

## 2009 First Place Winner

CIP4 International Print Production Innovation Award  
for

Best cost/benefit realization and improvement in efficiency  
as a result of process automation implementation

And

## 2009 Second Place Winner

CIP4 International Print Production Innovation Award  
for

Biggest improvement in quality production & customer  
responsiveness as a result of process automation



Druckerei Bauer GmbH

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Lortzingstrasse 5-6  
74629 Pfedelbach  
Germany

## Application Outline

**Executive Summary** — Include an Executive Summary of no more than two pages which includes:



Druckerei Bauer is a highly specialized printing company, currently employing a workforce of around 80. In our over 45-year history, we have developed from being an all-rounder into an industrial supplier of folding cartons, displays, and sales packaging. Each year, more than 220 million folding cartons in every desired design leave the plant in Pfedelbach. Orders from the pharmaceutical industry make up around 50% of sales.

The pressroom houses two Heidelberg presses with a total of eleven printing units and two coating units and Prinect Image Control

spectral full sheet quality control. We also have two Heidelberg die cutters and three folder gluers from Jagenberg and Heidelberg.

The label printing sector has undergone dynamic development. One of the highlights is the Kodak Nexpress digital press with coating unit. This enables production of complex customized print products, personalized mailings or counterfeit-proof admission tickets with spot coating. The delivery time for these products is only a few hours.

DIN EN ISO 9001:2000 quality management is practiced throughout, thus ensuring complete traceability of production. Cutting-edge management, constant focus on technical advances, and employee commitment provide the basis for market success.

Long-term customer relations are particularly important in our business. This requires continuous customer development and made-to-measure solutions to achieve customer objectives. We can only meet the needs of our customers by continually examining the potential that exists for improving our production processes.

One example of the challenges facing us in this area is the label outsourcing project of a global trading concern back in 2003/2004. The customer in question wanted to dispense with its label store and a solution was needed for producing approximately 15 – 25,000 labels from 8,500 versions with up to 700 orders a day.

The solution concept for our customer reduces delivery times from several days to twelve hours through integrated production. The minimum batch size for each job has also been cut to one item. Following placement of orders from the customer's SAP system, these are scanned using "Printtalk", processed into jobs, and assigned to digital presses. Initially, we were surprised by the resounding success and rapid implementation of this project. However, further examination clearly showed us that it was only possible to harness the potential for rationalization and automation by using non-proprietary interfaces.

For many years, we have been working with the Prinance management information system (MIS) from alphagraph team, which supports a JDF interface. We asked ourselves whether it might be feasible to apply the experience gained on the label production integration project to the folding carton production area.

This opportunity presented itself to us in summer 2007. With Prinect Integration System, we found a JDF-based concept from our long-standing partner Heidelberg to network press and postpress production areas and thus meet our production needs in terms of rationalization and automation. The system enabled us to gradually develop integrated, JDF-based production.

The pressroom, die-cutting shop, and gluing department are now equipped with the Prinect JDF workflow for the pressroom and folding carton processing section and are fully integrated.

The main benefits of integration can be seen in the savings achieved by simplifying operation, e.g. faster setup, as we explain in Section VI of this application. Added to this are the enhanced reliability in production and improvements in production quality. Among other things, these are reflected in the marked reduction in delivery delays and unscheduled job changes.

**Section I. Background** — Please provide a description of the subject workflow environment and conditions prior to implementation:

We produce folding cartons and packaging in two shifts for a wide range of industrial sectors.

We have been working with the Prinace management information system (MIS) from alphagraph team since 1996. In prepress, we use artpro from ESKO for digital data processing and Fuji Luxel T9000 in a CelebraNT workflow for CtP. We have had our own CAD department since 1997. Prepress is connected up via CIP3/PPF. The option of presetting the equipment in the postpress stage had not been available to us.

We introduced electronic production data acquisition at our company using terminals from our MIS supplier alphagraph team back in 2000.

Overview of the situation prior to integration:

- Electronic production data acquisition in all areas via MIS terminals.
- CIP3 workflow for ink zone presetting in the pressroom.
- The die-cutting shop and folding carton gluing section receive information from Excel lists and job tickets.
- Although job changes are made, the communication workload is too great.

# db Druckerei Bauer GmbH - Pre-Integration Workflow

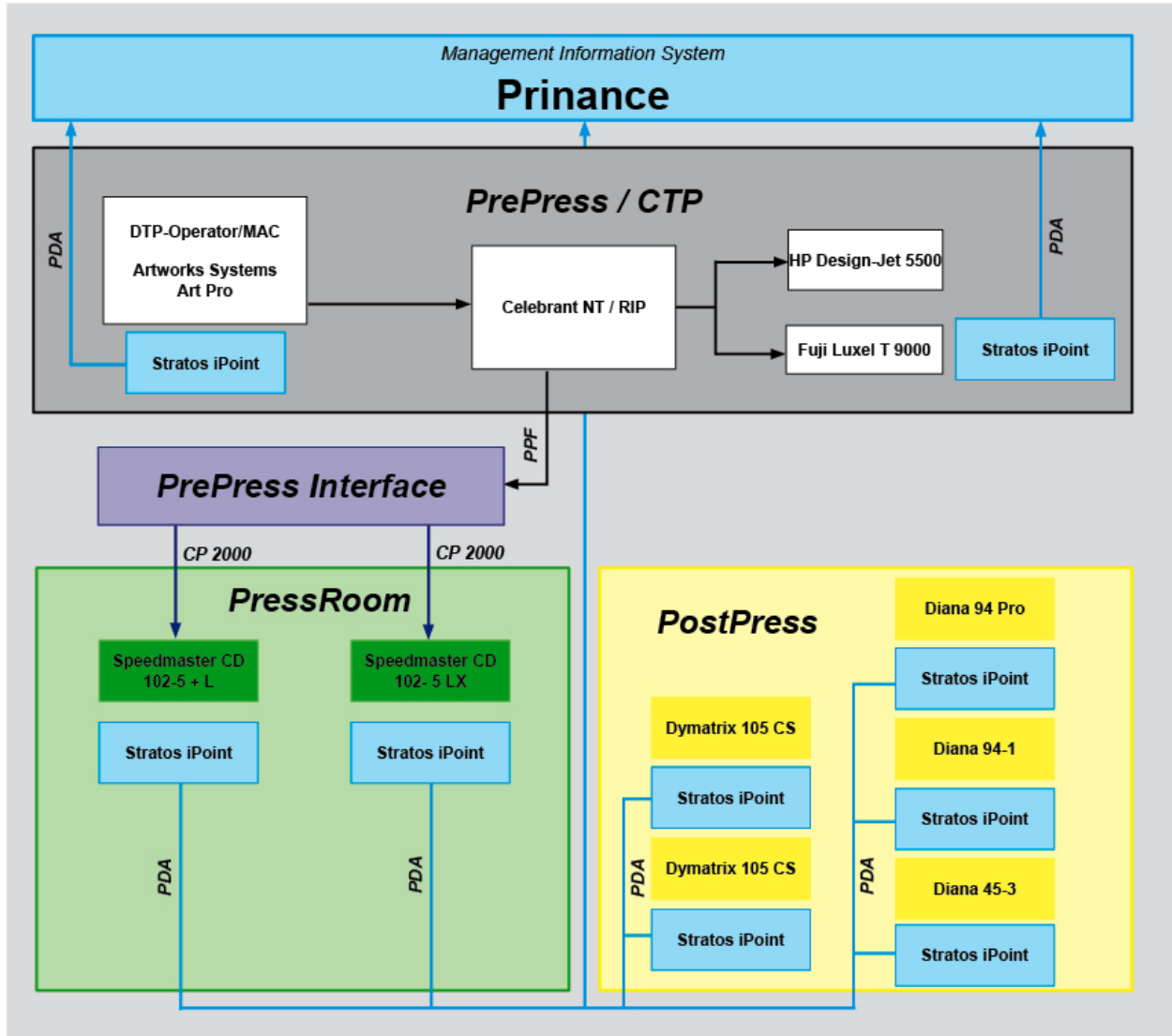


Figure 1: Pre-integration workflow until 2007

**Section II. Objectives** — Please provide a description of the printer, publisher or prepress service's goal and motivation, including any quantities criteria upon which the goals were established:

Long-term customer relations depend on continuous customer development and made-to-measure solutions to achieve customers' objectives. Only if we continually examine the potential for improving our production processes can we meet the needs of our customers.

Although electronic production data acquisition via terminals from our MIS supplier allowed fast and accurate feedback, this did not apply to all departments equally. In particular, we did not achieve the required transparency in precisely those departments that are key to producing folding cartons – namely the pressroom, die-cutting shop, and the folding carton gluing section. We had to look for possibilities for optimization due to the overly complex operation (terminal next to the press) and incomplete provision of information (MIS terminal does not take any changes from the previous process).

Requirements for folding carton production:

- Integration into the customer's supply chain
- Job workflow should be accelerated
- Transparent production, particularly for our pharmaceutical customers
- Transparent processes must be ensured
- Faster production of repeat jobs
- Order peaks need to be met through existing capacities without compromising on quality.

**Section III. Methodology** — Please provide a description of the process of selecting a solution, including alternatives and deciding factors:

Following the positive experience gained from integrating digital printing with standard interfaces, JDF integration seemed to offer us optimum opportunities. We looked for practical solutions for press and postpress at drupa 2004. However, at that time no manufacturer managed to win us over with its applications. While it was already possible to identify potential solutions for the press area, what we wanted was a practicable solution for integrating folding carton finishing that factored our equipment into the equation.

It was not until 2007 that we found a suitable solution from our supplier Heidelberg. This took the form of a JDF-based workflow to network all our production areas and thus meet all our production requirements. The fact that JDF is a non-proprietary technology allowed us to retain the necessary flexibility to integrate equipment from various manufacturers or workstations without a control station.

No other manufacturer was able to demonstrate a comparable level of integration at that time.

The modular system also enabled us to move towards integrated production in stages. We decided to implement the project in two steps initially:

- Step 1 – Press integration
- Step 2 – Postpress integration

Following our positive experience so far, we also intend to fully convert the prepress stage to JDF within the next 12 months.

**Section IV. Implementation Story** — Please provide a description of the implementation effort including timeline, participants, critical path/milestones, obstacles overcome (if any), training and testing:

In the first stage of implementation in June 2007 we opted to link our MIS Prinance from alphagraph with Prinect Pressroom Manager and presses from Heidelberg using a JDF connection. The second stage started in December 2008 when the production workflow was expanded by the Prinect Integration Manager and Prinect Postpress Manager applications.

## db Druckerei Bauer GmbH - Integration Workflow Step 1

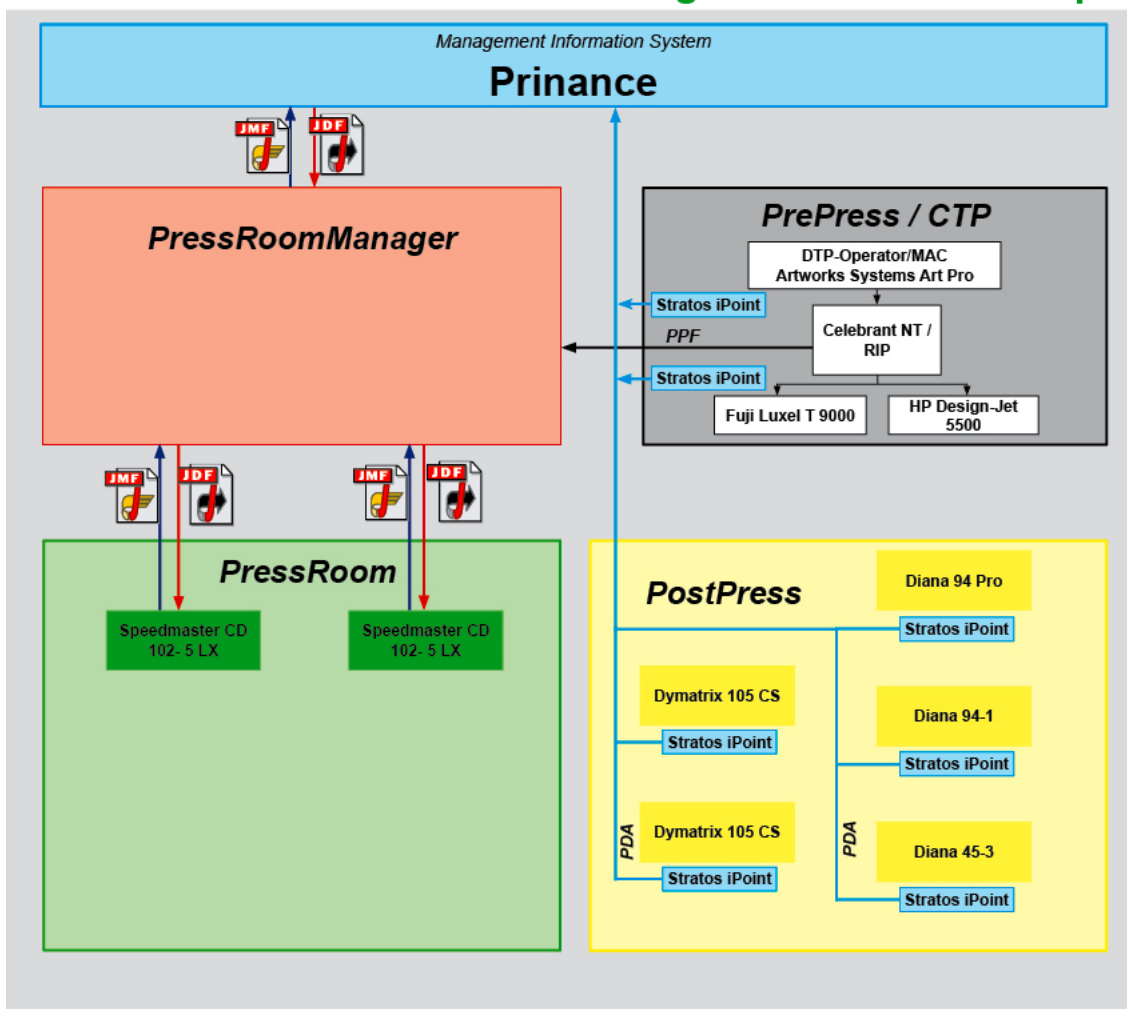


Figure 2: Integration workflow Step 1

**Step 1 – Press integration:**

- JDF via http from Prinance to Prinect Pressroom Manager
- PPF from Celebra RIP via hotfolder to Prinect Pressroom Manager
- Automatic merging of color and job data in JDF and transfer to the press

We were surprised and delighted that it was possible to upgrade a press from 2001 and bring it fully up to date. In 2001 we hadn't yet thought about JDF!

Feedback of press data was achieved via Prinect Pressroom Manager to MIS Prinance.

Installation, training, and commissioning were performed within a few days. The printers mastered the new operating concept very quickly. In our view, this was because it was even easier than the electronic production data acquisition that had been performed for many years using PDA terminals from alphagraph. Using JDF, information for presetting the press (ink zones, sheet size, material thickness, etc.) and the administrative job data are now transferred to the press in a single process. The printer loads the job and the press sets itself automatically while he reads the job ticket on the control station's screen. Feedback (setup, washup, OK sheet production, etc.) is generated automatically by the press. Auxiliary times and downtimes are also fed back directly from the press, significantly easing the printer's workload. Feedback quality has greatly improved, as a plausibility check on the press minimizes or even eliminates sources of error (e.g. printing without a job).

**Step 2 – Postpress integration:**

- Expansion to an integrated production workflow and connection of folding carton finishing
- JDF information via Prinect Integration Manager and Postpress Manager to postpress machines
- Feedback to MIS Prinance via Prinect Postpress Manager

Installation, training, and commissioning proved to be somewhat more difficult than in the press department. This was due to a total of three machines being connected up in the die-cutting shop and folding carton gluing section and to the pilot status of the software that we used initially. Here, too, the benefits quickly became apparent. Unlike the printshop, where printers and administrative staff alike speak of the significant benefits, this took a different form in the folding carton finishing section. The administrative and planning staff now have much greater transparency. Press operators derive the greatest benefit from the press being linked online, as presetting, production data acquisition, and machine control can be performed directly on the control station using the same operating ergonomics.

**Section V. Resulting Workflow/Processes** — A description of the resulting workflow, including any applicable workflow or process diagrams.

**db Druckerei Bauer GmbH - Integration Workflow Step 2**

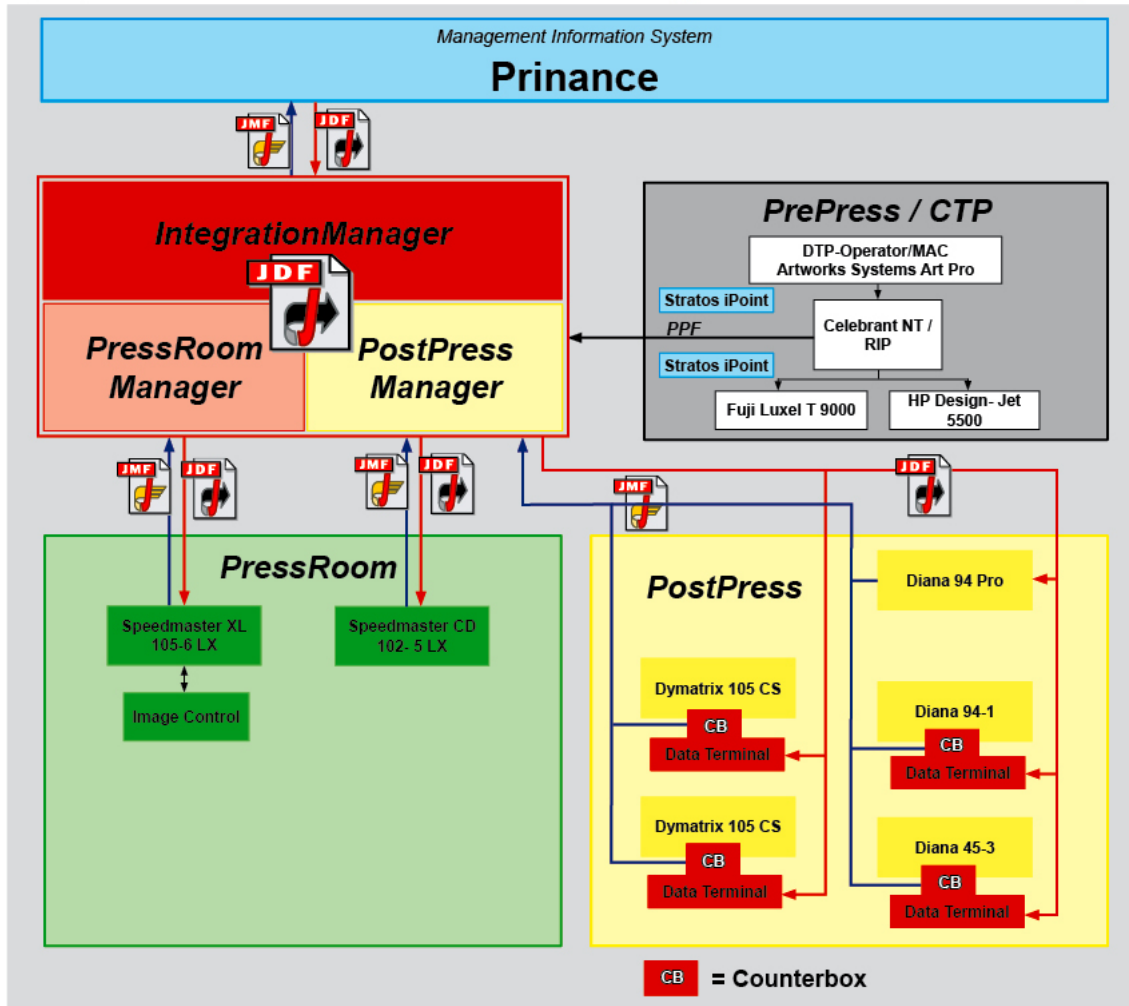


Figure 3: Integration workflow Step 2

We have now fully connected the pressroom and folding carton finishing section via an integrated JDF workflow – JDF-based online production data acquisition from all presses and a folder gluer, and JDF-based semi-automatic production data acquisition from two die cutters and two folder gluers.

The JDF workflow carries integrated job and presetting data to the machines and provides real-time feedback on status and operating data via JMF.

This provides:

- Greater transparency in production
- Job tracking in real time
- Savings in procuring information
- Actual costing of all individual jobs. Actual costing is available much earlier and faster than in the past.
- Faster production of repeat jobs
- Savings when changing jobs

**Section VI. Optional Detail** — Please provide detail.

ROI:

We have carried out ROI calculations for the steps described in our integration project, adopting a very conservative approach.

**Step 1 – Press integration:**

We measured the savings in time required for job entry pure and simple on the various machines. In doing so, we did not take into account the benefits that more up-to-date control station software offers for setting up a machine. The impact on the press was greater, as prior to the introduction of the online JDF connection more presetting parameters had to be input manually on the control station. What's more, it was possible to connect up all presses and these command a higher hourly rate.

In order processing, times for preparing actual costing decreased significantly by approximately 50%. We apportioned 50% of these times to Step 1 and 50% to Step 2. The time for correcting data also decreased.

For 2007, we only included 50% of the savings.

**Step 2 – Postpress integration:**

On the automatically connected folder gluer, we were able to cut times for job entry from six minutes to one minute. Viewed in absolute terms, savings are lower than in the pressroom, owing to lower hourly rates and fewer jobs (there are three folder gluers in all). Yet the potential is apparent to us and we will include integration of the control station as an absolute must in our specifications for our future investment decisions.

As described above, we have included the savings from the semi-automatically connected units in the benefits resulting from faster preparation of actual costing and reduced correction work.

**Net Present Value Druckerei Bauer GmbH - CIPPI Awards 2009**

		Periods				
		2007	2008	2009	2010	2011
Discount rate 6%						
<b>1</b>	Discount factor	0.9434	0.8900	0.8396	0.7921	0.7473
<b>Benefits (in savings)</b>						
<b>Annual savings Step 1</b>						
	JDF Integration Pressroom					
	CSR	7,825.00	15,650.00	15,650.00	15,650.00	15,650.00
	Press	90,000.00	180,000.00	180,000.00	180,000.00	180,000.00
<b>Annual savings Step 2</b>						
JDF Integration in Postpress						
	CSR	7,825.00	15,650.00	15,650.00	15,650.00	15,650.00
	Postpress	0.00	0.00	16,080.00	16,080.00	16,080.00
<b>2</b>	<b>Total annual savings</b>	<b>105,650.00</b>	<b>211,300.00</b>	<b>227,380.00</b>	<b>227,380.00</b>	<b>227,380.00</b>
Cumulative savings		105,650.00	316,950.00	544,330.00	771,710.00	999,090.00
<b>3</b>	Discounted annual savings	99,669.81	188,056.25	190,912.63	180,106.26	169,911.56
<b>Total investment</b>						
<b>External investment (products)</b>						
	Prinance	12,000.00				
	Upgrade Prepress Interface to Pressroom Manager	8,480.00				
	Princt Integration Manager and Princt Postpress Manager	25,250.00				
<b>Maintenance costs (recurring)</b>						
	Service costs	4,816.40	4,816.40	5,066.40	8,973.30	8,973.30
	Training	28,250.00				
<b>4</b>	<b>Total annual costs</b>	<b>73,980.00</b>	<b>4,816.40</b>	<b>4,816.40</b>	<b>5,066.40</b>	<b>8,973.30</b>
Cumulative costs		73,980.00	78,796.40	83,612.80	88,679.20	97,652.50
<b>5</b>	Discounted costs	73,980.00	4,543.77	4,286.58	4,253.85	7,107.69
<b>6</b>	<b>Net benefit (annually) (=2-5)</b>	<b>-73,980.00</b>	<b>100,833.60</b>	<b>206,483.60</b>	<b>222,313.60</b>	<b>218,406.70</b>
Cumulative net benefit		-73,980.00	26,853.60	233,337.20	455,650.80	674,057.50
Discounted net benefit		-73,980.00	95,126.04	183,769.67	186,658.79	172,998.56
<b>NPV (Net Present Value in €)</b>		<b>727,779.25</b>				
<b>ROI (Return on Investment) in %</b>		<b>983.75</b>				

Figure 4: Determination of Net Present Value

- Improvement in quality and customer service

Meeting delivery deadlines has been much improved, particularly through the integration of postpress equipment, and we have been able to cut delivery delays by over 50%. We compared Q1/2008 with Q1/2009 in this regard. As both quarters had different capacity utilization levels on account of the economic situation, we attribute half of the improvement to the increased transparency in the folding carton postpress section.

In daily production discussions involving order processing staff and production management, it is possible, using a Prinect cockpit, to monitor the current processing status of an order and to draw early conclusions about meeting delivery deadlines. We can react quickly if unscheduled delays occur.

In 2008, we were able to produce approximately 20% more jobs in the pressroom without changing staffing levels. The possibility of receiving information in real time on the processing status of orders enables us to significantly enhance our capacity. We change print jobs at short notice to ensure continuous capacity utilization levels in the folding carton finishing section, thus boosting our productivity overall.

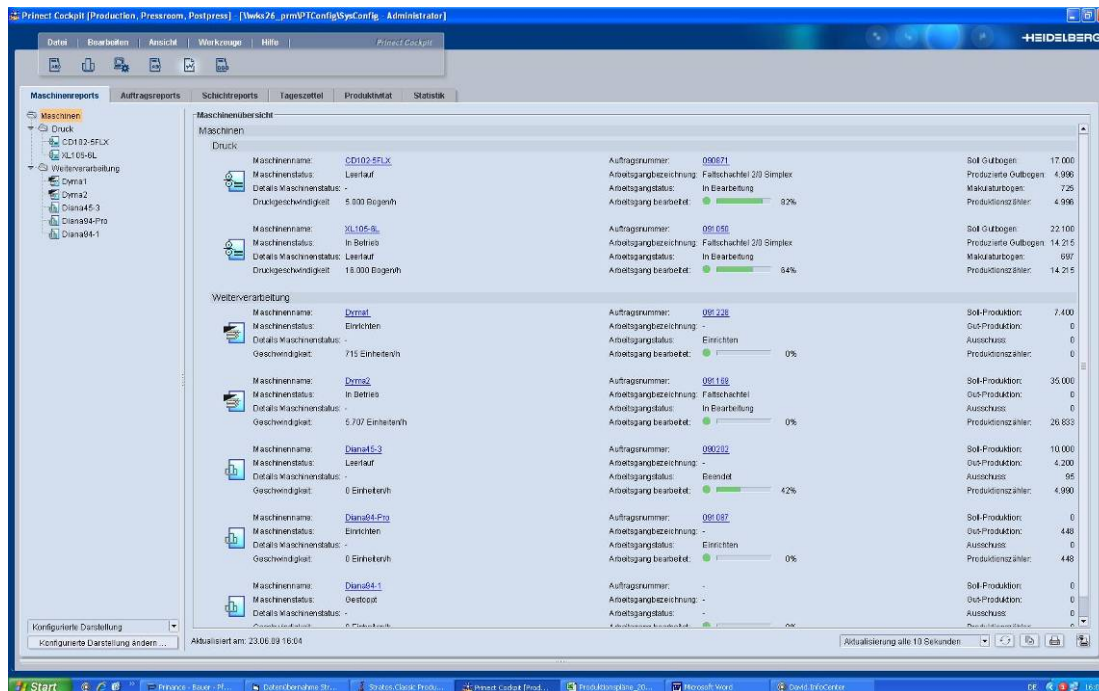


Figure 5: View of all production equipment in the pressroom and folding carton finishing section.

In the quarterly discussions between our sales and purchasing departments, some of our key customers from the pharmaceutical industry have already reported positively on this change. Our customers welcome this continuous improvement process and value us as a reliable supplier.

- Innovation

As stated earlier, the need to make the production process transparent and to accelerate it to ensure greater adherence to delivery times means our company has to focus in particular on automating postpress operations. No manufacturer supports JDF integration of different production technologies for die cutters and folder gluers. In our die-cutting shop, all units whose control stations cannot be upgraded to the latest software have been linked semi-automatically via JDF (by means of counting pulses). The innovative feature of this technology solution for us is that it enables us to also send production-related information to various manufacturers' units. This delivers dramatic improvements in comparison to the terminals of an MIS manufacturer.



*Figure 6: A die-cutter data terminal*

We have also carried out integration in our folding carton gluing section. A further and, for us, even more powerful innovation is the complete online connection of our very latest folder gluer via the control station using JDF – as we have had for our presses since 2007. The operator does not need any additional terminals and can load information for presetting and for the job directly into the unit.



Figure 7: Online operation for the Diana Pro 94 folder gluer

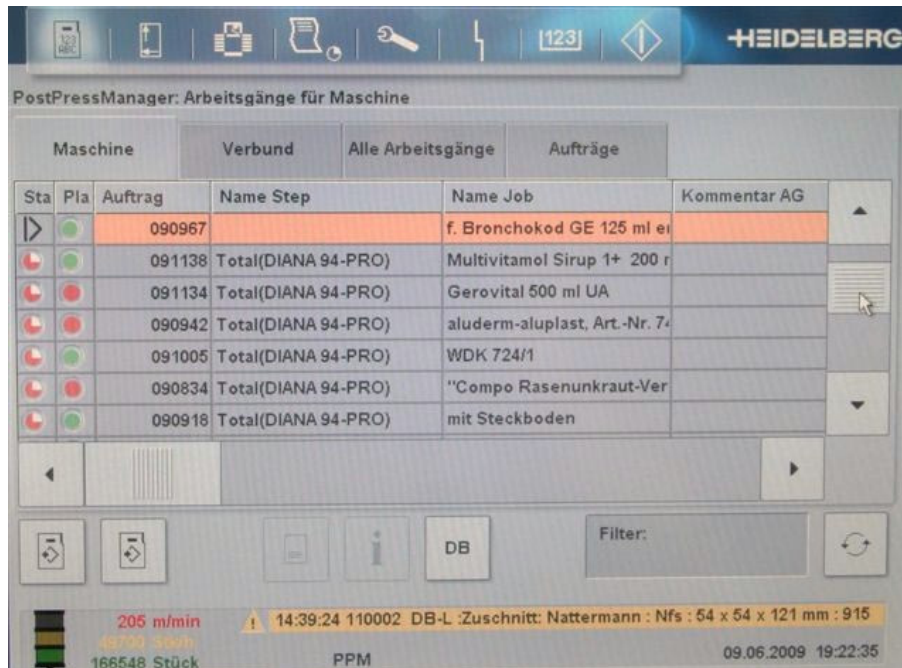


Figure 8: Screen shows the user interface on the unit. The operator can find his job easily and use the touchscreen to select it.

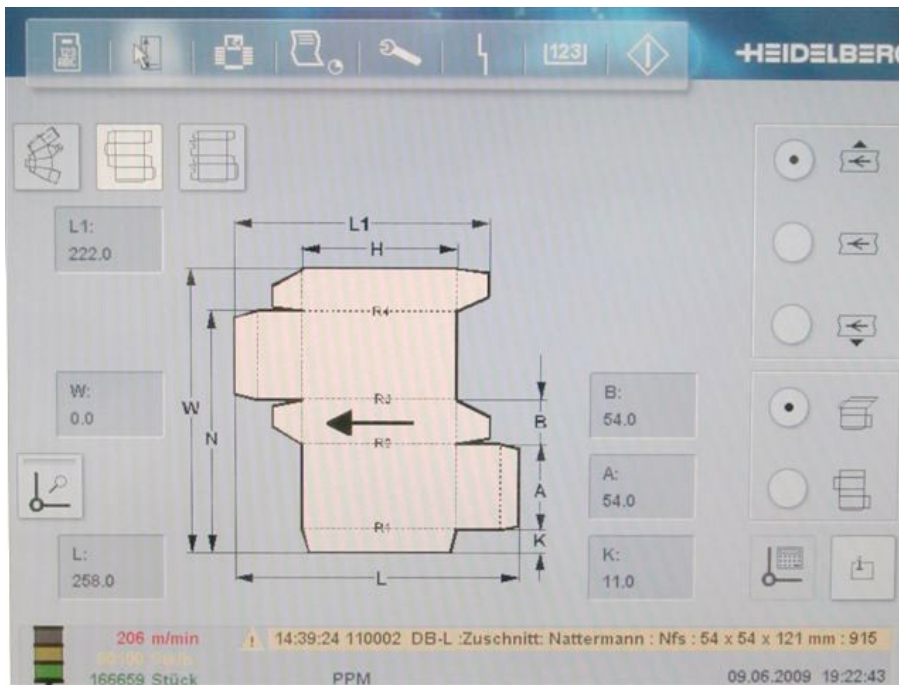


Figure 9: The job provides the operator with information from previous processes. This can be made available for automatic presetting or for information purposes.

We concluded the last expansion stage in December 2008 and can already see the benefits. We are addressing our needs and suggestions for improvement to the manufacturer.

Our conclusions on full integration:

Our MIS now offers us a detailed and up-to-date overview of all our production areas, regardless of what technology they are connected to. Digital printing is still networked with a pre-JDF technology. We can already fully harness the benefits of JDF technology throughout the folding carton production process.

On the basis of experience gained in the pressroom and now in the folding carton gluing section, we will be progressively expanding automatic integration directly from the control stations throughout the postpress section.

In our view, the main advantage of the JDF technology we are using is that we were able to begin integrating our production where we expected the greatest benefit. This delivered the hoped-for results.

Next steps:

- Developing planning. All our production jobs are in JDF format. We receive absolutely reliable feedback from our production equipment. In our view, this is key for using a JDF-based, integrated electronic production planning system.
- Integrating prepress. The special aspects of our production operations have so far not required switching the prepress department completely to JDF. However, following the positive experience of the project outlined here, we will be embarking on this expansion within the next twelve months.