

Electrophotographic Machines for Digital Colour Printing. The Tendencies of Development

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Abstract

The electrophotographic equipment of digital printing is a part of Quick Print. Here is occupied a lot of American and especially of Japanese corporations. The global necessity of the equipment by a 2001 is evaluated[1] from 1 up to 1,8 millions units. Among set of the equipment[2] for copying and output of the computer information is possible to select some categories. These categories are joined by a common electrophotographic technology of digital printing[3]. All these categories concern to a known contactless technology of printing «Computer-to-Print»[4]. It is conditionally offered all equipment to divide into categories[5]:

A. Colour digital copy machines (digital color copier);

B. Colour copying - output machines (color copier/ printer);

C. Colour digital printed machines (digital color press);

D. Colour laser printers (color printer).

The objective of the present work is the analysis of the tendencies of development of an equipment of these categories.

Keywords: Electrophotography, Copier, Copier/printer, Digital.

Introduction

Modern electrophotographic equipment of digital printing as a technology of multimedia

In the world the tendency of creation of information systems of a type multimedia[6] was scheduled. In these systems the interactive access to various sorts of the information is possible. It is carried out under the physical originals, and also on computer data. These systems allow to apply a color coding of the information on all stages and aspects of its processing. On a final stage the methods of a colour electrophotography[5] are applied.

Joining link of the varied information is the digital document[7]. The digital document is present on all stages of digital printing, from the physical original or digital file up to the hardcopy.

According to philosophy of multimedia, the equipment gains polyfunctionality. The availability of the digital document and uniform technology of digital printing allows to create an equipment joining in itself of the function of copier, printer, fax, scanner in various combinations. The user has possibility to gain additional devices and to expand polyfunctionality of the equipment. The printing of a type "Computer - to - Print" gives perfect possibility of obtaining of personificated reprints. Minimum circulation can be lead up to one personal copy. The principle "Printing - on - demand" is realized.

Chronology of an enter into a market of new models of colour machines

The development of a colour electrophotographic equipment of digital printing began in 1987[5]. The analysis of dynamics of the issue of an equipment of the categories A, B, C, D allows to place regularity of the development. The chronology of an annual enter into a market of new models is shown on Fig.1.

Category "A". The machines are intended for obtaining of colour copies from the colour originals (one function). They were created on the basis of analogue colour copy machines[5], produced in 1970-1992 years (about 20 models). Their release practically was stopped in 1993. In 1987 the first digital machines with one function have appeared. Since 1993 the digital machines completely have superseded analogue machines. Now analogue machines are

released only in one-colour variant. The release of digital single-function machines was stopped in 1994. They have conceded a place to two-functional machines of the following category.

Category "B". It is two-functional machines. Copying of

the physical colour originals under the scheme «colour - colour» - first function. Obtaining of colour documents under the digital computer information - second function. The machines have appeared in 1989 and heavily intensively develop. In a minimum specification this category of machines substitutes a category "A". With an additional specification they become of a type copier/printer machines. Annually is released about 20 new models. In this category the new direction of high-speed machines of the following category was arised.

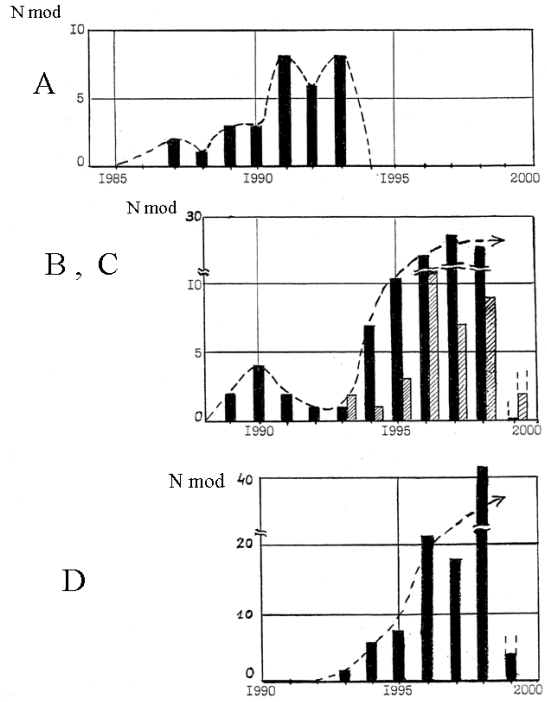

Figure 1. The chronology of an annual enter into a market of colour digital electrophotographic machines: N_{mod} - the total amount of models in one year. A - Copy machines; B - Copying - output machines; C - Digital printed machines (is shaded); D - Laser printers.

Category "C". It is machines for the operating issue of small circulations of printed production. There is a possibility of upgrade of the information on a during of printing of circulation. The machines have appeared in 1993 and are released with acceleration.

Category «D» Machines of a type desktop, specialized for printing of the computer information. In complete with scanner they can copy of the originals. The release of the machines is started in 1993. Each year occurs up to 40 new models.

The appearance in the market of a digital technology in 1987 has defined an annual growth of an amount of models of all categories of a electrophotographic equipment (Fig. 2). To the beginning of 1999 the park of colour digital machines was more than 260 models. In 1998 more 60 new models have appeared. The allocation of models on categories shows advantage of a category "D".

The modern colour equipment develops only on methods of digital printing. An equipment of categories «B», «C» and «D» now develops only.

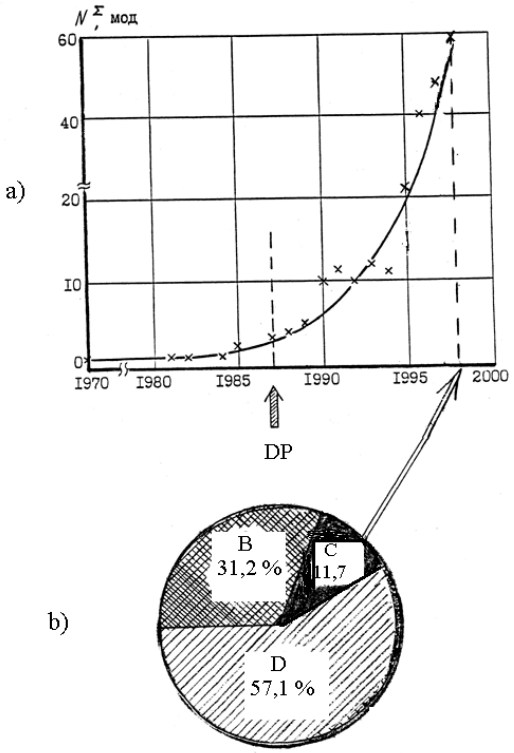

Figure 2. An annual increase of park of models of electrophotographic colour machines of all assignments (a) and a structure of an increase of digital colour machines for 1998 (b): DP - beginning of digital printing in a electrophotographic technology; $N^{\Sigma}_{,\,mod}$ - the total amount of models in one year.

Productivity of an equipment of digital printing and dynamics of its distribution

One from main parameters of an equipment is it the productivity. The productivity expresses in an amount of output documents in minute (ppm). The difference of productivity between the categories is shown in Fig. 3. Each category has the priority zone of productivity. These zones contain a main amount of models.

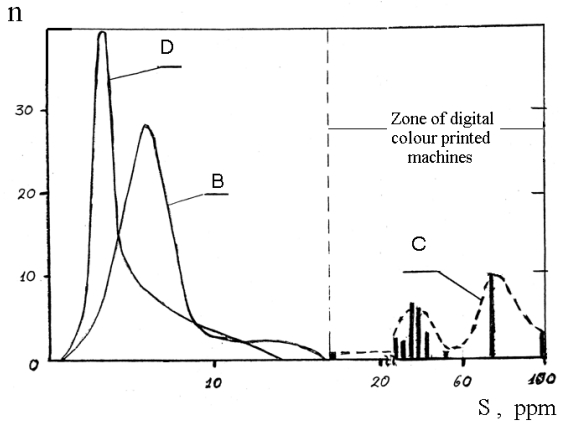

Figure 3. Distribution of colour machines on the parameter of productivity: n - amount of models; S, ppm –productivity

Priority zone of productivity for laser printers - 3 ppm, for is copying - output machines - 6 ppm, and for digital printed machines - 30 - 40 ppm. Recently productivity of a category «C» has grown up to 100 ppm. Absolute championship has the duplex model DCP 50/D of the «Xeikon» Corporation, which also is released under brands Infocolor 100 and Chromapress 50i. Dynamics of productivity on separate categories of an equipment is generalized in Fig. 4.

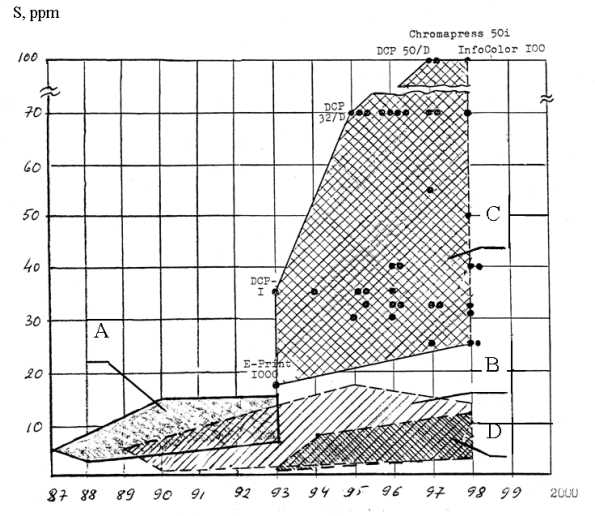

Figure 4. Dynamics of productivity (S) on separate categories of an equipment of digital printing.

The category «C» is most detailed. In this category the new reachings of a colour electrophotography and digital information processing are concentrated. The equipment of a category «C» is applied for creation of desktop publishing systems of operating graphic arts industry.

Conclusion

Digital methods of information processing and the electrophotographic process is a union of two technologies which have determined the development of reprographic information engineering.

The tendency of development of polyfunctionality of machines is observed. The strict boundaries between categories are erased. The electrophotographic technology gains tags of systems multymedia. Within the framework of one technology there is a possibility to accept and to treat the varied information. The top of development of an electrophotographic equipment are digital color press. Digital color press is successfully applied in operating graphic arts industry. Now it is possible to print on a principle «on demand», i.e. when it is necessary, how many it is necessary and where it is necessary.

The electrophotographic technology of digital printing continues to develop. The single disadvantage is the fast aging of analyzable data. Each year there are tens new models. The new models are not always stacked in the already customary scheme. But also consists of it a principle of development.

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Biography

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