

Digital Press Benchmarks: Availability & Actual Production

Xerox Color 800, Konica Minolta bizhub C8000, and Ricoh Pro C901

Many print providers, and even production printer/press manufacturers themselves, are asking the question: *How much time is spent printing – actually printing sellable sheets?*

Digital printers and presses are increasingly able to create excellent print quality. As the demands and expectations for digital presses increase, maximizing Actual production time – time printing sellable pieces – is becoming a pivotal issue, playing a crucial role in the value of a press. Higher Operational Availability, the percentage of *Actual* to *Potential* production time, equates to improved performance, lean operations, a higher Return-on-Investment and the resultant financial advantages. Consistent Availability allows print management to perform more accurate cost estimates. Through the reduction of set-up, maintenance, service time, etc., the consequential net increase in Availability offers print providers increased opportunity, competitiveness, and profit.

SpencerLAB has the unique ability to benchmark the Availability of digital printers/presses. In order to accurately and successfully study Availability and Actual production time, it is necessary to identify and collect utilization metrics specific to the commercial digital printing environment. Design of the methodology is critical; therefore, *spencerLAB* has designed procedures and tools to enable efficient collection of data in a high-productivity commercial press environment. *SpencerLAB* has established test parameters and protocols that allow quantitative determination of the *Potential* production time as well as the *Actual* production time, time that is utilized producing sellable print pieces.

In this continuing application of our proprietary methodology, *spencerLAB* measured three digital presses in real commercial operation. Our results showed significant differences among them, with the Xerox Color 800 Digital Press [Color 800] achieving the highest Availability among the tested digital presses, substantially more than that of the tested Konica Minolta bizhub PRESS C8000 [KM C8000] and the Ricoh Pro C901 Graphic Arts Edition [Ricoch C901].

EXECUTIVE SUMMARY

The *spencerLAB* DIGITAL COLOR LABORATORY was commissioned by Xerox Corporation to perform an independent benchmarking study, to estimate the level of digital press Availability by determining Potential and Actual production time measurements of a Xerox Color 800 Press, Konica Minolta bizhub PRESS C8000, and Ricoh Pro C901.

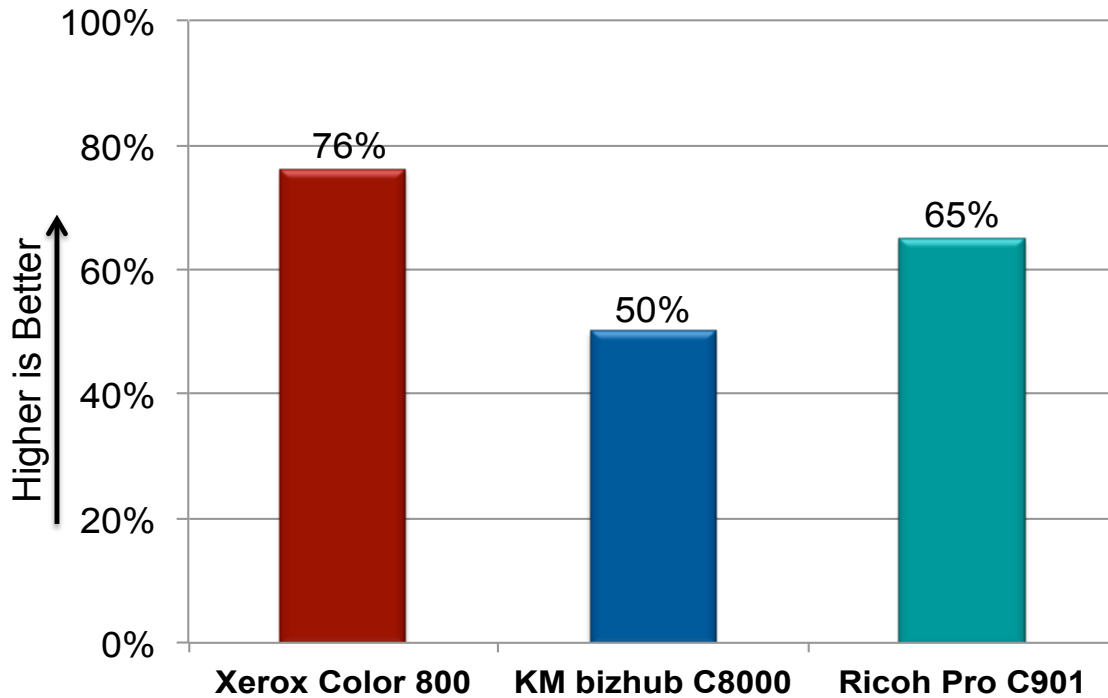
The Xerox Color 800 Press achieved the highest machine Availability of the evaluated commercial presses, outperforming the KM C8000 and Ricoh C901. Higher machine Availability means higher performance – more sellable print pieces in the hands of customers, and greater income for the digital press owner.

Several commercial install sites were contacted to explore the study approach; *SpencerLAB* then partnered with one install site per press. The participating print shops were typical commercial printing operations.

It is understood that results of this study may not represent the general population of press installs; however, these results do provide – for perhaps the first time – anecdotal insight into the Availability of these tested digital presses.

SpencerLAB provided on-site training to the operators, technicians, production managers, and various other personnel involved at each of these partner sites in order to communicate data collection requirements and techniques.

Average Machine Availability*



*Results based upon a single commercial install of each press

Performance data was collected by the press operators themselves for a period of one month (four calendar weeks – 20 workdays), then reviewed and analyzed by *spencerLAB*.

SpencerLAB has designed strategic filters to categorize every press and non-press related activity during each of the 20 workdays. Excluding Non-Press Delays, the Potential production time categories include: Morning Routine, Repair, Service, Consumable Change, Planned Maintenance, Paper Jam, Waiting for Press, Job Setup, Quality Control, and Press Error Waste as well as the Actual production time – Producing Sellable Print Pieces. Quantitative data analysis metrics were then calculated to determine the Availability of the presses [see chart, p3].

$$\text{Availability} = \frac{\text{Actual Production Time}}{\text{Potential Production Time}} \%$$

KEY FINDINGS

The Xerox Color 800's consistently high actual daily machine production time contributed to its highest average Availability for the test period. The Xerox Color

800 required lower average Job Setup and Repair time than the Konica Minolta bizhub PRESS C8000 and the Ricoh Pro C901, utilizing more of the Potential production time to produce sellable print pieces.

This study also helps to identify opportunities for improvement, which may help vendors and their customers recapture lost Potential production time and offer a more lean and efficient service.

While lack of operator training and non-optimized RIP/workflow can significantly increase the time to produce a sellable printed piece, operators of these digital presses undergo rigorous training, often by the press manufacturers, and it is assumed that they are capable of operating the press to its best capacity as per manufacturers guidelines.

Our summary finding is that *the Xerox Color 800 Press achieved the highest machine Availability among the tested digital presses, substantially more than the tested Konica Minolta bizhub PRESS C8000 and Ricoh Pro C901 presses, thereby providing greater Actual production time* [see chart, above].

METHODOLOGY

In order to be able to benchmark the utilization of Potential production time for digital presses, *spencerLAB* spent considerable time and effort to design and implement a research methodology that would provide quantitative data analysis results based on common parameters – while being equitable to each of the competitive devices from which data was collected and evaluated. *SpencerLAB's* analytic approach seeks and eliminates variances among non-press-related events by determining the Potential and Actual production times of each of the tested digital press operation, and then deriving the Availability percentage of each press from that data.

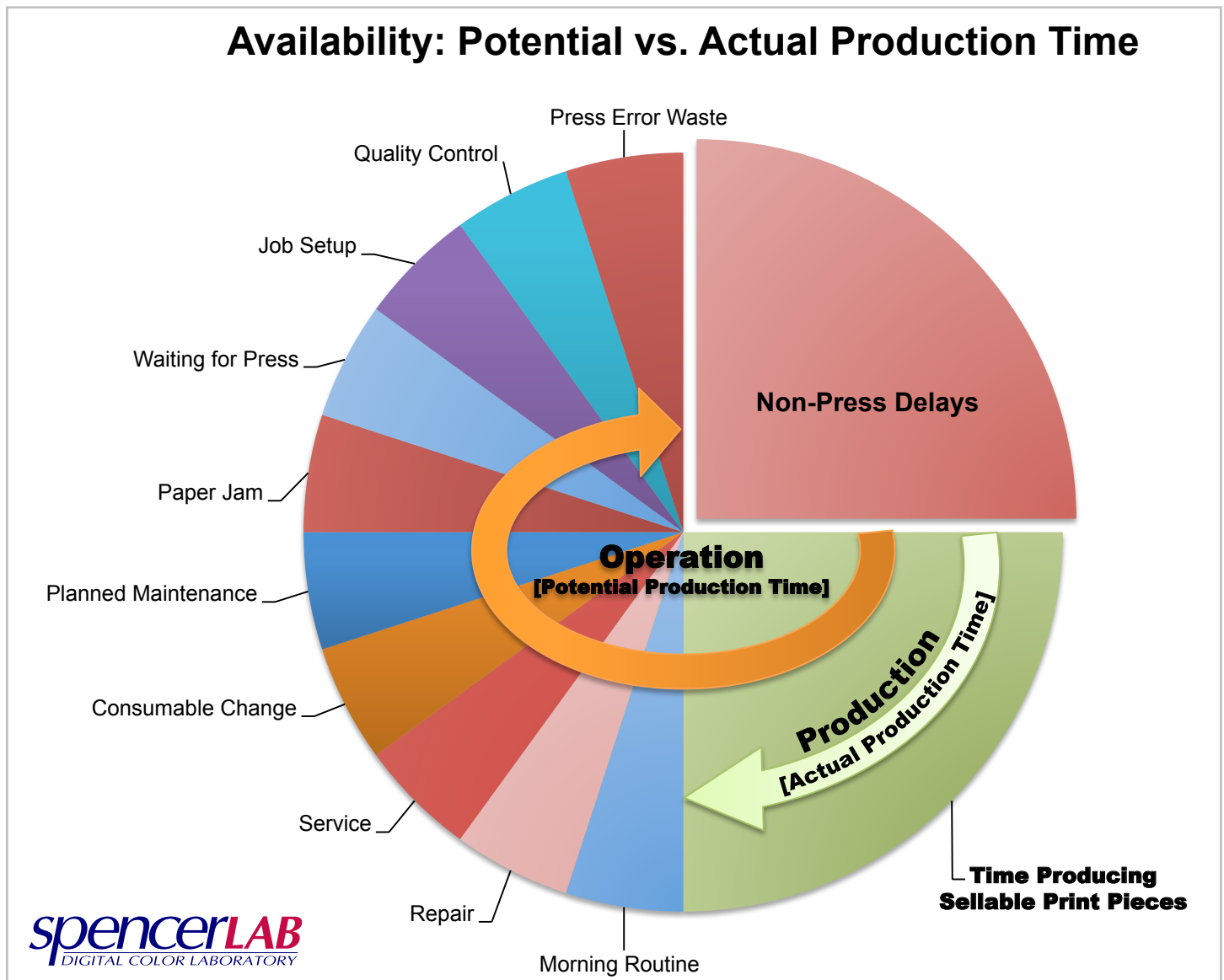
- In order to estimate the level of digital press Availability, *spencerLAB* established test parameters and protocols

that adapt and apply the concepts of production equipment availability and productivity to commercial digital printing. The aim of establishing the protocols was to be able to quantitatively determine how much time is really spent in producing sellable print pieces.

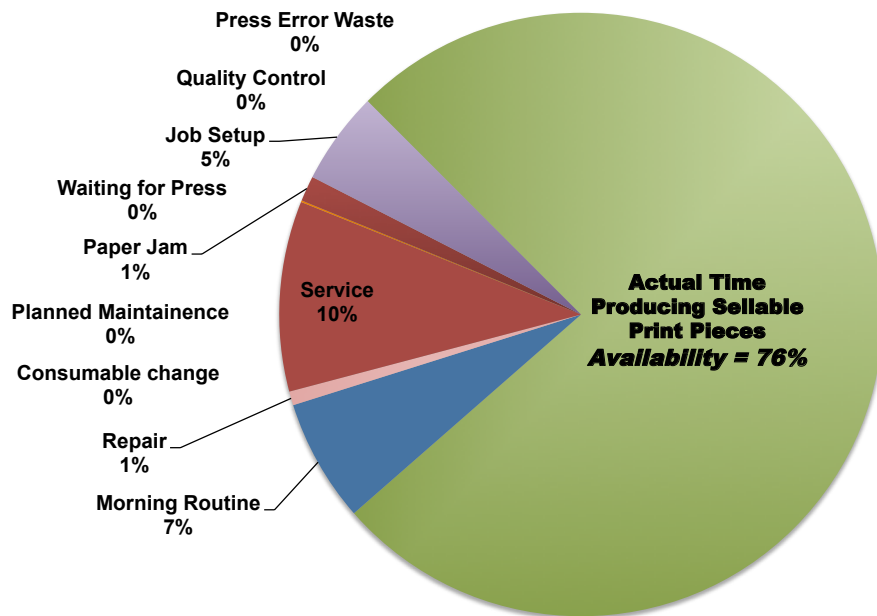
- *SpencerLAB* designed guides and tools to assist real-time data tracking and recording by the operators themselves. Care was taken to ensure efficient data collection without burdening the operators or interfering with their workday activities.

- In order to study digital press usage in a commercial print environment, *spencerLAB* contacted several commercial install sites and explored the study approach, and then partnered with one (1) install site per press. The participating print shops were typical commercial printing operations.

Availability: Potential vs. Actual Production Time



Average Potential Production Time: Xerox Color 800*



*Results based upon a single commercial install of each press for 20 workdays

- *SpencerLAB* provided on-site training to the operators, technicians, production managers, and various other personnel involved at each of the partner sites, to communicate data collection requirements and techniques. Press data was collected for a one-month period (four calendar weeks – 20 workdays).
- This study did not take into account print content. Each commercial printer continued to print their normal job flow. Therefore, some variance may be attributed to different types of print jobs and/or quality requirements of the final output; however, we believe that a month of data provides a reasonable estimate of press behavior, irrespective of the printed piece itself.
- *SpencerLAB* designed strategic filters to categorize every event from each workday into Non-Press Delays and Potential Print Time (including Morning Routine, Repair, Service, Consumable Change, Planned Maintenance, Paper Jam, Waiting for Press, Job Setup, Quality Control, Press Error Waste, and Actual Print Time). Quantitative data analysis was performed on the real-time data to determine the mean (average) Availability of the tested digital presses, the percent of Potential production time producing sellable print pieces.

DETAILED FINDINGS

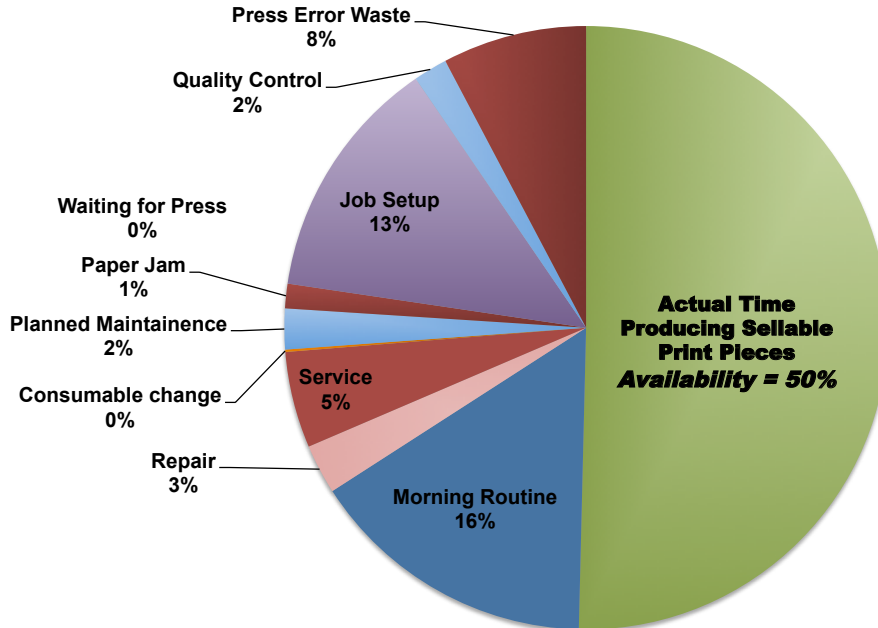
The following section presents the Potential production time usage for each press – the detailed categorization of production time metrics and resultant machine Availability and consistency.

POTENTIAL AND ACTUAL PRODUCTION TIME

The Potential production time is that portion of the workday that can be used for printing. It excludes the time spent on all non-press related activities during a workday. Once the Potential is determined, the Actual production time and Availability – a benchmark of print production performance – are derived by excluding the time spent on all the other press-related events and including only the time spent in printing either a job or a proof that can be sold to generate income.

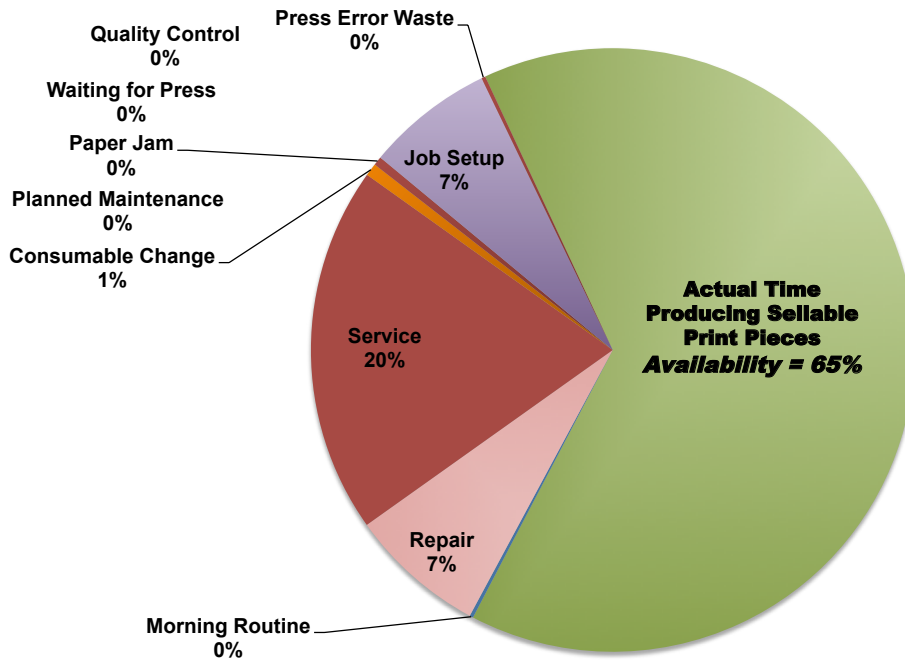
Press	Job Setup	Service	Press Error Waste
Xerox Color 800	5%	10%	Negligible
KM C8000	13%	5%	8%
Ricoh C901	7%	20%	Negligible

Average Potential Production Time: Konica Minolta bizhub C8000*



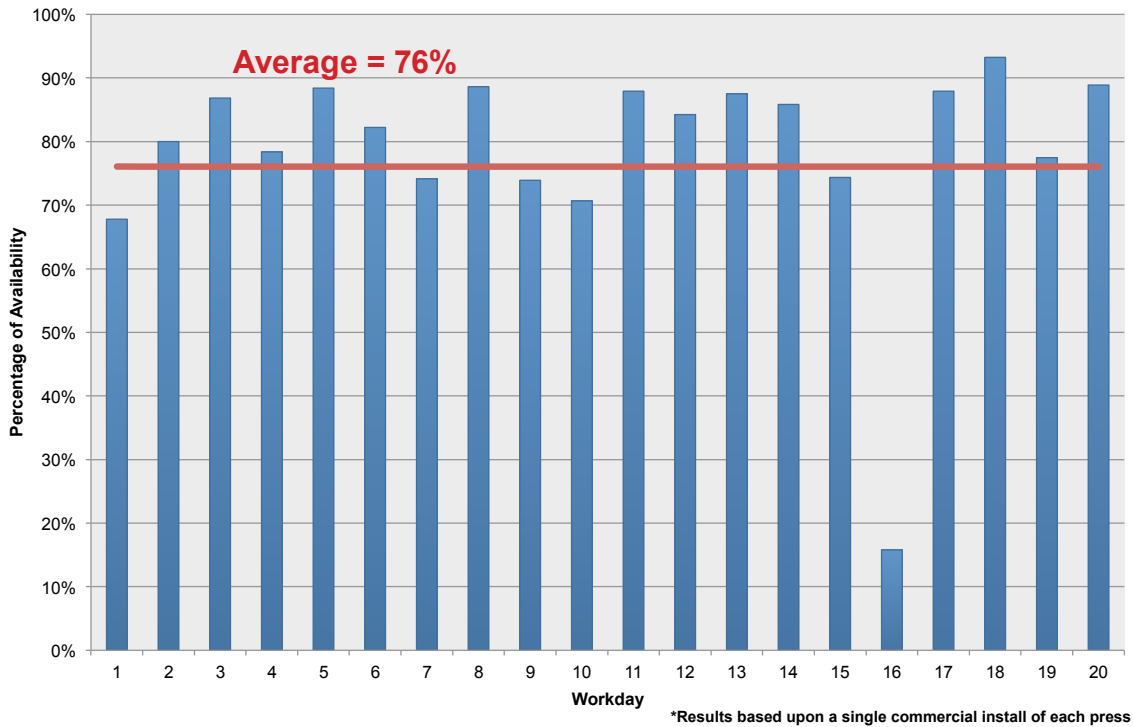
*Results based upon a single commercial install of each press for 20 workdays

Average Potential Production Time: Ricoh Pro C901*



*Results based upon a single commercial install of each press for 20 workdays

Test Period Availability: Xerox Color 800 Press*



During this Potential production time, the more time a press spends actually producing sellable print pieces without experiencing press-related stoppages, the more benefits will be realized. Press Availability can be maximized by reducing other press-related delays and consequently having more time to print sellable pieces.

Availability was calculated as a percentage of each measured workday’s Potential production time; the mean was then calculated to determine the month’s average.

Xerox Color 800 Press

The Xerox Color 800 achieved the most utilization of its Potential production time with the highest average Availability for the test period. Negligible time was spent on Press Error Waste and Consumable change. Job Setup required 5% of the Potential production time. Although the average time spent on Servicing the press was 10%, the in-house Repair time was only 1%. The Xerox Color 800 achieved the highest average press Availability of 76%. The Xerox Color 800 has an optional Fixed Width Array configuration that might have helped reduce delays in certain categories; however, the testing and results herein are based on a press configuration that did not have the optional Fixed Width Array technology.

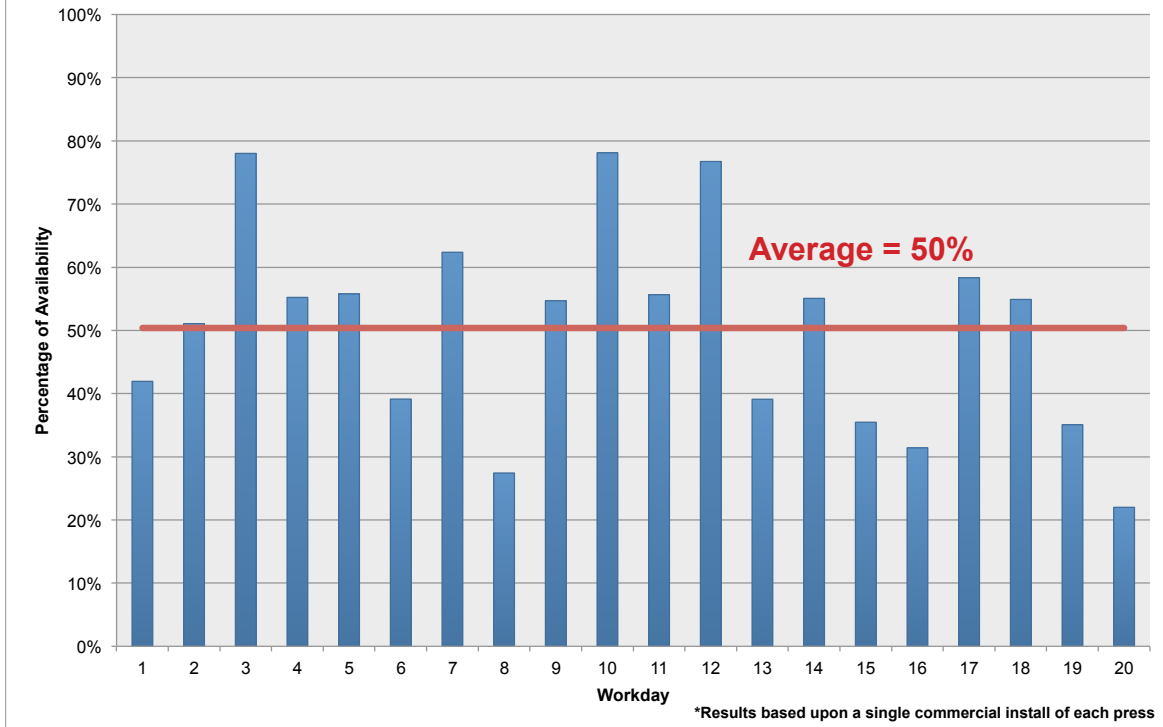
The maximum Availability achieved on a single day during the 20-workday period was 93%, with majority of workdays recording Availability in excess of 80%. The lowest Availability recorded by the Color 800 on one day was 16%, lowest of all tested presses, was primarily due to a press Service-related delay. The Color 800’s overall high daily utilization contributed to its high average Availability.

Konica Minolta bizhub PRESS C8000

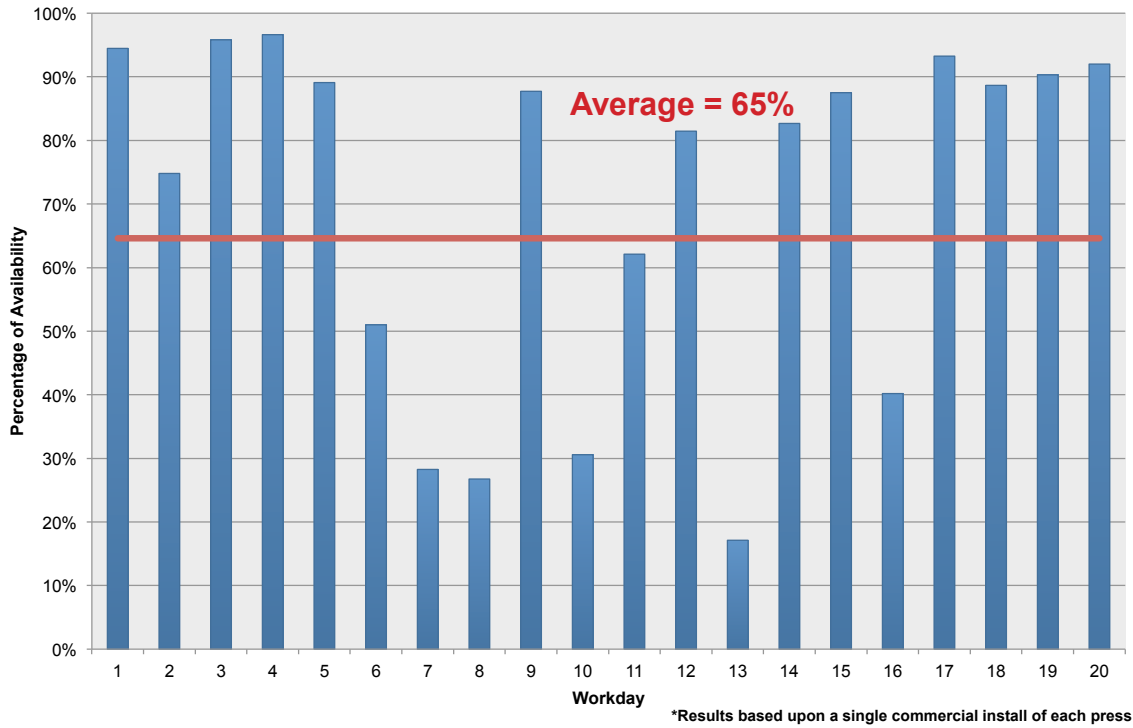
The KM C8000 achieved the least utilization of its Potential production time with the lowest average Availability for the test period. In addition to an 8% Press Error Waste, there was a substantial amount of time (13%) spent on Job Setup. For the test period, the average time spent on Service and Repair was 5% and 3% respectively; however, the press required the most time of the three presses to be spent on Morning Routine (16%), which may have contributed to the low Service and in-house Repair time. The KM C8000 achieved the lowest average Availability of only 50%.

The maximum Availability achieved by the KM C8000 on one day during the 20-workday period was

Test Period Availability: Konica Minolta bizhub C8000*



Test Period Availability: Ricoh Pro C901*



78% and the lowest Availability logged on one day was 22%. The press achieved Availability of over 60% on only four (4) out of the 20 workdays. Seven (7) out of the 20 workdays logged less than 40% Availability, with more than half of the Potential production time forfeited to various press-related delays and stoppages; had this time been utilized to increase the production of more sellable printed pieces, there would have been a correspondingly increased ROI.

Ricoh Pro C901

Availability of the Ricoh C901 was higher than the KM C8000, but lower than that of the Xerox Color 800. Unlike the Color 800 or KM C8000, the Ricoh C901 had negligible Morning Routine time, which perhaps led to the press requiring the most time of all the presses evaluated to be spent on Service (20%) and in-house Repair (7%). The other largest amount of time was spent on Job Setup (7%). Over the 20 workdays, the Ricoh C901 achieved an average Availability of 65%.

On the day of its best performance, the Ricoh C901 achieved the highest maximum Availability of all tested presses at 97%; the lowest Availability achieved on one day was 17%. The performance of the Ricoh C901 was unpredictable, with noticeable variation in day-to-day Availability.

CONSISTENCY

Higher consistent Availability of a digital press makes it more predictable, thereby minimizing unexpected resource reallocation. It allows print shop management to estimate costs with higher accuracy.

The Xerox Color 800 had a consistently high performance with a 16% standard deviation of Availability over the test period. Konica Minolta bizhub PRESS C8000 provided consistently low performance, also with a 16% standard deviation of Availability over the test period. As noted above, the Ricoh C901's performance was most unpredictable of all presses evaluated, with noticeable variation in day to day Availability. This inconsistent performance is demonstrated with an Availability standard deviation of 27%.

FURTHER RESEARCH

SpencerLAB believes further research is warranted to corroborate these initial results by benchmarking these press models in additional commercial locations, and – as resources allow – to measure the Availability of additional comparative digital press models.

spencerLAB DIGITAL COLOR LABORATORY

Through more than two decades of industry service, SPENCER & ASSOCIATES PUBLISHING, LTD. has earned a premier reputation for its expertise in evaluating digital color imaging and printing. Its independent test division, the *spencerLAB* DIGITAL COLOR LABORATORY, is internationally recognized as a leader in unbiased, third-party research and comparative analysis of digital imaging and printing system performance; the laboratory strictly adheres to the integrity of its methodology, even in commissioned studies. *SpencerLAB* provides leadership in quantitative and qualitative comparisons, benchmarking key performance metrics of digital printing systems in all technology classes, from desktop printers to digital color presses – providing research and evaluation services, compliance certifications, benchmark test software/hardware, and focus group management.

Leading vendors and firms for whom printing is mission-critical rely upon *spencerLAB* to provide strategic support and benchmarking of Print Quality, Ink/Toner Yield and Cost-per-Print, Throughput, Availability, Reliability and Usability for ink- and toner-based as well as other printing technologies. Corporate users rely upon *spencerLAB* for guidance in print system acquisition and usage optimization.

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