

Rebuilds with Voith – Improved quality, productivity and economy for greater customer benefit



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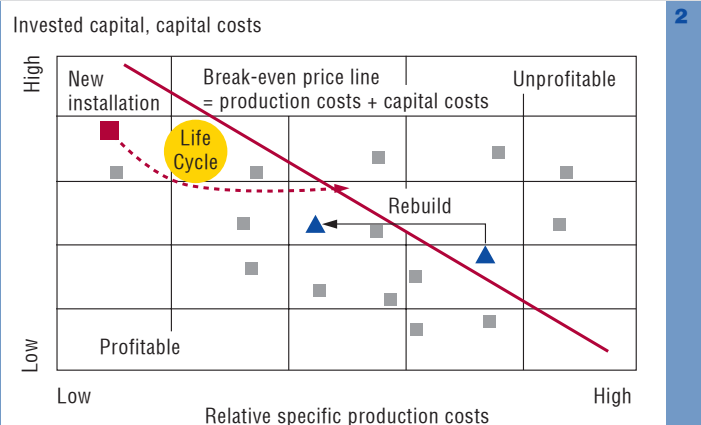
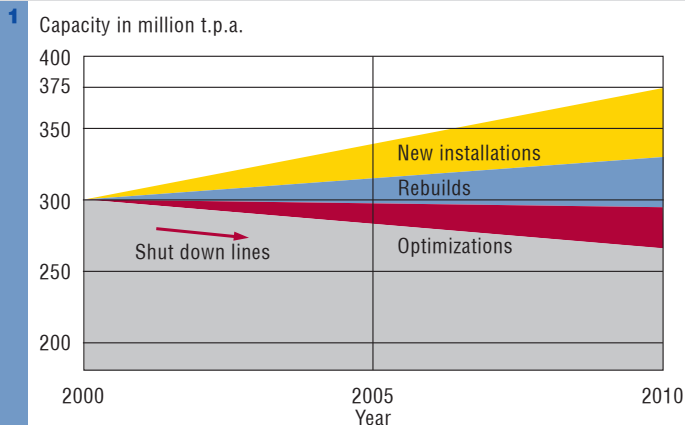
As one of the most capital-intensive industries worldwide, the paper industry demands concentrated efforts to **maximize productivity and profitability**. On the one hand this requires continuous advances in high-performance technology for cost-effective raw material utilization. On the other hand, the **commercial viability of existing plants must be assured** by quality and productivity enhancement measures, efficient maintenance, and compliance with environmental protection regulations. All these aspects are equally important for staying abreast of market competition.

Net global market growth of the paper industry is currently forecast at about 2.5% per annum. But taking account of capacity replacement for old production lines, the figure rises to about 3.5% p.a.

As shown in Fig. 1, this comprises new mill capacity plus increases through rebuilds and optimization measures. The

importance of upgrading existing lines for increased productivity is very clear.

Voith meets this challenge by systematically developing custom-made rebuild concepts for existing installations, focusing thereby on individual customer needs in order to ensure optimal benefit from each rebuild.



Rebuilds are a worthwhile investment

The profitability of a rebuild project depends on competition in the respective market segment (e.g. copying paper). **Fig. 2** is taken from a JP Management Consulting study comparing the market positioning of various different production lines (plotted in grey). The specific production costs and capital investment needs can be typified as a function of individual requirements per paper grade. This serves for determining the relative market positioning of each line.

New installations are typically the most competitive due to technical advances in paper technology and productivity, thus setting quality and cost benchmarks accordingly. For long-term viability, existing lines must, therefore, be upgraded by taking suitable rebuild measures. In many cases their relative market positioning can even be raised to the level of new installations, but with far less expenses. Assuming that product quality complies

with market demands, the resultant increase in productivity significantly improves their cost-effectiveness. Conversely, the relative market positioning of a new production line declines during its lifetime due to technical outdated. From the life cycle management point of view, today's new installations are, therefore, the rebuild candidates of tomorrow.

In 2002 a cost-effectiveness analysis of 9 global papermaking groups established that operating earnings are closely related to investment behaviour as a ratio of reinvestment capital to depreciation on technical installations (**Fig. 3**). Ongoing reinvestments in production lines to stay abreast of technology are, therefore, indispensable for market success in the paper industry.

Rebuild project drivers

The purpose of rebuild projects is to improve and maintain longterm a respective market position of the line concerned.

Fig. 1: Global paper industry capacity and investment developments.

Fig. 2: Market positioning.

Fig. 3: Operating earnings as a function of the ratio of reinvestment capital to production line depreciation.

Fig. 4: Rebuild project drivers.

The primary focus thereby is on productivity, quality, safety/reliability and environmental aspects, as well as production costs (**Fig. 4**). For optimal benefit from rebuild projects, simultaneous account must be taken of all these parameters in connection with overall project costs (total cost of ownership including costs arising during shut down, construction costs, peripheral and other costs).

Meeting customer requirements

For maximum customer satisfaction with optimal rebuild solutions, sixteen selected operators of technically outdated graphic paper machines were systematically interviewed by Voith engineers (**Fig. 5**). The primary goals of numerous rebuild projects are higher efficiency and higher operating speed while retaining or even improving product quality. The main emphasis for reaching both these goals is on rebuild measures in the press or dryer section. Quality improvement measures mainly include runnability increase for

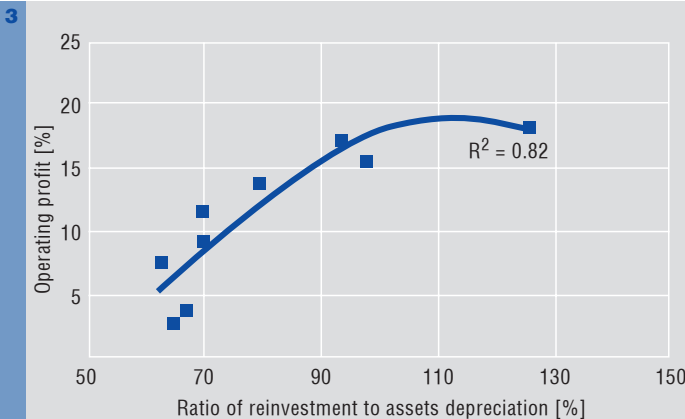


Fig. 5: Machine operator opinion – the primary drivers and goals of rebuild projects.

Fig. 6: Voith rebuild concepts.

Fig. 7: Braviken PM 52 rebuild concept.

Fig. 8: DuoFormer C rebuild concept to DuoFormer TQb.

5 Optimization and rebuild measures by priority

Efficiency	Operating speed	Quality	Other
Web break number Web break time Rejects volume ...		Roll profile Web defects Printability Dimensional stability	
– Dryer section – Wire and press section – Coating line	– Press section – Dryer section – Calender – Wire section	– Wire section – Headbox – Press section – Dryer section	– Vibrations – Reliability – Maintenance and operation – Safety



printing presses or processing machinery. The wire section takes priority in this connection, followed by the headbox. Printability improvement measures (sheet structure and two-sidedness) are mainly taken in the wire and press sections. Other optimization opportunities mainly include vibrations and individual equipment reliability.

Custom made solutions

In tune with customer requirements, Voith has developed rebuild concepts for various typical goals. All rebuild measures are however focused on the opti-

mal solution for maximum customer benefit in each case (Fig. 6).

Following the reports on successful rebuild projects in earlier editions of *twogether* Magazine (such as Ruzomberok PM 18 and Schongau PM 9), the Braviken PM 52 rebuild is reviewed here as latest example (see also separate article on page 32).

Braviken PM 52

Together with Holmen Paper AB, a rebuild concept was developed for Braviken PM 52 (Voith, installed 1985) incorporat-

ing ProSpeed, ProQuality and ProEfficiency goals. Fig. 7 explains these goals and their attainment.

This joint concept mainly focused on developing an upgraded former for PM 52 machine, which even prior to rebuild operated above the original design speed of 1,500 m/min. The wire section included a DuoFormer C roll-former with weak points in sheet quality. Apart from wire run, the former was improved by adding a D-section with flexible bars as already well-proven in the DuoFormer TQv (Fig. 8).

Thanks to the new headbox and the rebuilt former, newsprint quality, at a pro-

7 Braviken PM 52: project goals and rebuild concept

Efficiency	Operating speed	Quality
Web break number ↓ Web break time ↓	1,525 → 1,585 m/min	Basis weight ↑ cross-profile ↑ Formation ↑
ProRelease+ – Web stabilizers in the dryer section		MasterJet II headbox with ModuleJet
Ropeless threading	DuoFormer C → DuoFormer TQb	
ProEfficiency	ProSpeed	ProQuality

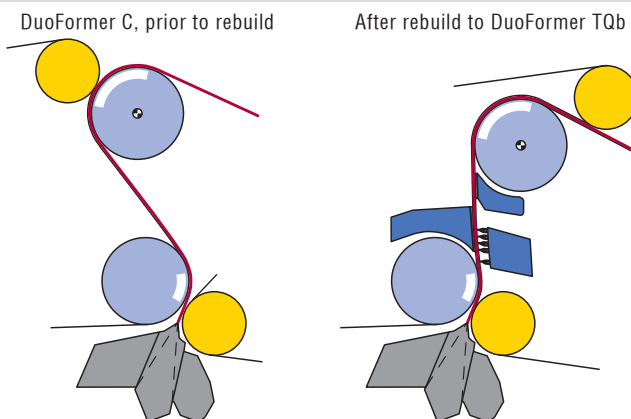
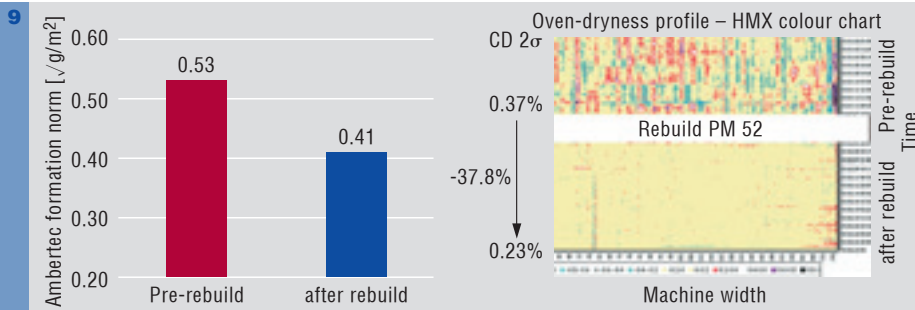


Fig. 9: Quality improvement by rebuilding headbox and former.

Fig. 10: Customer orientation, custom made, perfect fit, partnership.

Fig. 11: Typical rebuild phases before and after receipt of order.



duction speed in excess of 1,550 m/min, – was significantly improved (Fig. 9).

Four months after recommissioning, all the project goals have clearly been met, so that this 20 year old paper machine can now hold its own well in the newsprint market.

Voith – the right partner

Voith is dedicated to meeting the needs of the paper industry as a project partner and process technology supplier. In order to fulfil specific customer requirements at all times, a specialist team has been formed for rebuild projects. This team is responsible for concept development and project handling to ensure the optimal “perfect fit” rebuild solution in each case (Fig. 10). To that purpose, the specialists normally involved later on are already included in the project well before order

placement. This ensures a smooth transition from the proposal phase to order processing.

Shown on the left in Fig. 11 are the typical phases of a rebuild project prior to order placement. After requirements have first been clarified with the customer, the condition of the line is carefully investigated on site. Priority is always given in this connection to the re-usability of rolls, auxiliary equipment and other machinery components. If the entire plant periphery (stock preparation, media, logistics, etc.) has to be included in the project, the necessary data is gathered for preliminary studies, which may also include feasibility studies. Afterwards, the optimal “perfect fit” concept is developed with the customer to meet his productivity and quality targets. These targets define the technology concept, that first has to be confirmed by quality comparisons, pilot trials and printing tests.

Once the rebuild concept has been established, the proposal and specification are prepared as a basis for order placing.

After receipt of order, the order processing phase continues until handover and contractual fulfilment (Fig. 11 on the right).

A well-proven solution for complex rebuild projects is to delegate the entire responsibility to a single contractor for optimal coordination of all interfaces. In this connection, the Voith Process Line Package (PLP) was described in *together 18*.

The latest joint project successes confirm that Voith’s rebuild philosophy is correct. By taking into account all the complex needs of rebuild projects, with specific measures and adjustments in the proposal and order processing phases, the focus is always on customer benefit from beginning to end.

