A NEW COUNTER-ETCH SOLUTION FOR CORRECTIONS ON ZINC PRINTING PLATES

by Mitsuo OBANA
Hydrographic Department, Maritime Safety Agency, Tokyo

Editor's Note. — This is a shortened version of an article in the *Report of Hydrographic Researches*, No. 8, January 1973, published by the Maritime Safety Agency, Tokyo, Japan. Copies of an English version of the original Japanese text can be supplied on request by the IHB or by the Hydrographic Office of Japan.

The author has recently published a paper on "Abrasive graining of zinc plates for nautical chart printing" (*Report of Hydrographic Researches*, No. 9, March 1974, Japanese text).

PRECIS

Nautical charts must be kept up-to-date in order to provide navigators with the latest information. Both chart printing plates and film negatives have therefore to be continually updated by means of corrections. Before making a correction the zinc plates used by the Hydrographic Department of Japan are treated with a counter-etch solution and a polishing stick to remove the obsolete images and clean the plate. New printing images are then drawn in by hand or printed by photomechanical process.

The result obtained depends on the quality of the counter-etch solution; the new image must be sufficiently bold and distinct. The solution hitherto used was somewhat ineffective, in that the corrected images on the plate were often insufficiently clear, and the oil-sensitivity of the plate deteriorated during printing, causing the printing ink to lose adhesion so that sometimes breaks or omissions in reproduction occurred.

In order to remedy this deficiency, a counter-etch solution with better properties was sought and finally devised.

INTRODUCTION

There are two types of corrections to a chart printing plate necessitated by Notices to Mariners: one entails redrafting the image over a considerable

area by means of a "correction chartlet" (with or without a transfer plate), and the other is a correction by hand used when the changes are limited to a small area.

In both cases, the existing image in the area concerned has to be erased, first by polishing and then by the application of a suitable counter-etch solution to render the plate oil adhesive.

However, it is not easy to erase completely the existing image by means of polishing, which needs skilled experienced operators. If the erasure is incomplete there is a risk of blotting during the printing process.

Moreover, while the image is being erased in this way the grain of the plate will get damaged and the surface smooth, and thus the printed impression may blur. Therefore, it is necessary to regrain the plate either mechanically or chemically.

Alkaline or acid chemicals can be used to erase images without damage to the grain, and this is a good method for negative process plates (colour plates) but is not suitable for positive process plates (black-line plates), where there is a danger that the existing image may become saturated or the adhesion of the ink weakened.

The chemical abrasion method of graining the plate using a counter-etch solution was not practicable with previously used solutions which were of weak strength. The author's new solution fulfils all requirements.

PROPERTIES REQUIRED

The solution employed must be suitable for use on the various different types of corrections. The characteristics required are:

1. It must clean the surface of the plate to give better ink and oil adhesion.

2. It must not unduly damage the existing grained surface of the zinc plate.

3. It must be retainable within the area to be corrected, so as not to affect other images.

4. It must not cause blots when the printing ink is applied.

5. It must completely reveal any remains of the image being erased.

6. It must be capable of regraining chemically the surface of the zinc plate after polishing.

Solutions based on potassium alum and nitric acid had hitherto been in use at the Japanese Hydrographic Department, but none met all these requirements satisfactorily.

Experiments with various solutions based on potassium alum, ammonium alum, chromium alum, glacial acetic acid, nitric acid, sulfuric acid, hydrochloric acid, formic acid, aluminium acetate, aluminium sulfate, etc., were therefore undertaken.

NEW SOLUTION

The final formula chosen was:

Chromic anhydride	CrO_3	200 gr	pH 0.2
Sodium sulfate (10 hydrate)	$Na_2SO_4 \cdot 10 H_2O$	5 gr	
Nitric acid	HNO_3 (s.g. 1.38)	38 cc	
Water	H_2O	1000 cc	

Variations in the above proportions caused a yellowish striped or white effect on the plate.

The new solution is dark red-brown in colour, and opaque, and has quite different characteristics from the earlier colourless alum-based solutions. It has a stronger acidity than other solutions, which was expected to cause corrosion, but this was not nearly so strong as expected.

The solution has much better adhesional wetting capability, so that blots do not easily form. The subsequently applied image is much clearer owing to the finer graining achieved.

The solution has a strong effect on skin and brushes, and must be washed off immediately with water.

In contrast to the other solutions tried, the new solution need only be spread over the plate and left for one minute. No rubbing is required. It is removed by sponging with water and the plate is then carefully dried. The application time must be respected to avoid over-exposure.

The new image can then be either drawn in by hand with lithographic ink or printed by photomechanical process. Care must be taken to render the image-free portion fully oil repellent. The printing process can then be undertaken.

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