

HYDROGRAPHIC CHART PRODUCTION IN NEW ZEALAND

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The « Astrafoil » Multi-Positive, Deep-Etch Zinc Process, as used by the Hydrographic Branch, of the Navy, New Zealand

Since the establishment of a Hydrographic Branch in New Zealand, much thought has been given and numerous experiments made to find the best way of producing hydrographic charts in a small organisation with limited resources, whilst still maintaining the high standard of printing expected internationally.

With the co-operation of the Government Printing Office it has been possible to produce Charts N.Z. 9 and 10 Cape Campbell to Kaikoura and Kaikoura to Banks Peninsula by the above process. The method used and the type of copy required is set out below.

The copy :

The first essentials are absolute cleanliness of background, a completely non-actinic image and preparation on the same scale throughout.

The chart was compiled on 0.005 clear grained « Astrafoil » using red « Astrafoil » ink, so that the final drawing could be prepared by superimposing a sheet of clear « Astrafoil » on the compilation, the red work underneath enabling the draughtsman to « see » his black lines. Red was chosen rather than blue so that photographic copies of the compilation could be made if required. Black « Astrafoil » ink mixed with about 30 % red and thinned as required, was used for the final drawing. The addition of red was found necessary owing to the tendency of the arc lights to penetrate the blue-purple stain of the black ink when thinned out at the end of a pen stroke. This thinning out was not apparent to the naked eye. Compass roses, tidal data, title, inscriptions and sounding numerals, i.e. those items which are common to all charts, were either patched up from type impressions or drawn originally on a larger scale. A positive on thin film or stripping film was then made, waxed and backed and finally cut out and burnished onto the final drawing. It was found that type impressions on ready prepared waxed cellophane materials such as « Zipatone » were not sufficiently opaque for this method. However, a machine is now being used which produces an impression on both sides of a transparent material thus giving a sufficiently opaque image, which may then be waxed on either side producing a positive or reversed positive image as required. The most likely choice of material is very thin « Astrafoil » and the development of this method will enable the fullest use of type without the trouble and expense of preparing photographic positives.

It must be remembered that the whole process has a tendency to fine up and good firm lines should be used on the final drawing.

The reversed image positive :

As it is essential in direct contact methods to have the actual image in contact with the coated medium, it was not possible to go direct from the final drawing to coated zinc unless the drawing was prepared in reverse and the special highly trained staff necessary for this are not available to us. It was, therefore, necessary to produce a reversed positive which would hold its size exactly. This was made on .01 clear, grained « Astrafoil », using the following method as published by the manufacturers of « Astrafoil » :

Preparation of coating :

Stock Solution A. 1 x 500 gramm box Astrafoil Coating Powder to be dissolved in 1500 cc. (60 oz.) water. Mix well, leave overnight. Mix well again until all residue is dissolved.

Stock Solution B. 1000 cc. (40 oz.) water to be mixed with 250 gramm (9 oz.) Ammonium Bichromate. (Keep in a brown bottle out of strong light).

Working Solution C. 1000 cc. (40 oz.). Solution A. and 300 cc. (12 oz.) Solution B. and 20 cc. (1 oz.) Ammonia.

An addition of 5-10 % Methylated Spirit to Solution A. increases its solubility and preserves it. This addition is, however, not essential.

Working Solution C. should be left to stand for 24 hours before use; it does not keep and should be mixed from the Stock Solutions as required.

Cleaning the foil :

Rub in prepared coating strongly for at least five minutes and wash with water until water remains on foil.

Coating :

Whirl at 50-60 r.p.m. and allow to dry well, avoiding over-heating of foil. For matt foil, whirl somewhat slower. After drying wipe the reverse side of foil.

Exposure :

Place the coated foil into the printing frame onto a black sheet of paper or similar material and under the positive. Exposure time is very critical to avoid getting an image from the edges of burnished on film etc., and is slightly shorter than the positive would take to print down onto a zinc plate. For instance 2 1/2 minutes for a recent chart.

Developing and inking up :

Lay the foil on a white surface, preferably on opal sheet of glass. Pour on Astrafoil developer and rub with cellulose wadding or a pad until the image is clear in all detail. Squeegee developer off foil, pour sufficient developer on again and distribute evenly (thinly). The inking up now follows by inking with « Astrafoil »

black film dye until the image appears black in every detail. If it is found now that not every part of the image has been developed out sufficiently, pour on developer again and make sure that one has developed out the finest dot. The ink adheres firmly to the clear parts of the film and, when these are sufficiently covered, wash with water, thereby removing the stencil. Dry the film with blotting paper.

Note :

It was found that the coating powder was very difficult to dissolve and filter; experiment is therefore being made in using « Howter » commercial deep-etch coating.

The colours :

Reversed positives were prepared for the three colour plates by superimposing a sheet of « Astrafoil » on the back of the original drawing and painting in the colour areas with « Astropaque », using the original drawing as the « key ». The stability of the material ensures final registration.

The printing plate :

The Zincs were prepared from the reversed image positives in the normal way for the deep-etch process.

Advantages of the method :

1. Elimination of the camera and 40" × 30" plate glass negatives ;
2. The advantage of working on a transparent material for the drawing, without final loss of quality as would be the case if the transparency were photographed, due to the thickness of the material between the surface image and the white reflective background against which it must be photographed. Blue image prints from the compilation which are required when the final drawing is made on an opaque medium may be dispensed with ;
3. Any retouching required on the reversed positive is much easier and more pleasant than photo-writing on a glass negative. The plastic positive is easy and safe to transport ;
4. The reversed positive can be retained for future reproduction and amendments readily made upon it ;
5. A deep-etch zinc gives better quality printing, the image being etched about .001 ins. below the surface, thus retaining the ink after the manner of an engraving. An albumen image tends to spread.

The sum of these items should result in a saving of time and money at several stages of the job once the experimental period is over, whilst the final production will be of superior quality.

A sample of the work is attached together with a previous printing by the wet plate negative — albumen plate method.
