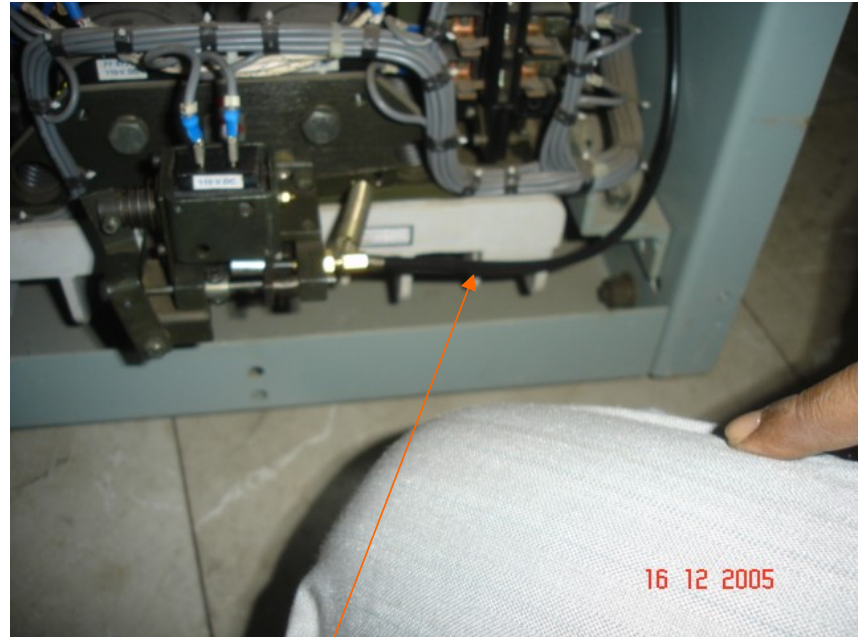
**BACKGROUND:** It was observed on 8/12/2005 HT pump motor was not getting off from field panel.

### **OBSERVATION:**

Date	Time	Detailed Observation	Action Taken
16-12-2005	11:00 am	It was observed that Vacuum contactor can put inside in closed condition also if people put off control power for safety reason during insertion. Mechanical trip facility is must to avoid this practice.	Mr Raghavulu , Mr D K Singh ( Spl project) Mr Mohanty ( L & T) and Mr Sajeev ( DUSTOR Co) are informed and ask to take action regarding this problem.



Round rod and grub screw



AREVA solution for mech trip

Coil 110 V DC

**Record note of discussion and site Demo by Areva Engineers On HV contactor panel mechanical trip mechanism and trip coil burning problem. Date-16-12-05**

TATA Steel: Mr. S.K. Kedia- G Bl. Fce  
Mr. P.Manna-G Bl. Fce  
Mr. S.K. Maitra- G Bl. Fce

AREVA: Mr. Kanchan Gupta  
Mr. N. C. Nandy  
Mr. Sandip Guha

Mr. S.K. Chowdhury-ETG

Following points were discussed and noted:

AREVA Engineers made site demo in front of G-furnace and ETG Engineers for the mechanical trip operation of HV contactor panel by Clutch wire mechanism connected between existing trip coil operating mechanism and the existing push button at the middle of the panel.

TATA steel didn't accept the arrangement since it was observed that slight loosening of clutch wire was not allowing the contactor to close, that means chattering of contactor taking place during switching on operation. It was proposed to provide oval cutout at the bottom with flap similar to the breaker-racking opening and loose operating handle (insulated) so that mechanical trip is possible from outside the breaker through the opening whenever required.

AREVA tested the existing trip coil and confirmed that it can withstand maximum 27second. They also brought one new trip coil with more number of turns hence more resistance that will withstand about 90sec of continuous energisation. Since the trip coil is getting disconnected from supply as soon as contactor trips it is felt that new trip coil will be more suitable. AREVA shall replace all trip coils with new higher rated trip coil and submit the test report of new trip coil.

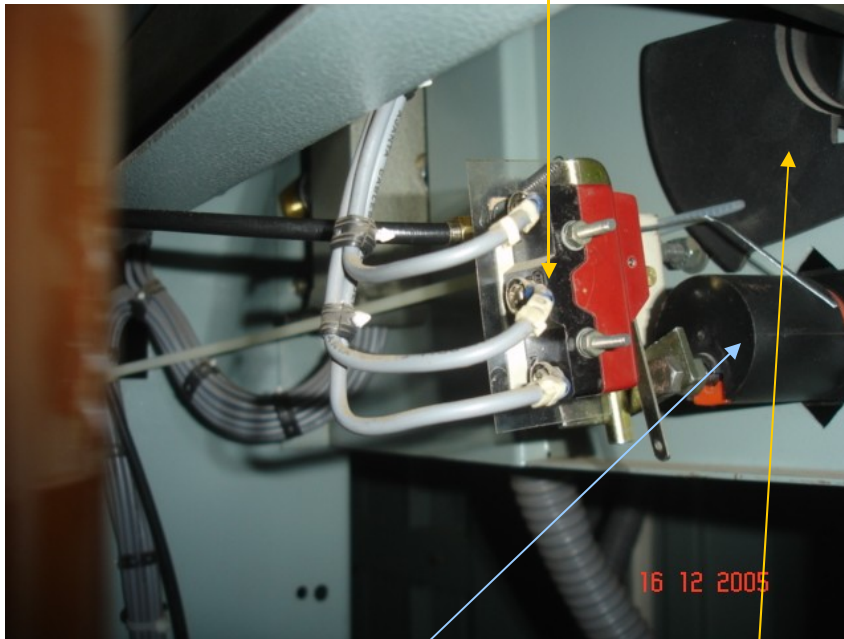
TATA steel pointed out that loosening of striker metal ring from its position was the main reason for not tripping the contactor and burning of trip coil. It was observed that the guide rod on which this metal ring is mounted is too thin (Approx. 3mm) and round, hence the striker ring got loosened due to vibration after several operation.

AREVA agreed to make necessary modification with permanent locking mechanism so that it does not loose after repeated operation.

The mechanical trip handle provided on the panel is fouling with the cable and also the handle is not properly adjusted to trip in case of emergency. Areva agreed to set right the mechanism. Areva will submit the schedule for completing the above jobs to TATA steel within one week.

AREVA shall supply the correct Part No. for new trip coil of contactor panel.

Electrical s/w available instead of mechanical trip mechanism.



Trip actuator



Lock/Free s/w for VC in/out should trip VC mechanically ( Standard safety Features)

THANK YOU

**G Blast Furnace**