

INFORMATION AND WEB TECHNOLOGIES

Chepurna Kateryna

PhD, Associated Professor, Associate Professor of Printing Production Technology Department
Publishing and Printing Institute of NTUU KPI, Ukraine

Khmeliarchuk Olga

PhD, Associated Professor, Associate Professor of Printing Production Technology Department
Publishing and Printing Institute of NTUU KPI, Ukraine

SPECIFICS OF PREPRESS OF THE LAYOUT WITH THE USE OF WORKS OF ART

***Abstract.** The paper presents the specifics of prepress preparation of museum paintings. The peculiarity of the training is to conduct studio shooting using color targets and longer image processing using specialized software. The main criterion for the quality of image preparation is the maximum reliability of the original. That is, the identity of the rejection of color and geometric indicators of the original.*

***Keywords:** prepress, hue, museum paintings, layout, color targets, white balance, reproduction, colometric accuracy*

When reproducing works of art, such as museum paintings, it is necessary to ensure facsimile accuracy of image reproduction, so important quality parameters are the absence of any discrepancies with the original: whether linear image size, or color, gradation. This is especially true for works of watercolor painting, because they are characterized by a wide range of color transitions and a variety of colors, the translucency of the base material through a layer of paint of different saturation. Thus, the exact color reproduction of reproductions of paintings is determined by the degree of coincidence or deviation from the color indicators of the original (standard).

Digitization of museum paintings, as a rule, is done by photography, and the main task is to comply with: the most accurate color reproduction; non-distortion of linear dimensions; invoice transfer; minimization (absence) of glare.

A modern camera usually has an effective color management mechanism and a description of its own system – matrix and color filters. In addition, the processor or computer image processing program has built-in white balance settings for various standard light sources and descriptions of standard subject tasks (portrait, landscape, etc.). But for specific, non-standard lighting conditions when shooting, the average color description of the camera may not be enough. Therefore, to adjust it to the real conditions of shooting and subjects, it is necessary to place in the frame and photograph a special color target, and on it with the help of professional software to adjust the color rendering [1].

There are the following types of color targets [2-6]:

- by nature (digital, subject, printing);
- by functional purpose (for input devices, for output devices);
- by the location of fields (flat, in which the fields are located in the same plane and volume, the faces of which have different reflection coefficients, for example, the tool Spyder CUBE from Data Color);
- for the purpose of photography (for color correction as a color card, to adjust the white balance as a gray card, white card).

Usually the complete set of the target is not only a color map, but also a gray map to measure exposure and to establish white balance. Depending on the specific brand of target, the number of colors in the palette set may vary.

There are two target manufacturers on the Ukrainian and Russian markets: X-Rite and Data Color. In addition to these, well-known manufacturers are Coloraid.de, FujiFilm, Kodak, LaserSoft Imaging. DGK Color Tools is also well-known in the USA, Europe and Australia. DGK Color Tools is also well-known in the USA, Europe and Australia. Depending on the frequency of use and operating conditions, manufacturers recommend that the color scale be updated approximately every two years for reliable color control, as optical, physical, or chemical effects on color fields occur during the use of the scales.

Typically, color targets, in addition to a set of calibration targets, also include software for creating camera profiles in various formats. Most often, the targets are a booklet measuring approximately 12.5×9×0.7 cm with a plastic base and a cover

that must be placed in the frame, within the key object, on any more or less flat surface without additional devices.

Photo processing and color adjustment are performed on the calibration scales of the color target, the initial values of which are reference, they are monitored and adjusted to the actual values obtained during shooting for each of the fields of the calibration target, which allows you to generate image profile for specific lighting conditions studio shooting.

Author's originals of paintings can be used in the digital prepress of both electronic and printed publications. In the case of prepress of original layouts for printing, when reproducing paintings, the goal is to achieve colorimetric accuracy. However, in case of impossibility to create colorimetrically accurate reproduction, there are two ways to ensure the maximum identity of color indicators [7–9]. The first method is to form a colorimetrically accurate reproduction of most colors of the image and reduce to the maximum approximation of those colors that are outside the color coverage of the output device. The second method involves compressing the information without losing detail in the case where the color coverage of the reproduction is less than the original, but the "uncovered" colors have a large number of image details and are subject-important.

Since the color coverage of a reproduction is often less than the color coverage of the original in achromatic colors, such compression can be performed according to the same laws as compression for grayscale reproductions. If you need to compress the tones of the dynamic range for saturated colors, this compression can also be performed according to the same laws. The criterion is always the maximum preservation of colorimetric accuracy of the image, taking into account the inevitable losses [9].

An additional possibility of maximum color reproduction is the use of Hi-Fi technology, that is reproduction with extended color coverage, obtained by using not four, but five, six and seven colors.

Ensuring accurate color reproduction in accordance with the standard is the result of the interaction of the processes of digital photographic image creation,

prepress and printing of the original layout. At each technological stage of reproduction of museum pictures distortions of the images which are resulted in the table can arise. Timely prevention and elimination of these shortcomings is the key to obtaining colorimetrically accurate reproduction.

Table 1

**Distortion of images that occur during the reproduction
of museum paintings**

№	Type of distortion	Cause	Ways to eliminate and prevent occurrence
1	2	3	4
1	<i>Photography</i>		
1.1	Deviation in color, hue	The color temperature is set <i>incorrectly</i>	– Selection of white balance manually. – Setting the color temperature according to the light source
1.2	Glare (loss of details in highlight)	Excessive exposure value	– Decrease the exposure value. – Adjust the shutter speed
		Incorrect installation of the original	Properly install or hang pictures relative to the camera and light sources
1.3	Loss of details in the shadows	Insufficient exposure value	– Increase the exposure value. – Adjust the shutter speed
1.4	Curvature of linear dimensions	Incorrect lens, focal length	The use of optics acceptable for shooting the subject
		Incorrect installation of the original	Properly install or hang pictures relative to the camera
2	<i>Prepress</i>		
2.1	Deviations in color, hue of color	Subjective error of the operator of prepress processing (at a manual mode of processing)	– Use of color scales when taking photos, – Use of additional software for auto-correction; – Calibration of the workstation monitor
2.2	Changing the proportion of linear dimensions	Image cropping error	Using guidelines of graphic editor
2.3	Loss parts of image	Gradation imbalance	Set points of white, black, gray balance
3	<i>Digital printing</i>		
3.1	Deviations in color, hue of color	Incompatibility of file profile data with the printing device	Match color separation settings to printing equipment
		Incorrect print settings	Set the print settings recommended for playing this image

Table continuation 1

1	2	3	4
		The choice of dyes and their quantity	- selection of recommended inks, toners or inks, - checking the presence of dye in the ink system; - changing the number of printing inks
		Selection of printed material	Selection of the materials for printing, which leads to the minimum possible distortions or ensures their absence
3.2	Loss of parts, non-printing details of image	Insufficient amount of dye	Checking the available resource of the ink and selection of material for printing with other parameters
		There is a problem with the printed material	
		Loss of parts image at the stage of prepress	Prepress, edit image file

References:

1. Palitry fotografa. Retrieved from <http://www.foto-video.ru/tech/test/59321> [in Russian].
2. Buyer's Guide: 10 Essential Color Management Devices. <http://www.dpreview.com/articles/0967807691/buyers-guide-10-essential-color-management-devices> [in .English].
3. Spyder Cub. Retrieved from: http://www.ixbt.com/digimage/spyder_cube.shtml [in Russian].
4. Obzor Eye-one (i1) Display Pro. Retrieved from <http://www.xritephoto.ru/foto/news/18> [in Russian].
5. Kalibrovka i proverka gamma-krivyh tonoperedachi videosistemy, ejo profilirovanie – vizual'no, apparatno i smeshanno. Retrieved from <http://forum.ixbt.com/topic.cgi?id=28:26439-10> [in Russian].
6. X-rite Munsell Color Checker Mini. Retrieved from <http://blog.i.ua/community/3802/757636> [in Russian].
7. Lektsii z tekhnolohii obrobky obrazotvorchoi informatsii. Retrieved from <http://uadoc.zavantag.com/text/2763/index-16.html> [in Ukrainian].
8. Margulis Djen. (2001). Photoshop b dlja professionalov: klassicheskoe rukovodstvo po cvetokorrekcii. Moskva: OOO «RTV-Media», 2001. p. 400 [in English].
9. Hant R.V.G. (2009). Cvetovosproizvedenie. Retrieved from <http://media-shoot.ru/books/Hant-Cvetovosproizvedenie.pdf> [in Russian].