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Wet End Rebuilds

Under Felt Pressure Forming in Comparison with a Three-Wire Fourdrinier Wet End.

Why do we need to rebuild our wet end?

Whether the machine operates using vats or pressure formers the traditional underfelt cylinder machines are being pushed close to their limits in terms of quality and/or machine speed. The speeding up of underfelt machines to 800 feet/minute or more has given the papermaker problems due to the adverse effects of centrifugal forces acting on the newly formed web on the rotating cylinder mould. Slower speeds that produce the heavy weight sheets can suffer with poor formation and cross machine grammage profile problems. Water removal at the couch roll has become an issue for both slow and fast speed operation. The fluctuating qualities of the recycled fibres available are exasperating the problems. To prevent papermaking becoming a black magic art, any wet end rebuild must have a machine capable of producing better quality product with easy to use, repeatable controls.

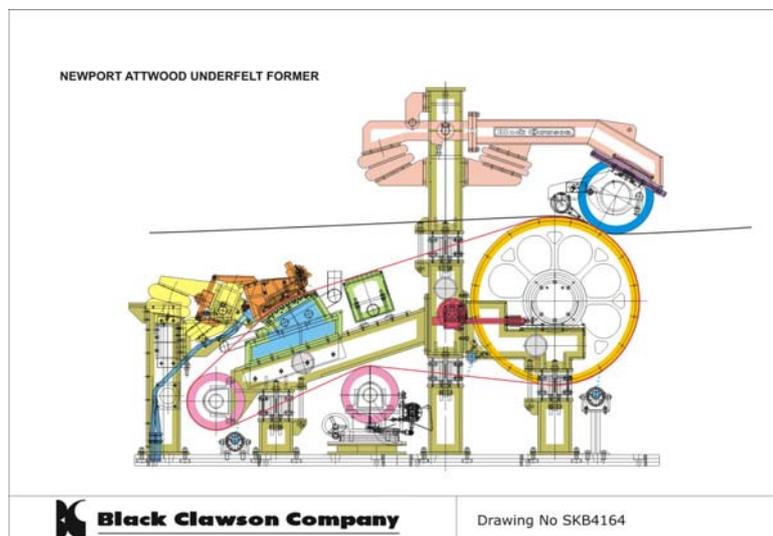
There are two ways of resolving these problems:

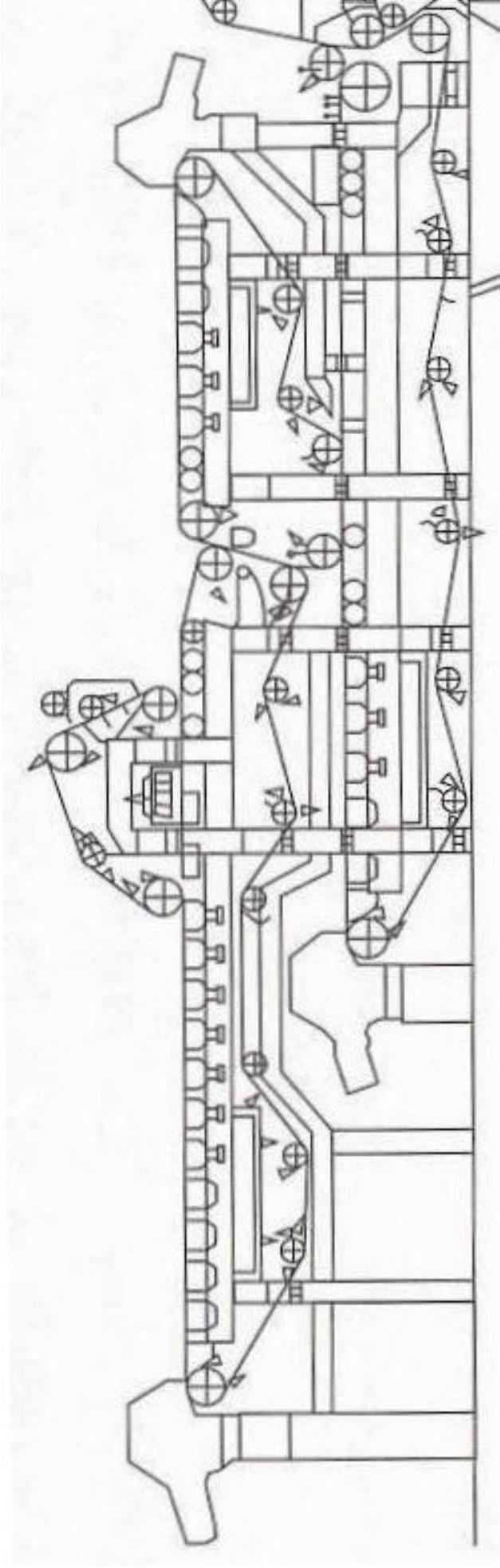
- a) The projection slice head box on a fourdrinier wire wet end.
- b) The Newport Attwood Underfelt Former.

The following information compares the Three Wire Fourdrinier Wet End with a Five unit Underfelt Newport Attwood Forming section.

Note: For customers not familiar with the Newport Attwood Former I would recommend reading the Black Clawson document titled:

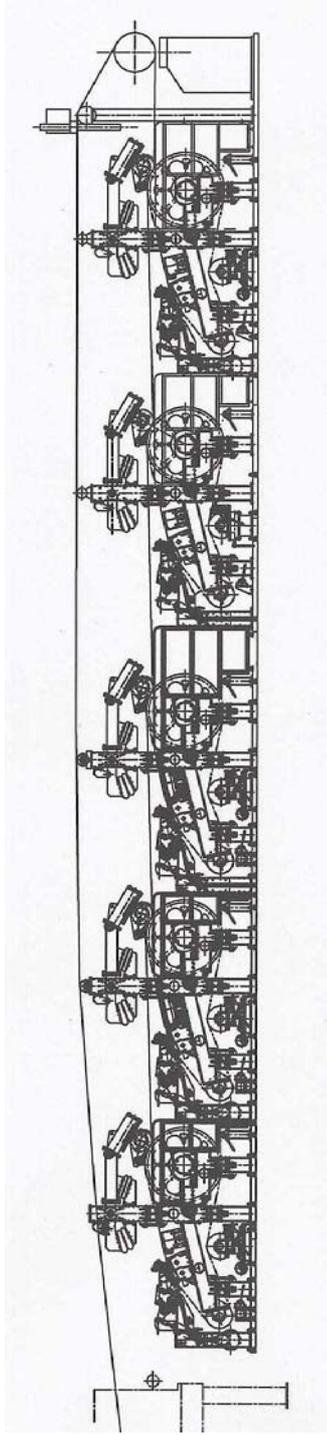
What is a Black Clawson Newport Attwood Pressure Former?





THREE-WIRE FOURDRINIER WET END REPLACEMENT

These two wet end rebuilds are drawn to the same scale and can make the same product.



NEWPORT ATTWOOD UNDERFELT FORMER WET END REBUILD

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Three-Wire Fourdrinier Wet End.

Large in size.

Costly.

Large Building space required.

Complete new wet end required.

Unfamiliar machine for mill personnel.

The machine operators have a new learning curve to overcome before the machine can be optimised.

High maintenance machine that can be difficult to service.

Wire changing will be difficult major operation.

Liner Ply formation will be very good.
Large flocked soft formation

Middle ply. With only one middle ply drainage can become a problem. To help achieve the weight, sometimes an extra upward drainage device is required with its own wire loop. This makes the machine more costly and complicated.

If this middle ply unit or its additional upward drainage device develops a problem then the machine cannot run.

The middle ply is stuck with the same furnish.

Speed 2000 feet/min +

Controls take a while to settle the machine down and as a result start up times are longer.

Five Newport Attwood Formers

Compact wet end.

Relatively cheap.

Can be retrofitted into existing building.

Some existing equipment can be reused.

Familiar equipment.

In many cases the machine operators existing knowledge and experience can be applied to the new equipment. This makes for faster optimisation.

Low maintenance machine that is easy to service.

Wire changing is quick and simple.

Liner Ply formation will be good.
Very close and level small flocked formation, excellent for coating.

Three or four units can make up the middle layers. There are no drainage issues.

If for some reason a unit has to be switched off then the remaining units can still operate and production can continue.

Some of the middle ply units may be changed to operate as under liners if required.

With five Newport Formers it would be possible to operate with a different furnish on each unit.

Speed 1500 feet/min +

Controls are simple to operate with adjustments made fast and easily. Start up and shut down times are quick.

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Three-Wire Fourdrinier Wet End.

Rapid grade changes can be problematic as it takes some time to settle the machine and drainage of the middle layer limits the amount of weight that can be applied. This means that production is tailored to long runs of the lighter weight board of limited grades.

Fabrics are expensive and are typically of differing lengths. This means more spare fabrics are required to be held in stock with each fabric having different mesh size depending on the furnish for that ply.

Energy costs are high with long wire runs using foils, vacuum boxes, doctors etc.

To start up and operate a Three-Wire Fourdrinier can be time consuming as each Fourdrinier head box has to be adjusted and settled. The dewatering elements such as the forming board, hydro foils, vacuum foils, vacuum boxes and suction transfer rolls all have to be fine tuned before all three plies are combined on the base wire to be further dewatered by high vacuum boxes and the suction couch roll. In addition the middle ply upward dewatering device has also to be adjusted and settled before production can get underway.

Products are usually large production runs of light weight to medium weight range 36lbs to 92lbs/1000sqft (10 to 25 calliper points).

Five Newport Attwood Formers

Grade changes are quick and simple. This equipment can often undertake short production runs of specialised grades as well as the longer runs of standard products.

Relatively cheaper fabrics all of the same standard length. This means less spare fabrics are required to be held in stock.

Short runs with less equipment gives a lower energy cost.

Operation is simple with fast responding controls for each unit: Total flow, Thick stock flow, Throat gap, Slice gap, Vacuum settings and couch roll loading.

Each individual Newport Attwood Former is adjusted to suit the furnish being supplied. This allows each ply to obtain different specialised sheet properties that combines with the other ply's to make the final product. Adjustment of individual Newport Formers will control :- Formation, Bulk, MD:CD ratio, Basis weight and ply bonding.

Note: The Octopus headers used on the middle ply formers can be used with water dilution to control the total sheet basis weight profile.

The full range of products from heavy weights through to light weights and specialised grades that were previously produced on the old underfelt cylinder machine can be made with the Newport Formers. The benefits of a Newport Former wet end will allow improved production in terms of Tons per day output or higher speeds or improved quality of the finished product.

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Power Consumption on for example a triple wire machine can be up to three times higher than the equivalent line of Bristol or Newport Formers.

Grade Changes that can take hours to achieve a saleable product on a Multi-Fourdrinier would take a matter to 10 – 15 mins on a line of Bristol or Newport Formers.

For BLACK CLAWSON LIMITED

R.Wiltshire.

Paper & Board Machine Sales department