

FAILURE REPORT OF BUCKET ELEVATOR OF TRAIN –A (DAP)

EQUIPMENT NO: 30-31-010A (PRIMARY ELEVATOR)

TECHNICAL DETAILS: The primary elevator is used to raise the dried material from dryer to oversize screen at the height of about 36 meters. There are 176 buckets each of 135 litre capacity mounted on HARDENED CHAIN NO. R4037 WITH G6 ATTACHMENT REXNORD MAKE and moving on HEAD END & TAIL END SPROCKET driven through 132 KW motor with 18 rpm and 0.86 m/s chain speed. The capacity of elevator is 680TPH

OBSERVATION: On date 08/04/2014 there was a major breakdown in chain and bucket of this elevator. The chain was broken and entangled with casing of elevator and also lifted the tail end sprocket with counter weight beyond a particular limit. Due to lifting of tail end sprocket there was damage on guide channel of counterweight. A picture is attached herewith.

The similar nature of failure was also observed 15 days back (17/03/2014) in the same elevator.

DETAILED OBSERVATION:

1. At 08:45 PM on Dtd: 08/04/2014, it has been reported by control room of DAP Tr-A that primary elev stopped due to tripping in high current
2. The elevator was inspected immediately by maint staff from boot area to top hood area by opening the inspection/boot/side doors
3. After inspection following observation has been found
 - i) One side chain (control room-workshop side corner) has snapped & link plate with guide plate has broken from hole area (fastening pin joint hole)
 - ii) Total counterweight with tail sprocket, guide channel & CI block has damaged severely & counter weight with tail sprocket lifted upto side door top.
 - iii) One guide angle with bent & broken condition also found at boot area.
 - iv) Around 5-6 nos of bucket getting twisted & kept the chain in tension condition
4. As per current trend of drive , overload alarm shown thrice as per DCS chart



Expected Reason:

Due to failure of chain link, Elevator run in detached chain condition, it might be struck to guide angle, caused guide angle damaged & dislocated as trend report showing three times high current between 06:00 PM to 08:37 PM before tripping.

Finally the detached chain with bucket rested on casing of elevator in no load side, while load side chain might be in tension with drive, causing up lifting of tail sprocket up to side boot door top flange, where sprocket staked & drive tripped.

It shows first chain link has failed & caused all the damages


Conclusion: The mounting bracket of bucket broken & which leads to failure of chain & for that following corrective action is needed in future

- i) Some manhole to be fitted over elevator casing on each important floor like control room & screen floor, where manpower are daily available, so that it may be inspected twice in a shift
- ii) During cleaning shutdown, it should be inspected by opening side boot door in running condition.
- iii) In coming ATR, each joint of chain should be inspected after washing
- iv) Guide angle should be inspected every day. (Clear approach/proper housekeeping required near guide angle manholes)
- v) Broken link should be tested for its microstructure
- vi) Sprocket should be checked for its hooking
- vii) Drive leveling should be checked
- viii) Limit switch at the tail end sprocket can be provided to avoid major break down

If current crossing alarm level, elevator should be stopped immediately. As in this case three times it crossed alarm level i.e. > 200 amps

ENCLOSURE:


DCS current trend copy


M.S. Jena

Dy. Manager


Pramod Kumar

Chief Manager


R.K. Jain

Jt. General Manager

→ ED (POP) → 12/4/14



Trend Display : TRFND.OS4.26

Operate Message list View Display Tools Print Help

| | | | | | | | | | |
|-----------------------------|---------------------|--------------------------|---------------------------|-------------------------------|--------------------------|--------------------------|--------------------------------------------|----|-----|
| II301-A-30 HIGH LOCAL | B30-01-051 LOCAL | B30-01-051-IS IOC STR | II131-A-30 HH LOCAL | II304-A-30 HIGH IOC STP | B30-03-010-IS IOC STR | B30-29-050-IS IOC STR | B30-29-050-IS PRIM-ZSSDEFEA BYPASSED | >> | 258 |
|-----------------------------|---------------------|--------------------------|---------------------------|-------------------------------|--------------------------|--------------------------|--------------------------------------------|----|-----|

04/08/14 18:51:59.269

250

237

225

212

200

187

175

162

150

137

125

112

100

87

75

62

50

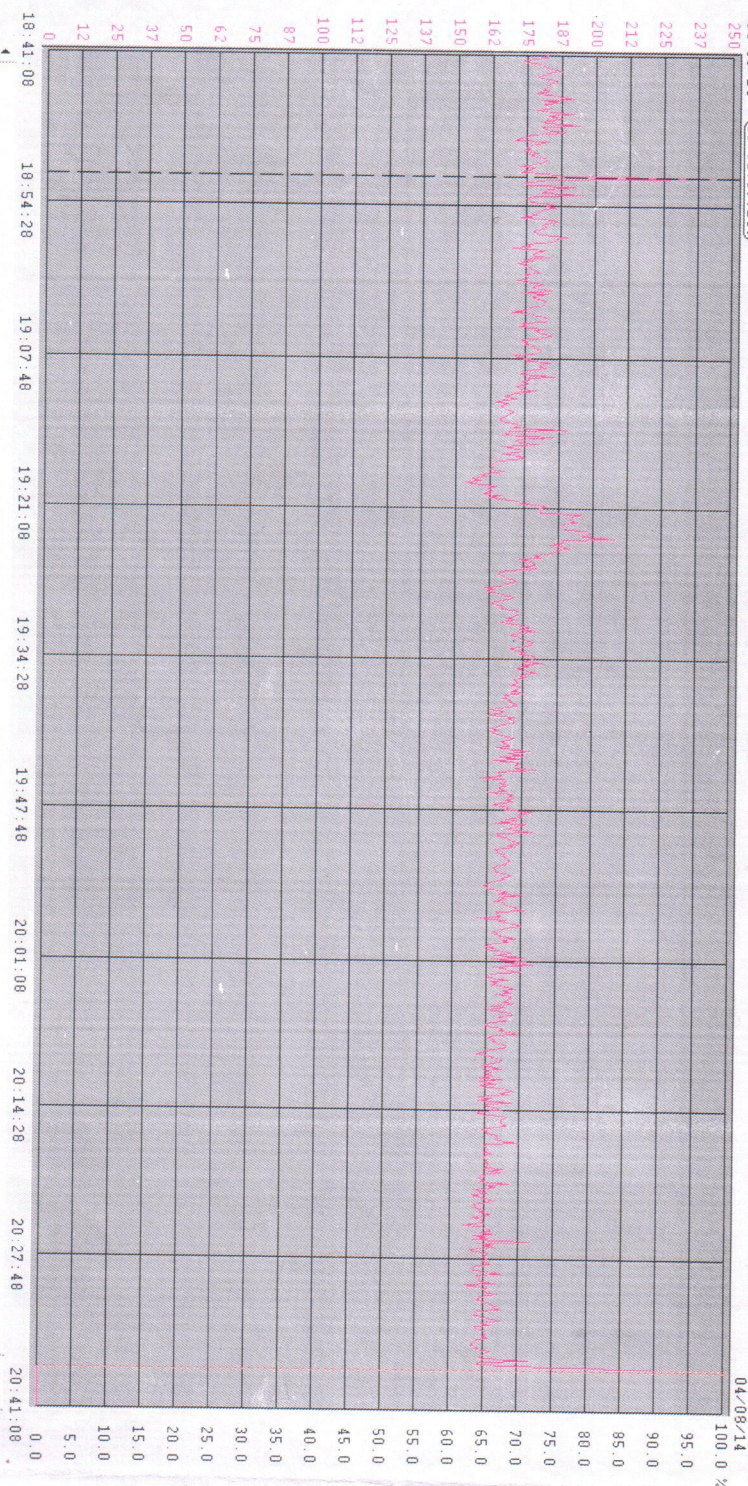
37

25

12

0

| Name | SCS | SCE | Actual | Cursor | Unit | Short text | Allocated log |
|--------------|------|--------|--------|--------|------|--------------|---------------|
| 30_I120_F_B | 0.94 | 4.06 | 0.00 | 32.92 | Amps | GRANULATOR-F | II120-A-30 |
| 30_I1301_B | 0.00 | 200.00 | 0.50 | 124.30 | Amps | SEC ELEVATOR | II301-A-30 |
| 30_I1300_B | 0.00 | 150.00 | 0.46 | 41.06 | Amps | FINES CONV. | II300-A-30 |
| 30_I1224_B | 0.00 | 250.00 | 0.00 | 242.19 | Amps | PRILEVATOR | II224-A-30 |
| 30_I1218_1_B | 0.00 | 100.00 | 0.30 | 46.62 | Amps | DRYER HIGH | II2181-A-30 |
| 30_I129_020A | 0.00 | 30.00 | 0.03 | 7.06 | Amps | DRY.DIS.CONV | II29020A-30 |



START

OPC-Server 900F-28

Trend Display - TRFND...

2:49 PM

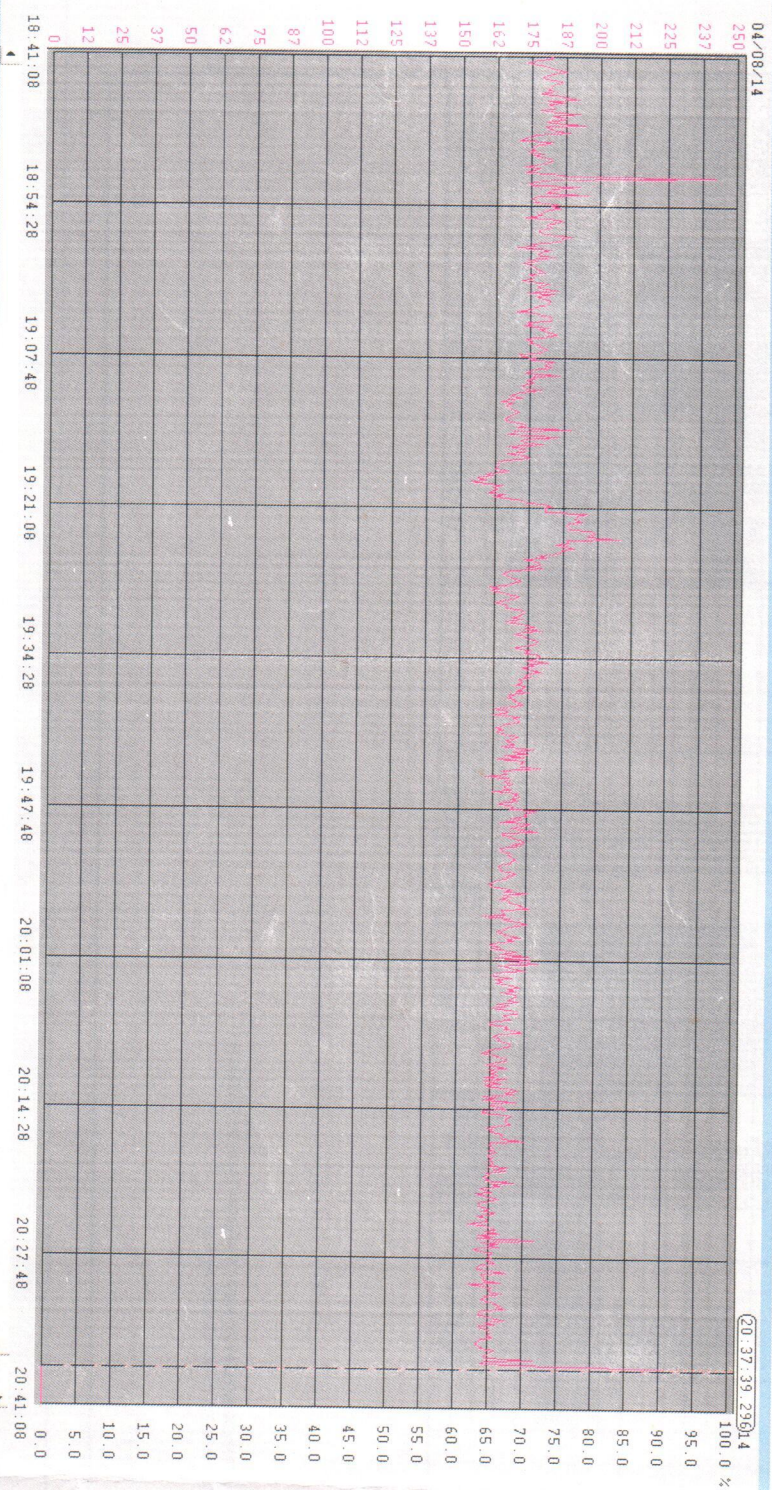


Trend Display : TREND,054,26

Operate Message List View Display Tools Print Help

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|---------------------|---------------------|--------------------------|---------------------------|-------------------------------|--------------------------|--------------------------|----------|----|
| I1301-A-30 HIGH | B30-01-051 LOCAL | B30-01-051-IS LOC STR | I1131-A-30 HH LOCAL | I1304-A-30 HIGH LOC STR | B30-03-010-IS LOC STR | B30-29-050-IS LOC STR | BYPASSED | >> |
| A30-01-011 LOCAL | A30-21-010 LOCAL | B30-29-050-IS LOC STR | A306-M-101 LOCAL | DRY HIGH LOC STR | B30-29-110-IS LOC STR | PRIN-2530FEA BYPASSED | 258 | |

| | Name | SCS | SCE | Actual | Cursor | Unit | Signal text | Allocated tag |
|---|---------------|------|--------|--------|--------|------|--------------|---------------|
| 1 | 30_I120_F_B | 0.94 | 4.06 | 0.00 | 29.32 | Amps | GRANULATOR-F | I120F-A-30 |
| 2 | 30_I301_B | 0.00 | 200.00 | 0.50 | 127.84 | Amps | SEC ELEVATOR | I1301-A-30 |
| 3 | 30_I300_B | 0.00 | 150.00 | 0.46 | 38.97 | Amps | FINES CONV. | I1300A-30 |
| 4 | 30_I224_B | 0.00 | 250.00 | 0.00 | 269.80 | Amps | PRILEVATOR | I1224A-30 |
| 5 | 30_I1218_1_B | 0.00 | 100.00 | 0.30 | 44.78 | Amps | DRYER HIGH | I12181-A-30 |
| 6 | 30_I123_000_A | 0.00 | 30.00 | 0.04 | 7.08 | Amps | DRY-DIS CONV | I123-000A-30 |





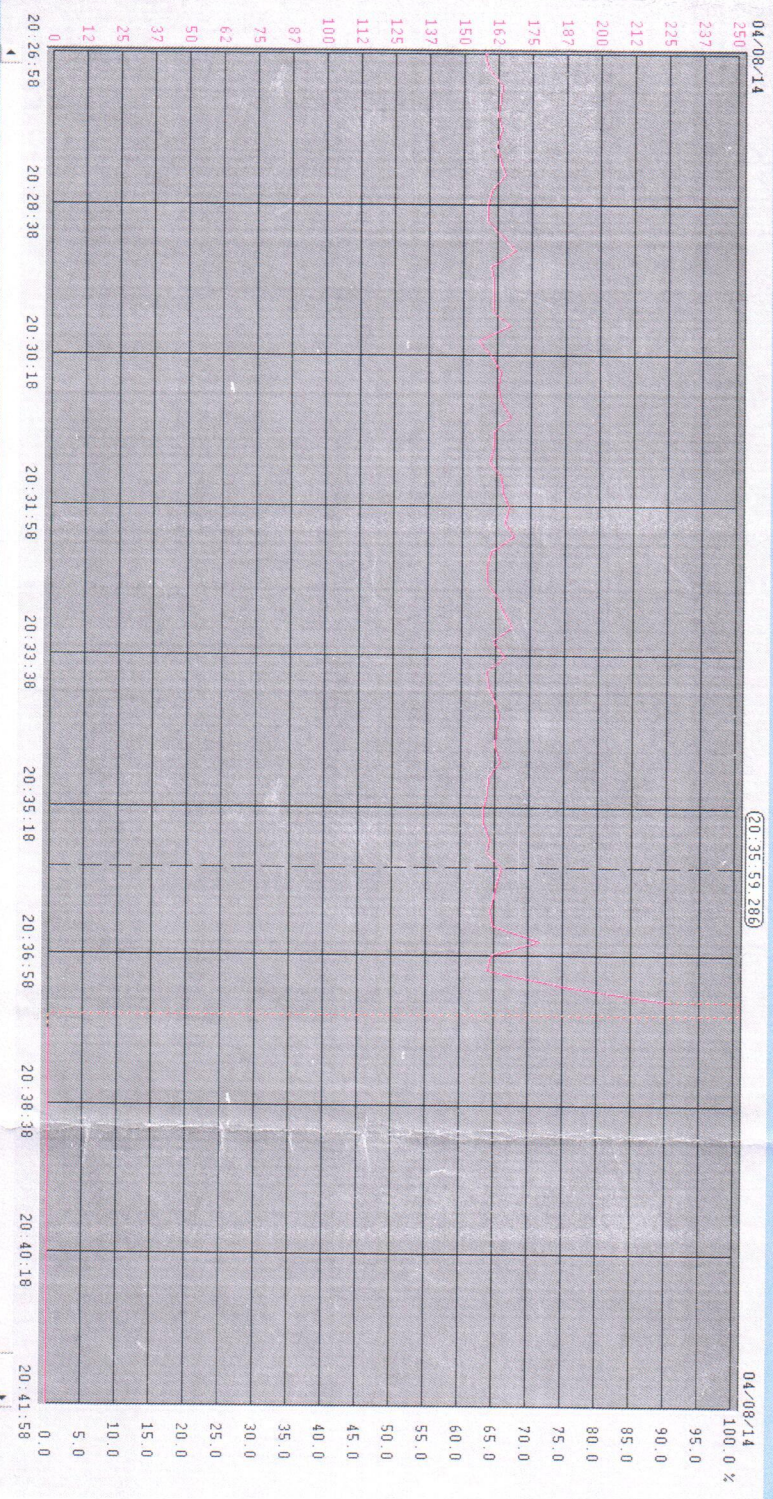
Trend Display : TRND.OS4.26

Operate Message List View Display Tools Print Help

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|---------------------|---------------------|--------------------------|---------------------|--------------------------|--------------------------|--------------------------|---------------------------|----|-----|
| I1301-A-30 HIGH | B30-01-051 LOCAL | B30-01-051-IS LOC STR | I1131-A-30 HH | I1304-A-30 HIGH | B30-03-010-IS LOC STR | B30-29-050-IS LOC STR | PRM-ZSSIBEREA BYPASSED | >> | 258 |
| A30-01-011 LOCAL | A30-01-010 LOCAL | B30-23-050-IS LOC STR | A206-K-101 LOCAL | RM Magnet 2.5 LOC STR | B30-29-110-IS LOC STR | | | | |

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| Name | SCS | SCE | Actual | Cursor | Unit | Short text | Allocated tag |
|---------------|------|--------|--------|--------|------|--------------|---------------|
| 30_I120_F_B | 0.94 | 4.06 | 0.00 | 28.28 | Amps | GRANULATOR-F | I120F-A-30 |
| 30_I1301_B | 0.00 | 200.00 | 0.50 | 120.83 | Amps | SEC-ELEVATOR | I1301-A-30 |
| 30_I1300_B | 0.00 | 150.00 | 0.46 | 37.56 | Amps | FINES CONV. | I1300A-30 |
| 30_I1224_B | 0.00 | 250.00 | 0.00 | 165.08 | Amps | PR-ELEVATOR | I1224A-30 |
| 30_I1218_L_B | 0.00 | 100.00 | 0.30 | 44.21 | Amps | DRYER HIGH | I12181-A-30 |
| 30_I123_020_A | 0.00 | 30.00 | 0.03 | 6.98 | Amps | DRY-DIS CONV | I123020A-30 |



Start OPC-Server 800T.23

Trend Display : TRND.OS4.26

2:48 PM