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COST OF DOWNTIME

A Note Submitted
by the UNIDO Secretariat

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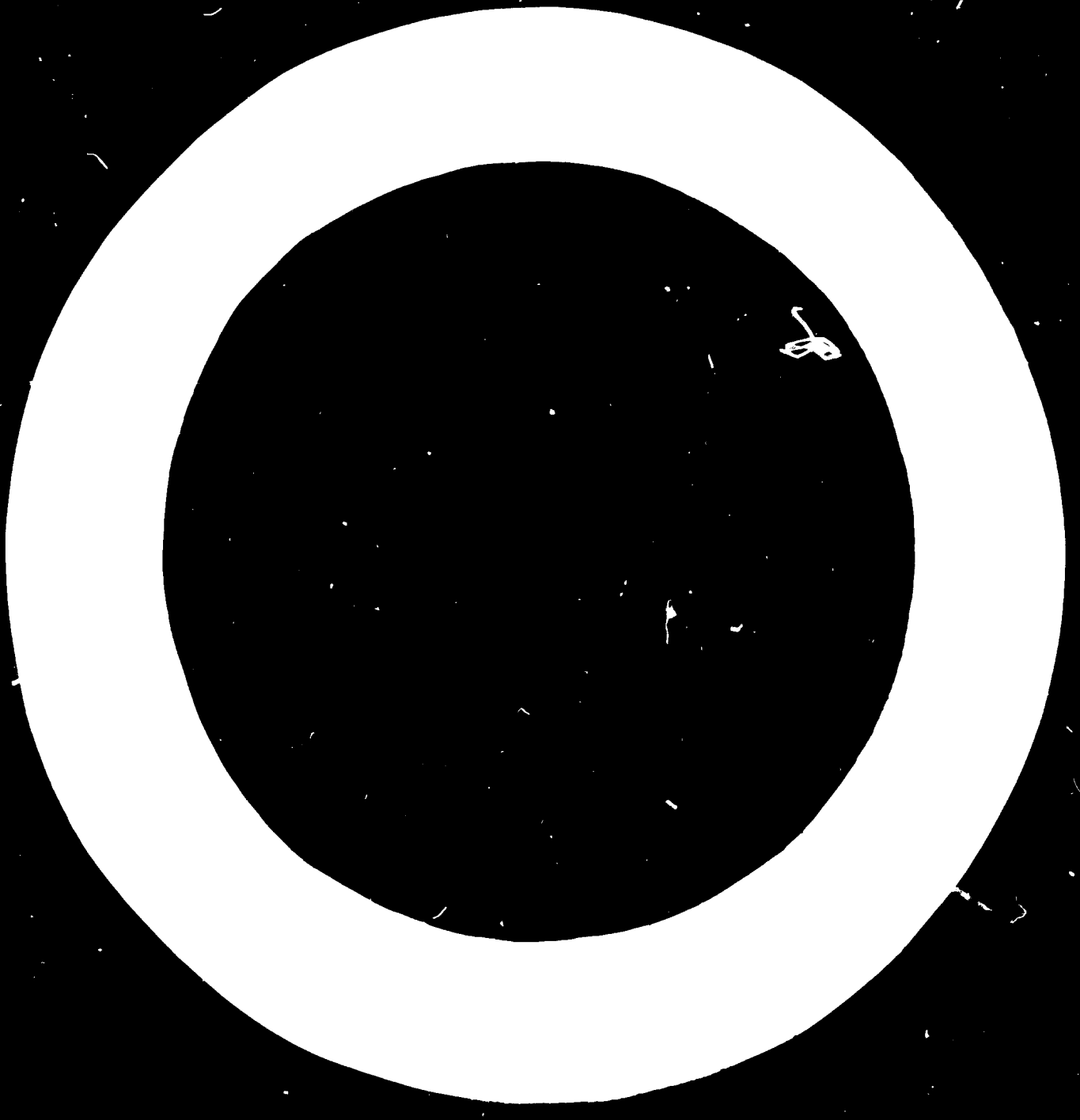

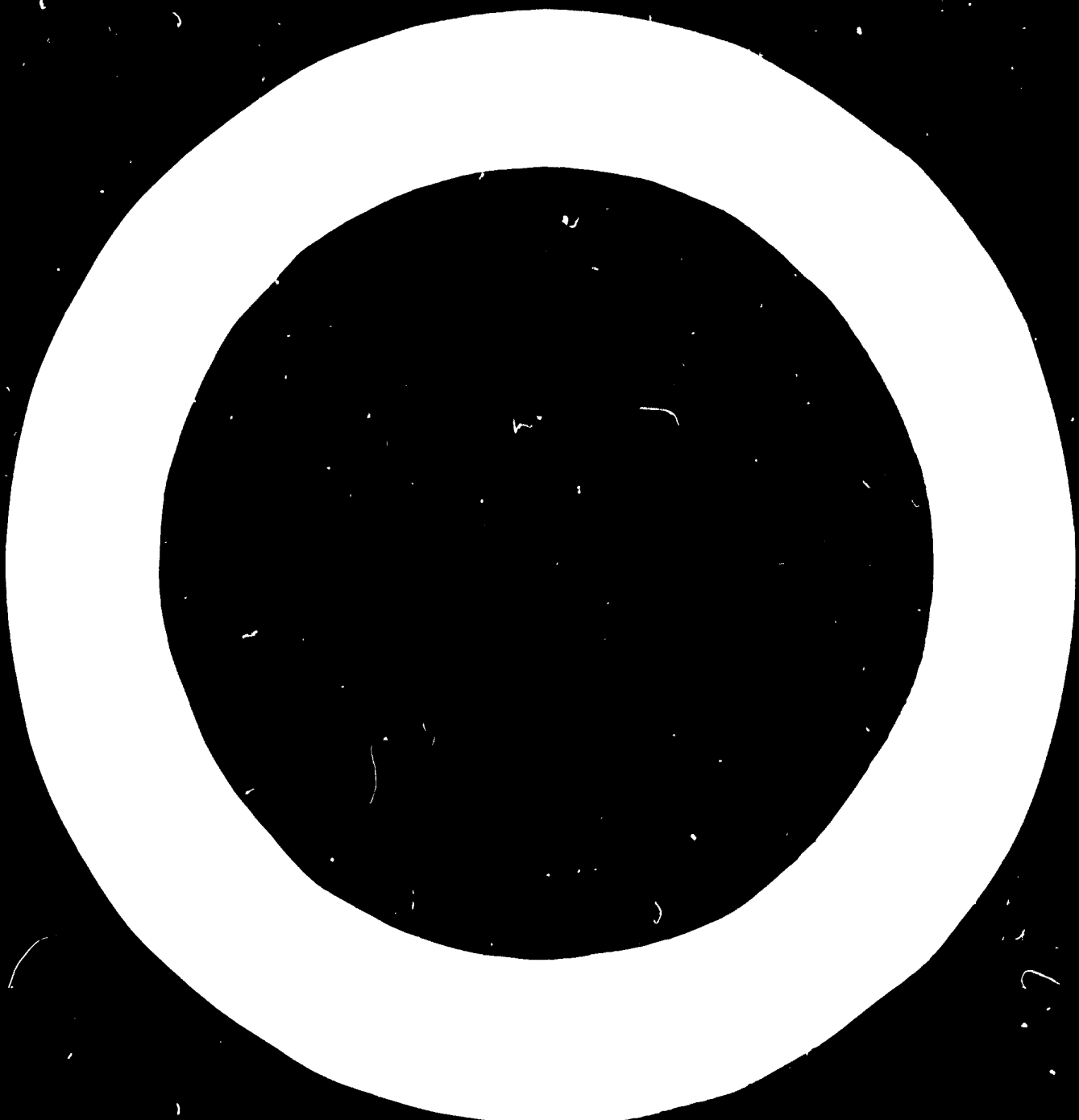

Introduction.

One of the main objectives of maintenance is to increase the availability of production equipment and to minimize downtime to the practical limit possible.

Maintenance costs money. Such costs, however, must be justified by an increase of equipment productivity accompanied by a lowering of production cost and an increase in profits.

No one hopes to attain a 100 per cent or near 100 per cent availability of equipment, i.e. zero downtime. It is often too expensive to attain. There is usually an optimum level of equipment availability which is the most economical. Below such level, maintenance is not given enough care and downtime is excessive. In such case, allocating more resources to maintenance in men and equipment will result in a better overall performance of the enterprise. Cost of production will decrease and profits will increase. However, if the resources allocated to maintenance are increased beyond a certain level, which is called here the optimum level, the further increase in the cost of maintenance is not compensated by an equivalent decrease in the overall profit of the enterprise.

Enterprise should thus aim at working at this optimum level of maintenance activity which would result in the optimum possible benefit to the enterprise. Such optimum level is affected by many considerations.

a) Safeguarding of equipment to attain maximum possible lifetime;

b) Safety of operation;

c) Cost of downtime of equipment.

This last item is the main theme of this paper.

Factors affecting cost of downtime: Cost of downtime to the factory is affected by the following:

1) Profit lost due to lack of production;
2) Direct labour paid, but not producing;
3) Spoilage of products in process, either before, during or after downtime;
4) Cost of bringing back equipment to working condition after repair;
5) Interest on idle investment;
6) Loss of customers and market good will due to unfulfilment of sales agreements.

1) Profit lost due to lack of production: This is probably the item that has the most effect on downtime cost. However, potential profit is lost only when there is potential sale. If market demand is less than production capacity, then any extra downtime which brings production output down to market demand level does not really entail a loss of sale or loss of profit.

The cost of downtime thus depends on the ratio between market demand for products and production capacity. If market demand is equal or higher than production capacity, then any production loss results in sales and profit loss. However, the magnitude of this loss depends on:

a) Is the factory working one, two or three shifts? There is no chance, in the case of three shifts, to make up for the production loss when downtime takes place. In the case of one or two shifts, there may be a chance to make up for some lost production. In this case the loss will be due to the increased production cost resulting from overtime, etc.
b) Is it the policy of the company to keep a certain amount of products in stores, if products are storeable? If so, market demand can be met from stored products and effect of loss of production due to downtime will not be as big as in the case when products are not usually stored.

2) Direct labour paid, but not producing: In this connection consideration must be given to whether such labour could be employed productively somewhere else during the shut down of the equipment.

3) Spoilage of products in process, either before, during or after downtime: In certain types of process industries, this can be a very expensive item. The cost of downtime in this case is not only the loss of profit from potential demand which is not satisfied, but also the cost of all raw materials which were spoiled during the breakdown and stppage of equipment.

4) Cost of bringing back equipment to working condition after repair: In certain industries this can also be an expensive item. An example is the heating of a cement kiln after repair, to bring it up to a working temperature.

5) Interest on idle investment: Interest on idle investment can either be calculated according to prevailing bank rate which may be about 6 to 8 per cent or at the rate at which the enterprise is obtaining return on its investment which may be about 15 to 20 per cent. The majority of opinions support the second alternative since this is the rate the enterprise expects from the risk-taking of establishing an industrial concern. Another point to be considered is that since a 100 per cent availability of equipment is not expected, the normal downtime figure, usually estimated between 10 to 15 per cent should be deducted from the total idle time.

6) Loss of customers and market good will due to unfulfilment of sales agreements: The long-term loss incurred due to inability to deliver in time, such as loss of customers, loss of market good will and financial sanctions are perhaps the most damaging effects of downtime.

In estimating the optimum level of maintenance and the degree of allocating company resources to maintenance facilities, all the above points should be taken into consideration. These would help management in determining the degree of sophistication of their maintenance programme and how much should be spent on maintenance taking into consideration the overall economy of the enterprise.

Conclusions:

Part of an enterprise's resources, in personnel and equipment, is allocated to maintenance to maximize overall enterprise performance and profit. Since the degree of allocating such resources to maintenance depends on the balance between cost of maintenance and cost incurred by the enterprise due to downtime, an accurate and factual evaluation of cost of downtime is necessary.

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