THE OFFSET GRAVURE ZINC PLATE ADOPTED BY THE JAPANESE HYDROGRAPHIC DEPARTMENT FOR CHART PRODUCTION, AND ITS ADVANTAGES

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PLATE MAKING PROCESSES.

The Japanese Hydrographic Department adopts the following three processes of plate making for chart production :

A) *Positive to Positive Process.*

1. The original fair drawing is made on a transparent paper.
2. This paper is laid on the surface of a zinc plate coated with a bichromate-sensitizer and exposed to light, as generally known.
3. After exposure the plate is washed with water and developed, dried and then smeared with greasy ink. By washing the plate with hot water the positive details of chart appear in greasy ink on the zinc surface.
4. The plate is completed by gumming and rolling.

B) *Ordinary Albumen Process.*

1. From an already existent chart a negative plate is prepared by the wet plate process.
2. The negative is exposed on the zinc surface coated with a bichromate-sensitizer.
3. The zinc surface is smeared with greasy ink and developed by washing with water.
4. The zinc plate is completed by gumming and rolling.

C) *Offset Gravure Zinc Plate Making.*

The surface, other than the lines and dots of drawing of a lithographic zinc plate completed by one of the above two processes, is coated with zinc grain by the galvanoplastic method, and an offset gravure zinc plate is produced. The procedure follows :

1. The details of drawing in greasy ink of the completed lithographic zinc plate are dried and hardened before the plate undergoes the galvanoplastic method.
2. Immediately before the work, oxides, organic matter, etc., on the plate surface are washed off with the following solution :

citric acid.....	2 % liquid
nitric acid	1.5 cc.
or saturated solution of alum	25 cc.
water	100 cc.

3. The cleaned plate is immediately wrapped face out around the cylinder and placed in the electric bath. The cylinder is 41.7 c/m in diameter, 121.1 c/m in length, made of hollow oak with a brass shaft and supported on the bath. The inner dimension of the bath is 160.6 c/m×115.1 c/m×48.5 c/m. Its inside is leadcoated.

4. The bath contains an acidic solution of the following recipe and of the quantity that can immerse one third or more of the whole cylinder surface:

zinc sulphate	180 kg.
ammonium chloride	18 kg.
sodium acetate	9 kg.
grape sugar	40 kg.

by adding water makes 600 litres (sp. gravity about 20° Baumé).

5. The zinc plate wrapped on the cylinder which is to be precipitated is connected to the negative pole. Facing the cylinder a pure zinc plate is suspended in the solution as the anode.

The standard strength of electric current is 3 amperes per square decimeter. The electric generator of this Department has a capacity of 10 volts and 500 amperes.

6. During the process the cylinder constantly rotates reversing the direction (clockwise and counter-clockwise) at an interval of about 30 seconds and at the same time oscillates along the axis by electric force. The standard number of rotations is 17 per minute. The ideal frequency of oscillation is 1 back-and-forth motion per 2 rotations.

7. The length of the electro-depositing varies as the temperature of the solution differs, but in ordinary cases extends from 2 to 5 minutes.

8. The plate thus finished with the electro-deposition is removed from the cylinder, thoroughly washed with water, then gummed and rolled, and an offset gravure zinc plate is completed and ready for the press.

ADVANTAGES OF THE OFFSET GRAVURE ZINC PLATE.

It has been confirmed by our experiences that the offset gravure zinc plate has the following features and advantages:

1. The offset gravure zinc plate can be used for rapid printing for an offset press by the same procedure as a lithographic zinc plate.

2. Though the surface of the plate is apparently smooth, gaps between zinc grains are cut deep and highly hygroscopic.

3. Since the lines of drawing are cut deep below the surface the plates very seldom suffer the mechanical damages such as injuries by handling and spread of the lines by the friction with blanket cylinders.

4. Due to the lines of the drawing being cut deep and fully filled with ink and very firmly constructed, they are very seldom affected chemically by acid-washing or other chemicals.

5. In case of spreading of the lines caused by long preservation or others, the plate can be cleaned of scums by using acids, ammonias, or by rubbing so as to regain the condition of the lines as they were. This is due to the lines being cut deep and free of mechanical or chemical effects, as stated in

3 and 4, and being able to stand a pretty daring act of remedial work.

6. For the reasons stated in 3, 4 and 5, the offset gravure plate has vast advantages over the lithographic zinc plate when used as an original plate and preserved for a long period.

In addition, it is superior to the lithographic zinc plate in printing efficiency and in cost for plate making.

This Department formerly was following a duplication system, in which the copper intaglio plate is first made and kept as the original and zinc plates are reproduced for printing purpose by transferring from the former.

However, since the completion of the offset gravure zinc plate, which combines the advantageous points of both copper and zinc plates, the duplication system was abolished and the single system of solely preparing the offset gravure plate as the original as well as the printing plate, has been introduced instead. Consequently, a considerable amount of rationalized reduction in personnel expenditure, plate producing cost, and in time of work, etc., has been accomplished.

7. The durability, for impression, of the offset gravure zinc plate is considerably great in comparison with that of the lithographic zinc plate.