Presses—Past, Present, and Future

John MacPhee*

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Abstract: The major advances made in the past 15 years in the technology of sheetfed, commercial web, and newspaper presses will be reviewed. The aim of each advance, increased productivity, increased quality, or both, will be noted so as to characterize the primary driving force behind press improvements. This history, together with the current status of press technology will be used to provide the basis for forecasting the most likely makeup of presses in the post-millennium.

Introduction

Of the three topics I have been asked to address in this presentation, the last one is by far the most challenging: how indeed does one predict what presses are going to look like in the future? One possible approach is to survey the manufacturers and find out what new products they are planning to introduce in the next few years. History, however, teaches us that there have been many new products introduced in the past that did not make it, or were before their time.

For example, three different keyless inking systems were introduced in the 1970s, but it is only in the past few years that such systems have become technically and commercially viable. Another example is a system for monitoring and controlling water film thickness and/or ink/water balance. At least one such product has been introduced at every DRUPA since I entered the industry, and one has yet to catch on.

Another approach to predicting the future would be to make a survey of printers. The focus of printers, however, is on what is needed; therefore, a survey of them would more likely end up as a wish list.

*Baldwin Technology Company, Inc., Norwalk, Connecticut

Many years ago I was impressed by a quotation of Santayana that William L. Shirer included in one of his books: "Those who forget the past are doomed to relive it." Recalling that quotation, it occurred to me that it might be possible to learn something about the future by looking into the past. More specifically, if I could discern what drove press advances in the past, that might provide insight into what to expect in the future. Thus, the initial stage of my presentation, a look at the past, is not simply an exercise in history but, more importantly, is a search for patterns.

A few words are in order on the scope of this address: it is limited to lithographic presses that are at least 20 inches wide. In addition, three broad categories of presses will be distinguished: sheetfed, commercial web, and newspaper.

The Past

In reviewing past advances, it is important to add the warning that only advances accepted by the industry are to be counted. Table I is a listing of such advances in sheetfed press technology, arranged more or less in chronological order of acceptance.

Table I Major advances in sheetfed press technology of the past 15 years or so.

Advance	Objective	
	Increase productivity	Increase quality
Hickey elimination systems	√	√
Presetable ink fountains	√	
Oscillating form rollers		√
Extended delivery	√	
Automatic blanket cleaners	√	
Speeds of 15,000 impressions/hour	√	
On-press coating units (water-based and UV)	√	√
Automatic impression cylinder cleaners	√	
Automatic ink roller washup systems	√	
Remotely operated feed and delivery settings	√	
Remotely operated register controls	√	
Remotely operated impression cylinder controls	√	
Waterless plates	√	√
On-press plate imaging systems	√	
Convertible four-over-four perfecting presses	√	
Closed loop color control systems	√	√
Automatic plate changers	√	

While the exact makeup of this and subsequent lists might be arguable, the feature that jumps out at you is that all but one of the seventeen advances listed promised an increase in productivity, whereas only five out of the total of seventeen promised an increase in quality. In other words, it is improvements in productivity rather than print quality that drove the acceptance of past technical advances. This comes as no surprise when one considers that the pressroom accounts for the lion's share of a typical printing company's costs, not including paper.

A listing of past advances made in commercial web press technology is shown in Table II. This exhibits a similar pattern in that there is only one advance that did not promise an increase in productivity. This is in spite of the fact that of the eighteen advances identified, thirteen are different from those of sheetfed presses listed in Table I.

Table II Major advances in commercial web press technology of the past 15 years or so.

Advance	Objective	
	Increase productivity	Increase quality
Presetable ink fountains	√	
Oscillating form rollers		√
Center web guiding systems	√	
Automatic blanket cleaners	√	
Closed loop register control systems	√	√
Production monitoring systems	√	
Pinless folders	√	
Automatic roll handling equipment	√	
Antiwrap-type press protection devices	√	
Robotic signature stack palletizing systems	√	
Automatic signature log building systems	√	
Rollup-type signature storage systems	√	
Systems for eliminating chill roller marking	√	
Gapless cylinders	√	√
Speeds of 2500—3000 feet/minute	√	
Shaftless drives	√	
Closed loop color control systems	√	√
Automatic plate changers	√	

A third listing, of advances made in newspaper press technology, is given in Table III. Of the ten advances identified, four of them are unique to newspaper presses. In addition, all of them promised an increase in productivity.

The Present

Currently manufactured lithographic presses can be described as complex electro-mechanical systems. Sheetfed presses may incorporate all of the features listed in Table I and range in width up to 63 inches. They may have as many as 10 printing units and two coating towers. Makeready times can be less than ten minutes, depending on features included, and mid-sized presses, i.e. 40 inches wide, are typically manned by a crew of two.

Currently manufactured commercial web presses are even more complex because of the additional accessories required for operation, i.e., automatic pasters, web controllers, dryers, and folders or sheeters. Complexity may be compounded by the inclusion of in-line finishing equipment to provide special folds, special cutoffs, imprinting, numbering, scoring, gluing, and the like. Web presses range in width up to 80 inches, and may have as many as six printing units on single-web machines. Two-web mid-size (35—38 inches wide) machines are common and are generally equipped with four printing units per web. Plate and blanket cylinders are either one- or two-around, i.e. their circumference is equal to one or two cutoff lengths. Most commercial web presses come equipped with perfecting units. Other features available are listed in Table II.

Table III Major advances in double-width newspaper press technology made in the past 15 years or so.

Advance	Objective	
	Increase productivity	Increase quality
Spray dampening systems	√	√
Ink fountain presetting systems	√	
Automatic roll handling equipment	√	
Automatic webbing systems	√	
Four-color tower configuration	√	√
Production monitoring systems	√	
Automatic blanket cleaners	√	
Closed loop register control systems	√	√
Shaftless drives	√	
Keyless inking systems	√	

Currently manufactured newspaper presses come in two sizes: single-width and double-width. Single-width presses take their name from the width of an unfolded broadsheet newspaper, i.e., two pages or approximately 30 inches wide. Double-width presses are four pages wide, i.e., 55—60 inches. The plate

and blanket cylinders on single-width presses may be one or two pages around, while those on double width presses are always two around. Newspaper presses may be configured to run with as many as ten webs into a single folder and have as many as four perfecting printing units per web. Double-width presses generally run at 60-70,000 impressions/hour, which is in the range of 2000 feet/minute. Single-width presses run at about half that speed. Other features available are listed in Table III.

Before proceeding to discuss the future, I want to point out that an important byproduct of many of these past advances has been an increase in the safety of the operating crews.

The Future

Now I come to the difficult task, forecasting what advances are most likely to be made in press technology in the next five years. First, a reminder that advances are defined here as new press features that are accepted by the industry as evidenced by significant sales on a continuing basis, and not simply new developments announced by manufacturers. It is also worth noting that five years is a relatively short period in press development. Thus, new developments that will win industry acceptance five years hence are either already on the scene or on the horizon. Finally, regulations aimed at protecting the environment have had an impact on our industry in the past decade and there is no doubt that this trend will continue.

The review of the past, presented above, indicates that a new development in press technology must promise an increase in productivity if it is to have a high probability of acceptance by the industry. Productivity is normally defined as output per unit of labor. Here, however, I am going to use a broader definition: throughput per unit cost, as for example the number of signatures that can be produced on a web press per dollar cost. This expanded definition can be expressed by equation (1) as follows:

$$\text{Productivity} = \frac{\text{Throughput / unit time}}{\text{Cost / unit time}} = \frac{\text{Throughput}}{\text{Unit cost}} \qquad (1)$$

Equation (1) expresses what we all know—productivity can be increased through one of the following two strategies:

1. Increase throughput per unit time by increasing speed or reducing waste, where waste is broadly defined as lost time and/or lost product.

2. Decrease the cost of operation per unit time by decreasing waste, the cost of labor, and/or the cost of capital, i.e., equipment.

In my opinion Strategy #2 has a much greater potential for producing the advances of the future. This is because the potential of Strategy #1 has already been extensively mined to produce the advances made in the past 15 years—the higher press speeds, lower makeready times, and lower makeready and running waste that are achieved at present. Therefore, my forecast is that the advances of the future will result primarily from developments that simplify presses so as to reduce their cost. Specifically, the most likely advances will include the following:

1. Reusable plates, imaged on or off press.

2. Keyless inking on commercial web and sheetfed presses.

3. Less technically sophisticated presses at significantly lower selling prices.

4. Emulsion printing where emulsion is mixed on or off press.