

03 April, 2009

SAFETY ALERT

Paper Machine Breast Roll Cable Failure

Incident Summary

On 11 December 2008 at approx 01.30AM, whilst a paper machine breast roll was being raised into the run position, the front cable sheared followed by the rear, due to excessive load causing the breast roll to fall from its suspended pivotal arc position.

This failure resulted in the breast roll colliding with the machine frame making significant impact which caused damage to the immediate area. Inspections carried out by professional engineers found no structural damage. No personal injuries were sustained. All procedural safety & process checks were performed during the lifting process and subsequent to the incident.

Background

A few hours before the incident:

Paper machine was shut down to investigate a hole that was appearing in the sheet. The cause was subsequently identified as fabric damage with many CD strands broken. The fabric was cut from the machine and samples kept for testing by the manufacturer. As part of the procedure the wet end was cleaned by high pressure hosing and prepared for the installation of the new fabric. The motor/gear box mechanism was operated pre tensioning the cables. The nuts were loosened and the breast roll was lowered ready for the fabric to be installed. The fabric was installed and the breast roll was being raised to its home position. It is as a result of the cables failing that the incident involving occurred.

Work procedures are in place for Fabric changes.

Operation

As a result of a similar incident at another mill in 2005, which resulted in a fatality the following improvements were made after reviewing operations: relocating the backside switch; improving line of sight, no-go zone identified to eliminate personnel from the area;

The breast roll lower/raise is a three person operation. Two manual switches are required to be

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engaged before the air motor drive can be actuated. One switch is located at the front of the machine and the other at the rear. These switch positions are strategically placed so that the operators can observe the breast roll as it is lowered and raised. A third person is located on the wire section ladder and acts as an observer for the senior operator. The observer watches the top of the breast roll as it is raised to ensure no obstructions are apparent.

To remove the breast roll pretension of the breast roll cables is required.

This allows the

operator to undo the locking nuts front and backside. The locking arms are lifted and a locking pin inserted to hold arms clear of the breast roll path.

The breast roll is lowered and the cables slackened. The front side cable holding pin is disengaged and the cable removed.

When ready for raising the breast roll the front side cable is re attached to the breast roll is raised.

Incident Detail

Senior operator had positioned himself at the front of the machine as per standard practice.

Machine assistant was instructed to operate the backside switch.

Dryerman was instructed to be the observer. Senior operator made all visual checks as per the procedure. Senior operator was satisfied all was ready for safe raising of the breast roll. Senior operator instructed assistant to engage his switch and Senior operator did likewise. The roll was raised to a 45 degree angle where it was stopped. Senior operator then made his visual checks and all cables were sitting in their correct positions. Senior operator instructed Assistant to engage his switch and the breast roll was again raised. When the breast roll was within 40mm of the home position without warning the front side cable sheared followed by the rear due to excessive load causing the breast roll to fall from its suspended pivotal arc position. This failure resulted in the breast roll colliding with the machine frame making significant impact which caused damage to the immediate area. (**Fig 1** shows some of the localised damage on the front side)

Fig 1

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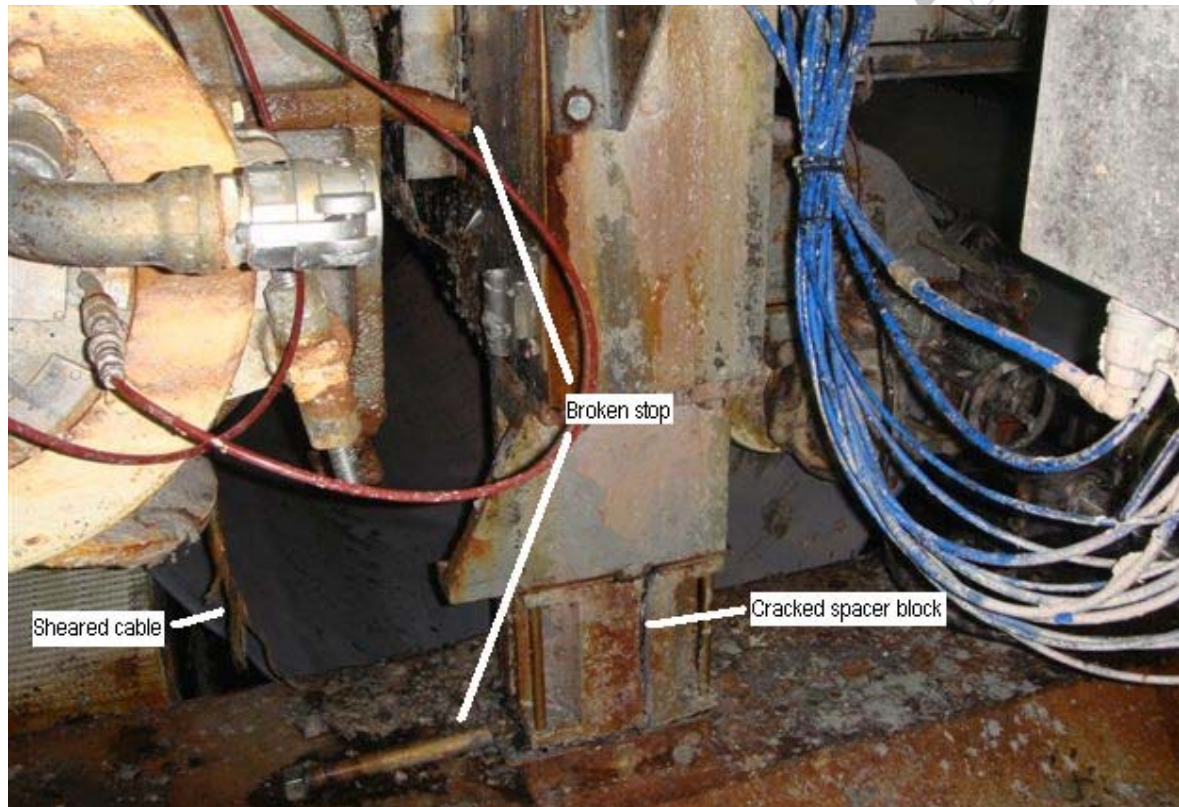


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The breast roll mechanism on PM3 is old technology to what is currently available in today's market it requires extensive human skill involvement which exposes potential human error. An alternative mechanical screw jack mechanism is available which eliminates human error completely. This will be added to the recommendations.

Fig 2 shows a crack in the floor mount which supports the spacer block. This support took the brunt of the impact.

Fig 2

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Cable history

As a result of a similar incident at Maryvale in 2005 which resulted in a fatality we made the following improvements after reviewing our operation; the cables are replaced every two years and inspections taken place every six months. These operations are included on our PM schedule.

The cables were replaced in October 2007 and last inspected in June 2008. The next inspection was due in Jan 09. The cables are manufactured for a lifting capacity of 4.5 times the breast roll. The cables are to be examined by independent company to determine their condition at failure and to be tested for shear.

I will refer the findings to the report named *Forensic examination of failed rope for SCA hygiene, Box Hill* page 2 line 7 page 2 *Observations & Preliminary Opinions* Point 2 line 3 and page 3 paragraph 2 line 7

Findings

The cables appear to be sheared which indicates excessive load has been applied at some

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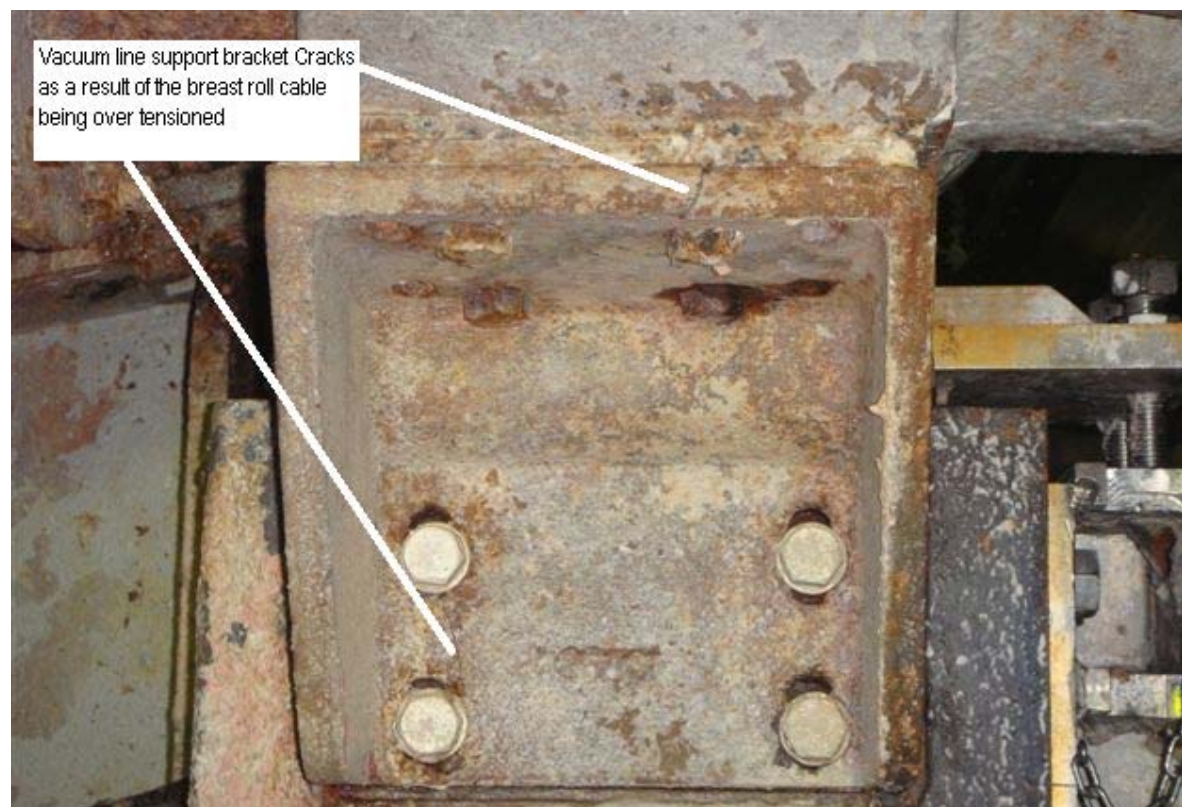
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stage during raising and lowering this could have happened at any point in history from last change out.

I will refer the findings to the report named *Forensic examination of failed rope for SCA hygiene, Box Hill page 5 first dot point line 9.*

The cracked bracket shown in fig 3 supports the vacuum pipe flange, this is a tell tail sign that excessive force has been applied to the bracket. The only way this could have happened is the breast roll flange has pushed against the fixed flange causing an upward force which has stressed the bracket resulting in the crack.

Figure 3



Incident Response

After failure the immediate area was made safe and flagged off. All senior management were duly notified. A call was made to Work safe and investigators arrived in the morning

Contributing Factors

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The cracked bracket holding the vacuum pipe flange, the bending of the cable pin, and bent stopping block indicates that excessive tension had been applied to the lifting cable.

Evidence of corrosion noticed on the cable.

The cables were replaced in October 2007, and last inspected in June 08. The next inspection was due in Jan 09. The cables are manufactured for a lifting capacity of 4.5 times the breast roll. The cables are to be examined by independent company to determine their condition at failure and to be tested for shear.

I will refer the findings to the report named *Forensic examination of failed rope for SCA hygiene, Box Hill* page 2 Point 2 *Observations & Preliminary Opinions* line 5 – page 3 line 5. In short corrosion was surface based and easily removed with a light brush. Over the past 3 years the water system has been closing up, resulting in a raise of water temperature, and conductivity. The stock temperature operates at 45°C.

Cables of differing length

At the shut in August 2008 the flow box was rebuilt. During the commission phase the breast roll was raised and lowered a number of times. No observation of differing cable length was detected during the time.

Over run of air motor

There is a lag in the stoppage of the air motor when the lever is disengaged, this will cause additional tension to be applied to the cable than required. I will refer the findings to the report named *Forensic examination of failed rope for SCA hygiene, Box Hill* page 5 – line 11

Recommendations and Follow Up

1. Installation of limit switches on the up movement to prevent the breast roll from raising 5 mm from the striker plate. Solution to be raised with operations.

When

End Mar

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Whom By

P Williams

2. Check if the cable is against frame bracket End Jan M Boadle

3. Provide torque wrench to tighten the locking nuts on the breast roll to a specified torque

End Mar L James

4. Alter installation procedure to ensure that the cable is continually observed running correctly in the drum

Procedure

T Miller

5. Investigate feasibility of applying a mechanic brake to the air motor

End Feb L James

6. Investigate coating the cable in corrosion resistant material.

End Feb L James

7. Investigate changing the lifting switch mechanism to electric.

End Feb C Ditchburn

8. Repaint the no go area to extend from the breast roll to the north wall

End Mar

L James

9. Install concertina barriers to be used during fabric changes

End Mar L James

10. Update the work procedure to include above recommendations

Next fabric

change

T Miller

11. Review the platform designs to enable better access for the breast roll removal

End Mar L James

12. Prepare CAPEX for alternative lifting mechanism (screw jack)

13. Change the cables every 12 months commencing.

Feb 27th

Jan 20th

R Stride

L James

Recommendations and Follow Up

1. Installation of limit switches on the up movement to prevent the breast roll from raising 5 mm from the striker plate. Solution to be raised with operations.

When

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End Mar

Whom By Status

P Williams Design stage

2. Check if the cable is against frame bracket End Jan M Boadle Complete

3. Provide torque wrench to tighten the locking nuts on

the breast roll to a specified torque

End Mar L James

4. Alter installation procedure to ensure that the cable is continually observed running correctly in the drum

Procedure

T Miller Complete

5. Investigate feasibility of applying a mechanic brake to the air motor

End Feb L James Complete

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End Feb L James Complete

7. Investigate changing the lifting switch mechanism to electric.

End Feb C Ditchburn Refer #1

8. Repaint the no go area to extend from the breast roll to the north wall

End Mar

L James 75% complete

9. Install concertina barriers to be used during fabric changes

End Mar L James Identified to be

ordered w/e 27th

10. Update the work procedure to include above recommendations

Next fabric

change

T Miller Complete

11. Review the platform designs to enable better access for the breast roll removal

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