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# Paper Machine Troubleshooting

This chapter includes troubleshooting guides for the forming, pressing, and drying sections of the paper machine. Although it is difficult to list all possible causes for all machine types, these lists can be used to provide guidance in troubleshooting most equipment.

## 8.1 Forming Section Troubleshooting Guide

<i>Symptom</i>	<i>Areas to Consider</i>
Barring	<ul style="list-style-type: none"> <li>• Condition of rolls (vibration)</li> <li>• Seals on couch roll</li> <li>• Vibration on all machine elements</li> <li>• Loose bearing housings</li> <li>• Compare sheet mark to fabric pattern</li> <li>• Pressure pulses (headbox, pressure screens, and stock delivery system)</li> </ul>
Cockling	<ul style="list-style-type: none"> <li>• Poor formation</li> <li>• Water jumps - stock jump</li> <li>• Water circulation from suction couch roll</li> <li>• Reduce refining</li> <li>• Pulsations in the stock system</li> <li>• Rewetting of the fabric from showers</li> <li>• Water spots from dandy roll or couch press</li> <li>• Drying rate if wet end set-up is correct</li> <li>• Cleanliness of dryer felts</li> </ul>
Couch Shadow Marking	<ul style="list-style-type: none"> <li>• Drainage (may be flooding couch)</li> <li>• Vacuums (may need to increase drainage on table)</li> <li>• Rush/drag or jet/wire ratio</li> <li>• Fabric tension (may be too low)</li> <li>• Excessive fabric wear</li> <li>• Fabric drainage capacity (may need to increase fabric drainage)</li> <li>• Stock freeness (may be too low)</li> </ul>
Cracks	<ul style="list-style-type: none"> <li>• Machine deckles</li> <li>• Trim</li> <li>• Rewetting on edges</li> <li>• Foreign material/stock slinging at roll edges</li> <li>• Minimal deckle wave</li> <li>• Weight profile at edge</li> </ul>

<u>Symptom</u>	<u>Areas to Consider</u>
Crushing	<ul style="list-style-type: none"> <li>• Moisture into Top Wire unit (may be too wet)</li> <li>• Hydraulic pressure buildup on Twin Wire former</li> <li>• Moisture at combining roll (may be too wet)</li> <li>• Cleanliness of fabrics</li> <li>• Tension on fabrics</li> <li>• Poor formation</li> <li>• Lack of activity on Fourdrinier</li> <li>• Sealing sheet at jet impingement or excessive early drainage</li> <li>• Low drainage on former</li> <li>• Plugging of combining or mating roll</li> <li>• Sheet running wet into press elements</li> <li>• Draws (speed differences)</li> <li>• Couch press</li> <li>• Dandy roll (balance, set too hard)</li> <li>• Sheet too wet at dandy</li> <li>• Stock consistency too high</li> <li>• Plugged fabric</li> <li>• Suction couch roll showers not set correctly</li> </ul>
Curl	<ul style="list-style-type: none"> <li>• Fiber alignment</li> <li>• Two-sidedness of sheet</li> <li>• Refining</li> <li>• Draw</li> <li>• Edge dewatering</li> <li>• Proportion of long fibers (may need to increase)</li> <li>• Stock freeness (may need to reduce)</li> <li>• Retention</li> <li>• Uniformity of fabric dewatering</li> <li>• Headbox slice opening</li> <li>• Excessive drying on one side</li> <li>• Excessive coating pick-up on one side</li> </ul>
Dandy Roll Marks	<ul style="list-style-type: none"> <li>• Plugged dandy shower</li> <li>• Damaged dandy roll</li> <li>• Dandy not level</li> <li>• Dandy not aligned</li> <li>• Sheet too wet coming into dandy</li> <li>• Sheet too dry - picking sheet</li> <li>• Vacuum levels of suction boxes</li> </ul>
Edge Breaks	<ul style="list-style-type: none"> <li>• Trim squirt plugged - not cutting clean</li> <li>• Recouching of sheet and edge trim</li> <li>• Trim too small</li> <li>• Dirt buildup on bottom lip</li> <li>• Dirt buildup on fabric edge</li> <li>• Stock buildup on deckles</li> <li>• Poor dewatering of edge area</li> <li>• Rewetting at couch</li> <li>• Fabric damaged - stock buildup on foils or suction boxes</li> <li>• Deckle board set-up</li> <li>• Stock buildup on return rolls</li> </ul>

<u>Symptom</u>	<u>Areas to Consider</u>
Guiding	<ul style="list-style-type: none"> <li>• High vacuum on suction boxes</li> <li>• Improper guide palm sensitivity</li> <li>• Uneven fabric tension front-to-back</li> <li>• Insufficient wrap on guide roll</li> <li>• Lead-in to guide roll too short</li> <li>• Lead-out from guide roll too long</li> <li>• Diagonal of drilled boxes</li> <li>• Drive synchronization</li> <li>• Fabric slippage</li> <li>• Doctor blades</li> <li>• Roll bearings</li> <li>• Fabric tension</li> <li>• Draw</li> <li>• Suction box vacuum and surface</li> <li>• Unbalanced rolls</li> <li>• Guide movement</li> </ul>
Moisture Profile Uneven	<ul style="list-style-type: none"> <li>• Uneven headbox slice adjustment</li> <li>• Stock jet speed difference in tubes</li> <li>• Stock speed difference</li> <li>• Uneven plates in headbox</li> <li>• Rectifier roll</li> <li>• Deflection of breast roll</li> <li>• Foils (levelness side-to-side, wear)</li> <li>• Fabric tension (level front-to-back)</li> <li>• Shower water supply (volume and uniformity)</li> <li>• Plugging of suction rolls</li> <li>• Gap former jet delivery</li> <li>• Top Wire unit blade wear and loading</li> <li>• Fabric tradeline uneven</li> <li>• Forming roll alignment</li> <li>• Fabric high pressure showers plugged or not oscillating properly</li> <li>• Breast roll shower temperature differential too high</li> <li>• Headbox temperature compensator not working properly</li> <li>• Mapping of profilers to scanner</li> <li>• Forming fabric wear</li> <li>• Sealing on former</li> <li>• Wear/streaking from foils</li> <li>• Plugged vacuum units on former</li> </ul>
Pinholes	<ul style="list-style-type: none"> <li>• Air in the system</li> <li>• Excessive drainage - stapling</li> <li>• Table elements - too slow drainage</li> <li>• Fabric open area (may need to close up)</li> <li>• Suction box vacuum - too high</li> <li>• Thin spots in sheet</li> <li>• Sheet release</li> </ul>
Ply Bonding/Delamination	<ul style="list-style-type: none"> <li>• Increase refining</li> <li>• Improve formation</li> <li>• Decrease internal sizing</li> <li>• Increase long fiber content</li> </ul>