

## Digital Press Benchmarks: Availability & Actual Production

### **Xerox iGen4, HP Indigo 7000, and HP Indigo 5500 Press**

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

Digital 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 setup, maintenance, service time, etc., the consequential net increase in Availability offers print providers increased opportunity, competitiveness, and profit.

*SpencerLAB's* unique benchmarking study of digital press Availability – perhaps the first of its kind – required intensive research. In order to accurately and successfully study Availability and Actual production time, it was necessary to determine and collect utilization metrics specific to the commercial digital printing environment. Design of the methodology was critical. Procedures and tools were designed that enabled efficient collection of data in a high-productivity commercial press environment. *SpencerLAB* was able to establish 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 initial application of our methodology *spencerLAB* measured three digital presses in real commercial operation. Our results showed significant differences among them, with the iGen4 achieving the highest Availability among the tested digital presses, substantially more than that of the HP Indigo 7000 and 5500.

### **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 iGen4, an HP Indigo 7000, and an HP Indigo 5500 digital press.

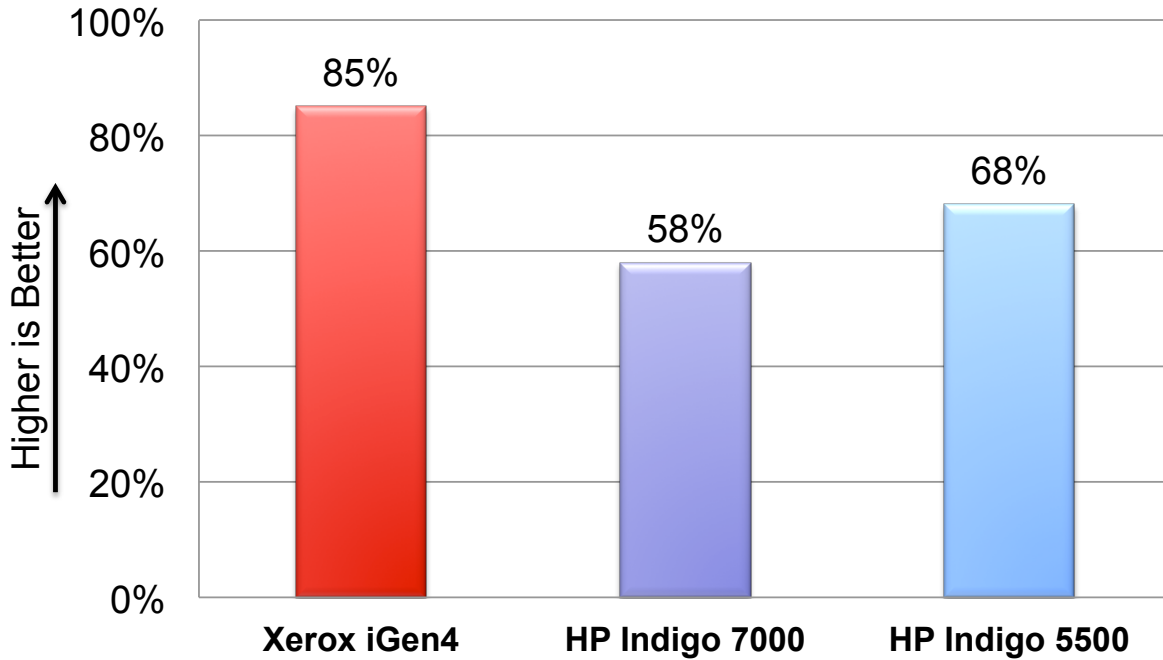
The Xerox iGen4 achieved the highest machine Availability of the evaluated commercial presses, outperforming the two HP Indigos. Higher machine Availability means higher performance – more sellable print pieces in the hands of customers, and greater income for the digital press owner.

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 the 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 for 20 workdays

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* designed strategic filters that categorized 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 iGen4’s consistently high actual daily machine production time contributed to its highest average

Availability for the test period. The iGen4 required lower average Morning Routine, Job Setup, and Consumable Change time than the HP Indigo 7000 and the HP Indigo 5500 presses, 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, many operators of these digital presses have undergone 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 iGen4 achieved the highest machine Availability among the tested digital presses, substantially more than the tested HP Indigo 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.

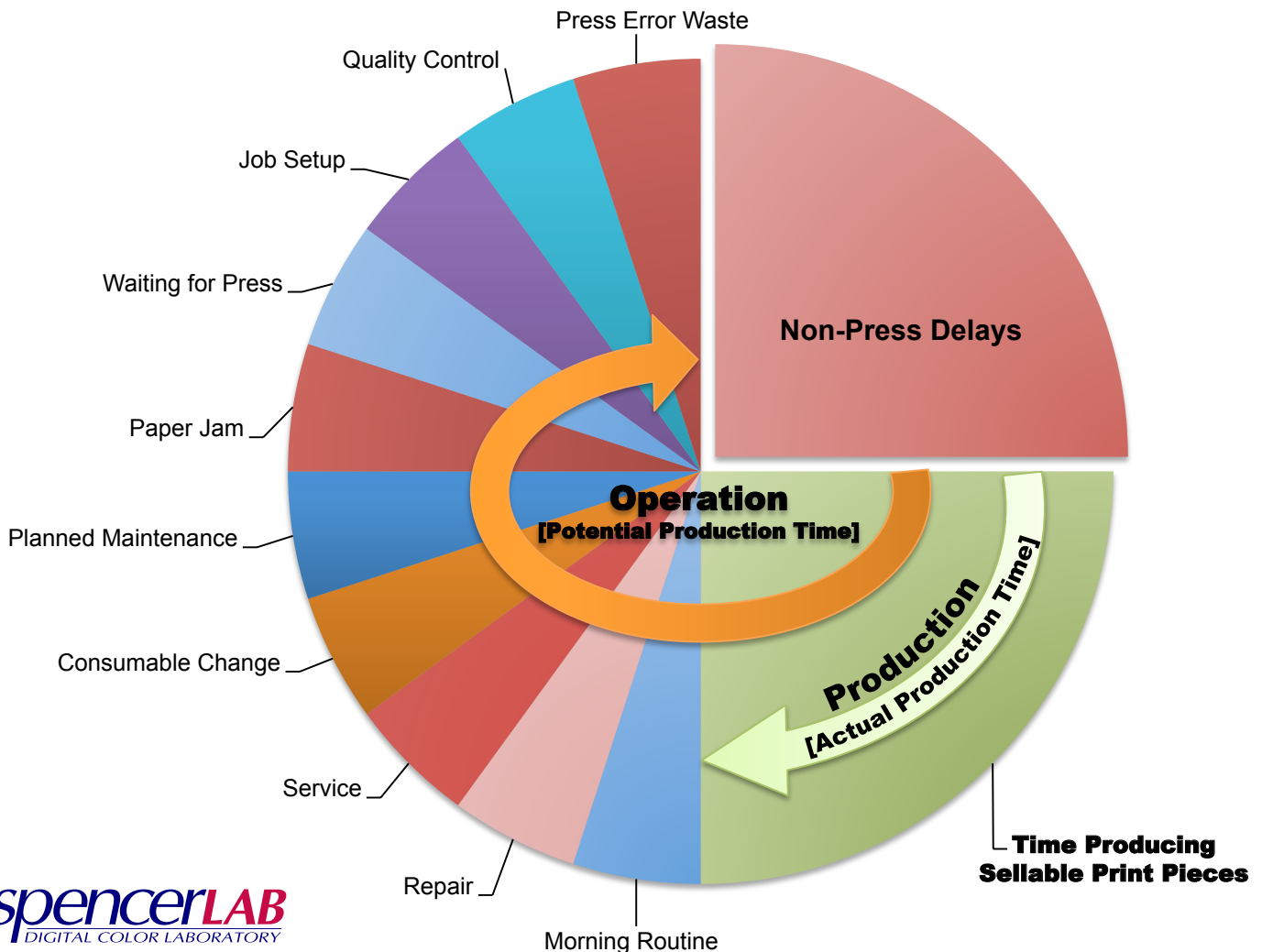
- In order to estimate the level of digital press Availability, *spencerLAB* established test parameters and protocols

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.

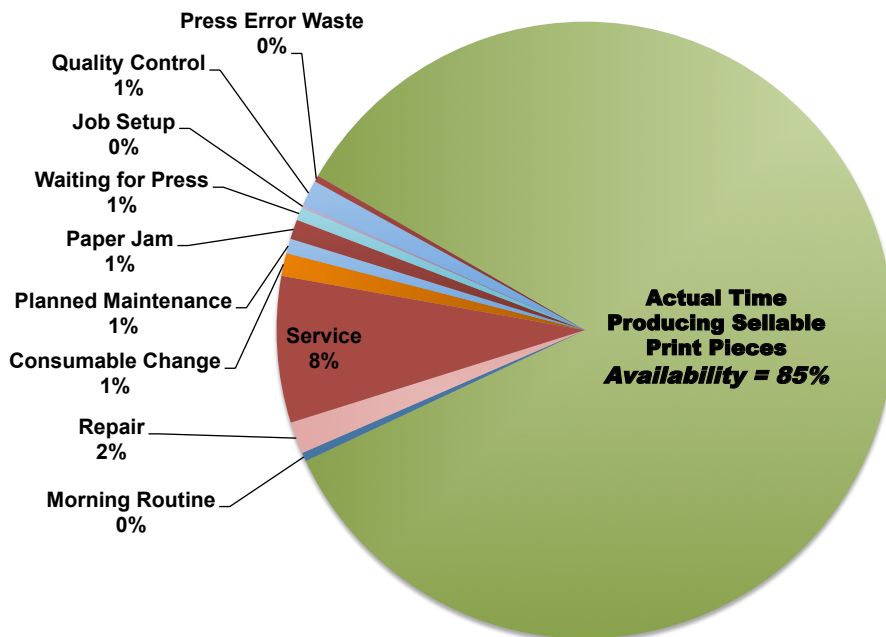
- *SpencerLAB* designed guides and tools to assist real-time data tracking and recording by the operators themselves. Care was taken to ensure efficient data collection without burdening the operators or interfering with their workday activities.

- 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 iGen4\***



\*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**

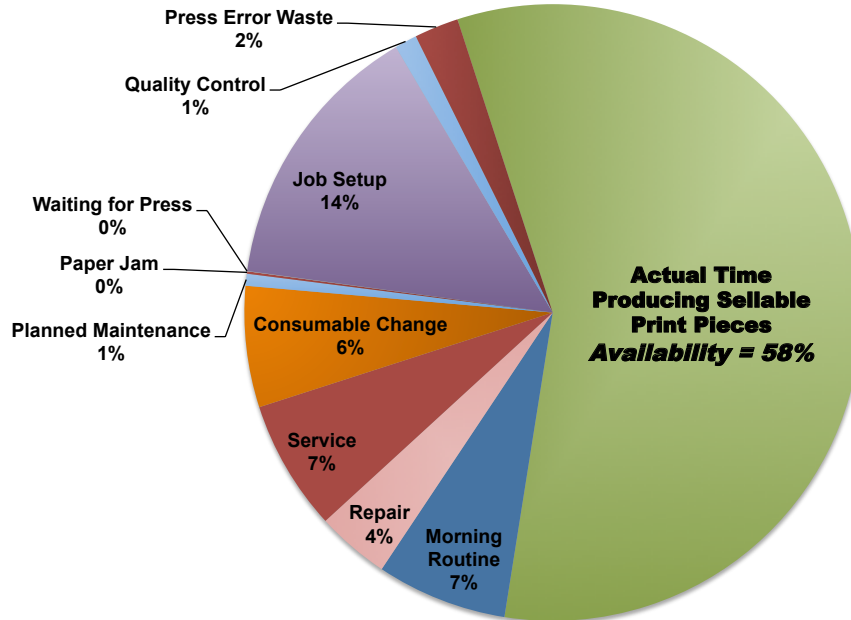
The following section presents the Potential production time usage for each press – the detailed categorization of production time metrics and resultant machine Availability and consistency.

**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.

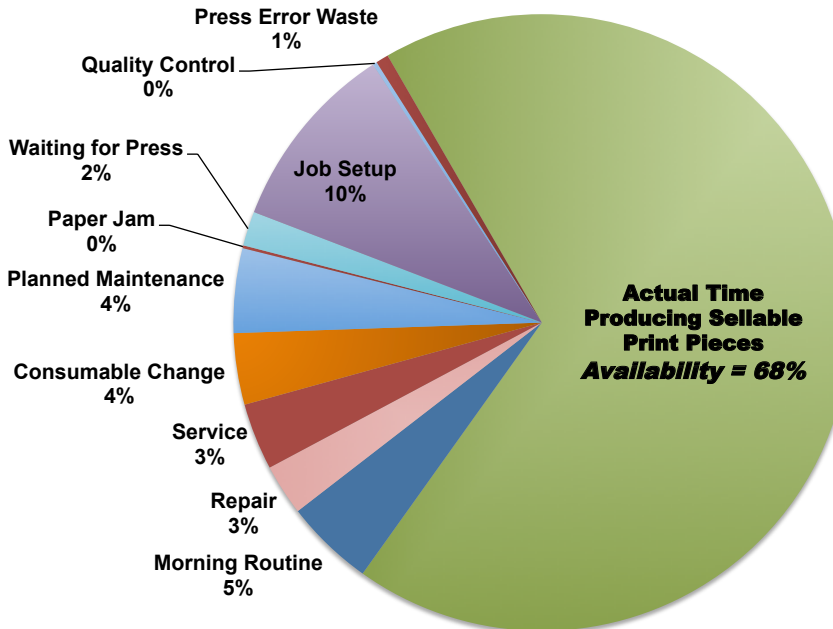
Press	Morning Routine	Job Setup	Consumable Change
Xerox iGen4	Negligible		1%
HP Indigo 7000	7%	14%	6%
HP Indigo 5500	5%	10%	4%

**Average Potential Production Time: HP Indigo 7000\***

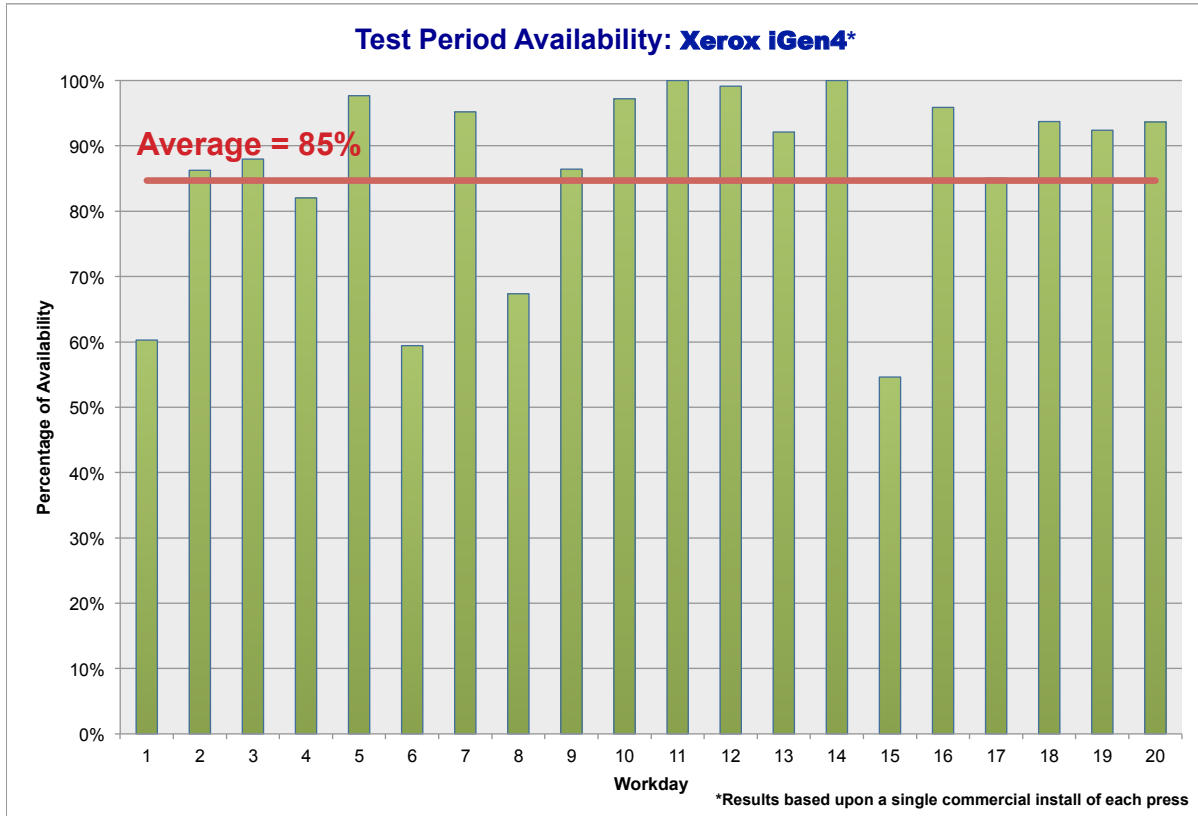


\*Results based upon a single commercial install of each press for 20 workdays

**Average Potential Production Time: HP Indigo 5500\***



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



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 iGen4

The Xerox iGen4 achieved the most utilization of its Potential production time with the highest average Availability for the test period. Negligible time was spent on Morning Routine and Job Setup. Consumable changes required only 1% of the Potential production time. The average time spent on Servicing the press was 8% and in-house Repair was 2%. The Xerox iGen4 achieved the highest average press Availability of 85% .

The maximum Availability achieved on a single day during the 20-workday period was 100%, which implies that on that workday, the press printed continuously without any press-related stoppages – it had the

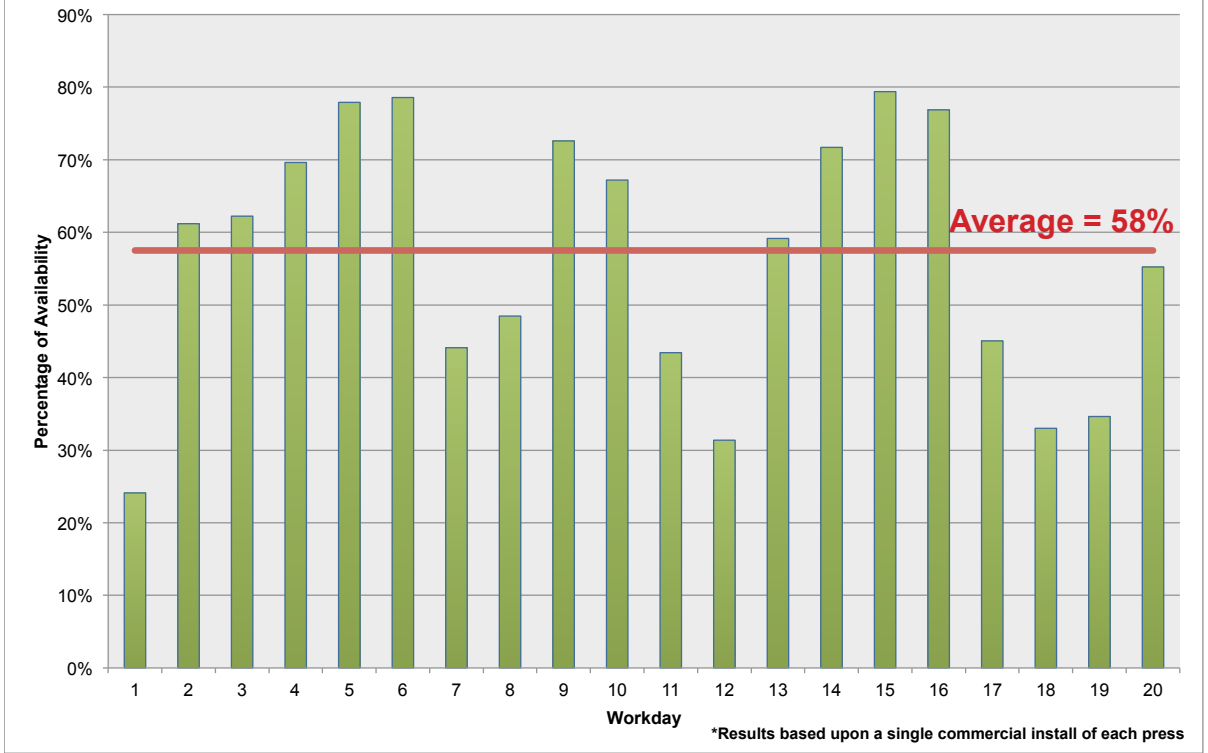
maximum utilization of the total Potential production time available. The lowest Availability achieved by the iGen4 on one day was 55%, primarily due to a press Service-related delay. The iGen4’s overall high daily utilization contributed to its high average Availability.

### HP Indigo 7000

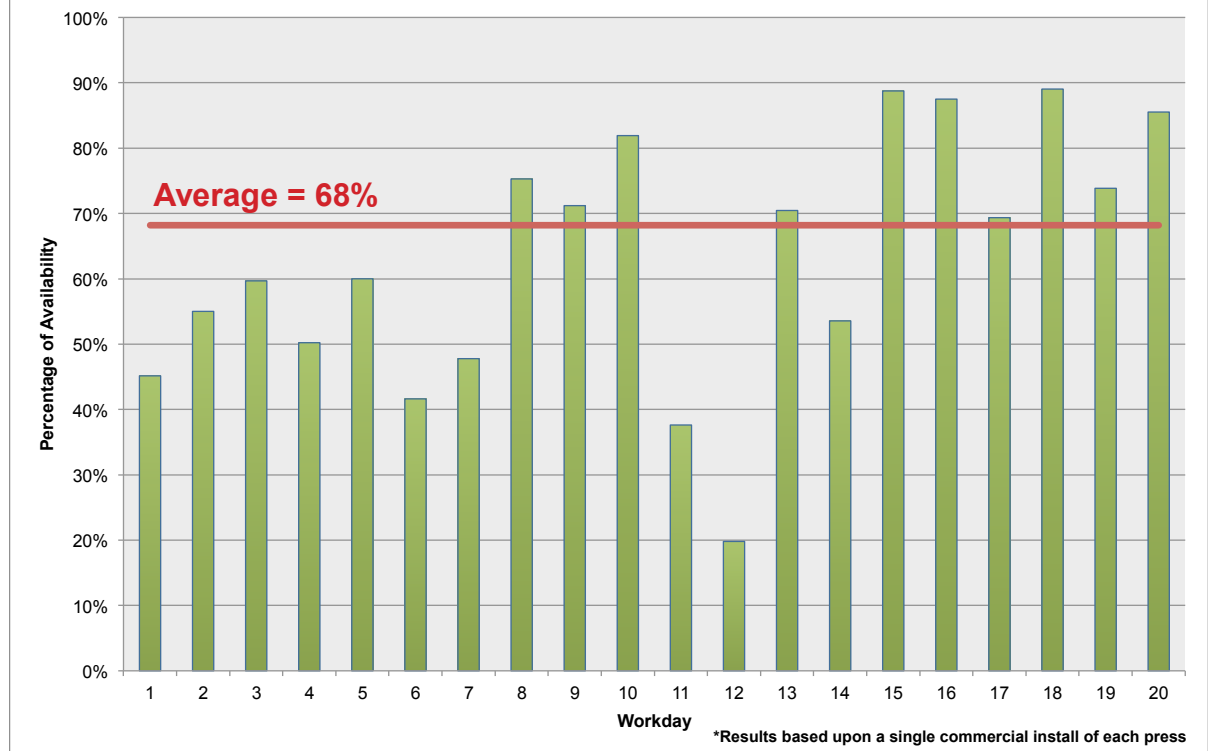
The HP Indigo 7000 achieved the least utilization of its Potential production time with the lowest average Availability for the test period. In addition to a 7% Morning Routine, there was a substantial amount of time (14%) spent on Job Setup; Consumable changes took 6% of the Potential. The average time spent on Servicing the press was comparable to the iGen4 at 7%, and in-house Repair was 4%. The HP Indigo 7000 achieved the lowest average Availability of only 58%.

The maximum Availability achieved on one day during the 20-workday period was 79%; that is, on the day of its best performance, the press experienced press-related stoppages/delays accounting for 21% loss of utilization of the Potential production time. The lowest Availability logged by the Indigo 7000 on one day was 24%, primarily due to a machine Service-related delay.

**Test Period Availability: HP Indigo 7000\***



**Test Period Availability: HP Indigo 5500\***



## HP Indigo 5500

Availability of the HP Indigo 5500 was higher than the HP Indigo 7000, but lower than that of the iGen4. As with the 7000, in addition to a 5% Morning Routine, there was a substantial amount of time (10%) spent on Job Setup; Consumable changes accounted for 4% of the Potential production time. For the test period, the average time spent on Service and Repair was 3% each; however, the press required the most time (4%) of all the presses evaluated to be spent on Planned Maintenance, which may have contributed to keeping Service and in-house Repair time low. Over the 20 workdays the HP Indigo 5500 achieved an average Availability of 68%.

On the day of its best performance the Indigo 5500 achieved a maximum Availability of 89%. The lowest Availability achieved by the Indigo 5500 on one day was 20%, the lowest of the three presses evaluated – with the remaining 80% of the Potential production time forfeited to miscellaneous press-related stoppages; had this time been utilized to increase the production of more sellable printed pieces, there would have been a correspondingly increased ROI.

### 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 iGen4 provided the most consistent performance with a 14% standard deviation of Availability over the test period. The HP Indigo 7000 and the 5500 recorded less consistent Availability standard deviations of 18% and 19%, respectively.

### 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 digital press models.

## THE *spencerLAB* DIGITAL COLOR LABORATORY

The *spencerLAB* DIGITAL COLOR LABORATORY is an independent printer evaluation laboratory that provides services to vendors and corporations for whom digital color printing is mission-critical. The Laboratory follows strict guidelines in the integrity of both methodology and reporting; vendor-sponsored studies do not guarantee favorable results. *SpencerLAB* has developed industry-standard test software, and performs print quality, cost-per-page, speed, and ease-of-use analyses in all technology classes, from desktop printers to digital color presses.

*SpencerLAB* is operated by Spencer & Associates Publishing, Ltd., a premier IT consulting boutique specializing in Digital Color Imaging. Since 1989 Spencer & Associates has provided strategic support in product planning, development, and launch to manufacturers, and workflow analysis, usage optimization and print system selection to corporate users.

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