# THE FEASIBILITY STUDY
# ON
# THE ERECTION OF A JUTE-PULP MILL
# IN
# THE PEOPLE'S REPUBLIC OF BANGLADESH

(SUMMARY)

March, 1982

JAPAN INTERNATIONAL COOPERATION AGENCY

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## 1. Background of the Study

Jute is one of the most important products in the People's Republic of Bangladesh, and jute and jute goods largely contribute to the country's export.

Recently, however, there seems to be a decline indication in Bangladesh jute industry, and production of jute is tending to decrease.

Accordingly, the Government of the People's Republic of Bangladesh signifies her enterprising intention in restoration of the jute industry in the 2nd Five Year Plan of Bangladesh. Bangladesh Chemical Industries Corporation (BCIC), which is under the influence of Ministry of Industry, has planned to manufacture pulp using jute cuttings as raw material aiming at a production increase of her own pulp and paper mills, and has been interested in the feasibility of the establishment of a pulp mill.

Under the foregoing circumstances, the Government of Bangladesh requested the Government of Japan in June, 1980 to udnertake a survey on the feasibility of the pulp mill. The Japan International Cooperation Agency was entrusted by the Government of Japan with the feasibility study and despatched a survey team to Bangladesh to perform the study.

## 2. Objectives and Scope of the Study

The objectives of the feasibility study are to make a comprehensive evaluation of the viability of the Project from the technical and economic aspects and to make an examination of the possibility of the industrialization of the plan to make pulp for paper making from the jute cuttings.

To attain the above objectives, the following subjects have been investigated and studied.

(1) Present situation of pulp and paper industry
(2) Pulp market
(3) Availability of jute cuttings as raw material
(4) Mill size
(5) Mill location and site
(6) Mill process
(7) Mill facilities

(8) Mill construction
(9) Project implementation
(10) Investment cost estimation
(11) Financing plan
(12) Financial analysis
(13) Economic analysis
(14) Comprehensive evaluaton and recommendation

## 3. Study Team and Survey Schedule

### 1) Members of study team

| Name | Field |
|---|---|
| Dr. Shigeo Ueki | Team Leader |
| Mr. Hirotake Tomita | Project Engineer |
| Mr. Yoshihisa Endo | Industrial Engineer |
| Mr. Masahiro Ariga | Technologist |
| Mr. Sigeki Haginouchi | Process Engineer |
| Mr. Keisuke Takamura | Civil Engineer |
| Mr. Nobuo Ishii | Industrial Economist |

### 2) Survey schedule

The survey was made in Bangladesh from September 19 to October 7, 1981. During this time the team collected the data and information required, engaged in discussion with Bangladesh officials concerned and carried out survey of the candidate mill sites.

## 4. Outline of the Project

### 1) Availability of jute cuttings

Jute fiber peeled off by the growers is retted and dried before being shipped to the market. A portion of the above is sent to the jute pressing and baling centres where the bottom part of jute is cut off. The cutoff parts are called as jute cuttings, a portion of which is exported and the remainder is stocked.

The stocked jute cuttings is estimated to amount to about 100 thousand tons annually, of which about 50 thousand tons of jute cuttings will be utilized as raw material for this Project.

2) Demand and market of pulp products

Bangladesh is importing long-fibred wood pulp. The imports is increasing and is foreseen to reach 17,000 tons by 1986.

Bangladesh is also exporting pulp to the neighbouring countries. It is expected to increase export of pulp if the quality of pulp is good.

The pulp to be produced by this projected mill can substitute for the imported wood pulp and the remainder will be exported.

3) Mill capacity

Judging from availability of raw material and demand forecast of pulp, the production capacity of pulp is selected to be 25,000 tons annually.

4) Mill site

Taking availability of raw material, natural gas as fuel, transportation, etc. into consideration, Bhairab Bazar (70 km north-east of Dacca) was selected as the most suitable mill site. The mill will require 7.35 ha. area.

5) Mill process

Soda process was selected as the most suitable pulping method. In soda process, the cooking yield is rather lower than that in the sulphate process. This is caused by the decomposition of carbohydrate that occurs simultaneously with the delignification in cooking operation. This may be solved by addition of quinone compounds, which accelerate delignification and eliminate decomposition of carbohydrate.

6) Major facilities

Major facilities in this pulp mill are as follows:

Raw material handling

Cooking
Pulp washing
Pulp screening
Pulp bleaching
Pulp drying
Chemical preparation
Chemical recovery
Power generation
Mill water treatment
Mill effluent treatment
Buildings and housings

7) **Mill construction and operation**

Pulp production and power generation facilities are installed on a barge and the other on land.

Construction period is expected to be 39 months including 3 month test trial. When the contract becomes effective on October 1, 1982, commercial operation of the mill will start on January 1, 1986. The mill is designed at 3-shift 4-change operation and the number of annual operating days is to be 330. The number of labourers and personnel required will be 808 in total.

## 5. Investment Cost and Financing Plan

(1) Terms of contract

Turn-key lumpsum basis

(2) Exchange rate of foreign currencies

USD1 = ¥230 = Tk.19

(3) Time of estimation of investment cost

September 1, 1981

(4) Summary of investment cost

(1,000 USD)

| Items | Foreign Currency | Local Currency | Total |
|---|---|---|---|
| Plant Cost | 54,939 | 10,809 | 65,748 |
| Land Acquisition | 0 | 137 | 137 |
| Preoperation Cost | 999 | 307 | 1,306 |
| Sub-total | 55,938 | 11,253 | 67,191 |
| Interest during Construction | - | - | 7,259 |
| Initial Working Capital | 1,757 | 2,501 | 4,258 |
| Total | | | 78,708 |

(5) Capital structure

Equity capital: 40%

Long-term loan: 60%

(6) Long-term loan

Interest: 11.5% annual

Repayment: 10 times/10 years repayment of principal by equal installment

Grace period: 3 years after starting of mill operation

## 6. Financial Analysis

### 1) Premise

(1) Project life: 15 years

(2) Basis of cost and price: Cost and price in 1986

Cost and price in 1986 are calculated taking price escalation (annual 10% for manpower cost and annual 7% for the other) on the cost and price in 1981.

(3) Selling price of products: USD828/ton

(4) Production ratio

| | |
|---|---|
| 1st year: | 76% |
| 2nd year: | 92% |
| 3rd year: | 96% |

(5) Depreciation

| | |
|---|---|
| Machinery and equipment: | 15 years |
| Civil and buildings: | 40 years |
| Preoperation cost: | 5 years |
| Interest during construction: | 5 years |

Straight-line depreciation is applied.

(6) Corporate tax

| | |
|---|---|
| Tax holiday: | 8 years after starting of mill operation |
| Tax rate: | 55% |

2) **Production cost**

Production cost per ton of product was calcualted as follows:

| | |
|---|---|
| 1st year: | USD955.5 |
| 3rd year: | USD814.5 |
| 8th year: | USD652.6 |
| 15th year: | USD516.8 |

3) **Internal rate of return**

| | |
|---|---|
| IRROI (before tax): | 10.54% |
| IRROI (after tax): | 8.95% |
| IRROE (before tax): | 9.55% |
| IRROE (after tax): | 6.56% |

## 7. Economic Analysis

### 1) Premise

(1) Shadow rate

| | |
|---|---|
| Foreign currency: | 1.30 |
| Skilled worker: | 1.50 |
| Unskilled worker: | 0.00 |
| Jute cuttings: | 0.80 |
| Natural gas: | 1.50 |
| Other local materials: | 1.00 |

### 2) Economic internal rate of return

13.18%

3) Implementation of the Project enables to save and obtain about USD339 million of foreign currency.

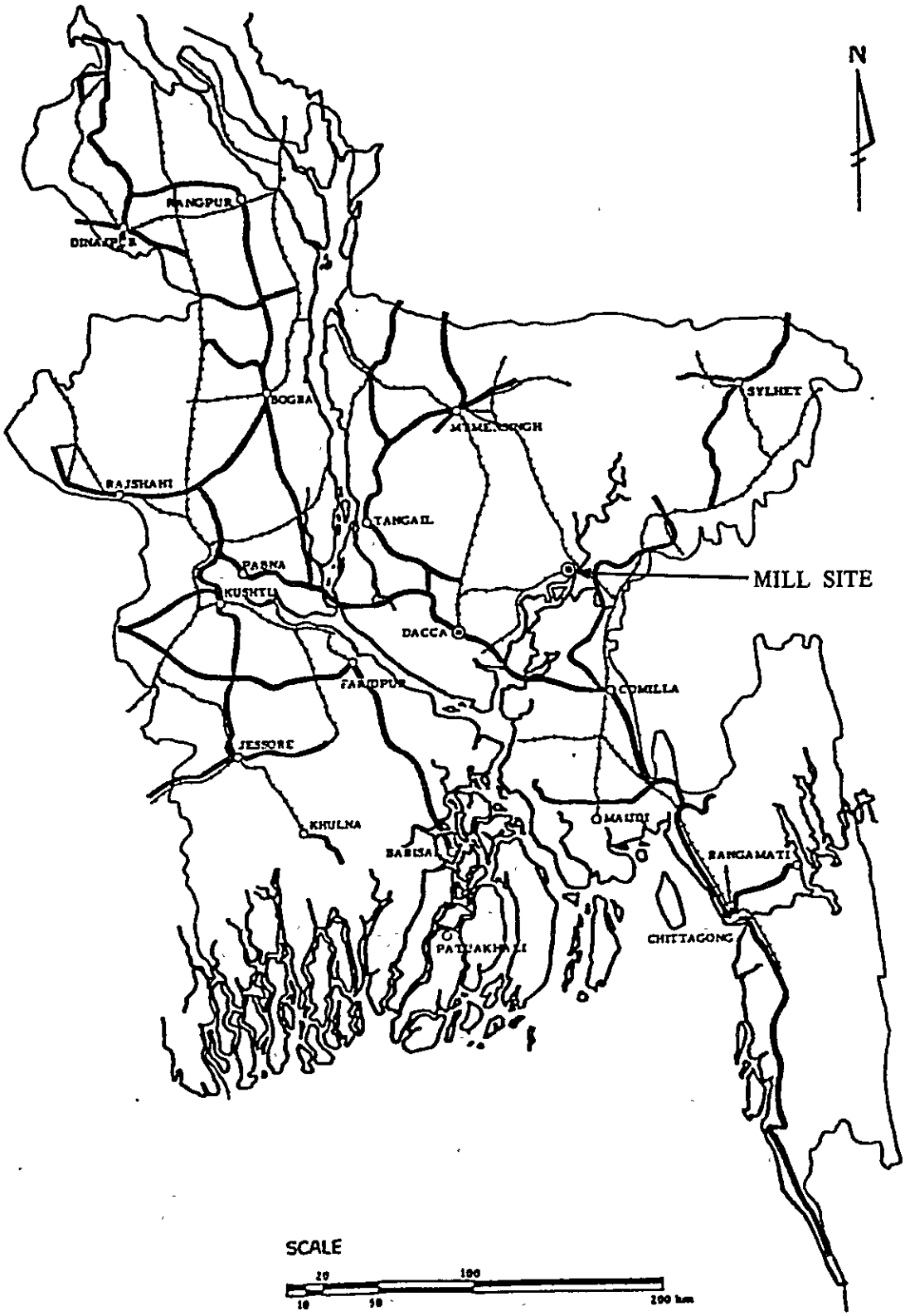
4) Furthermore, the Project brings increase of employment, economic effect to the community, extended effect tot he related industries, etc.

## 8. Conclusion and Recommendation

1) This Project is considered feasible from the technical, financial and economic view-points.

2) This Project accordingly should be undertaken as early as possible.

**BANGLADESH**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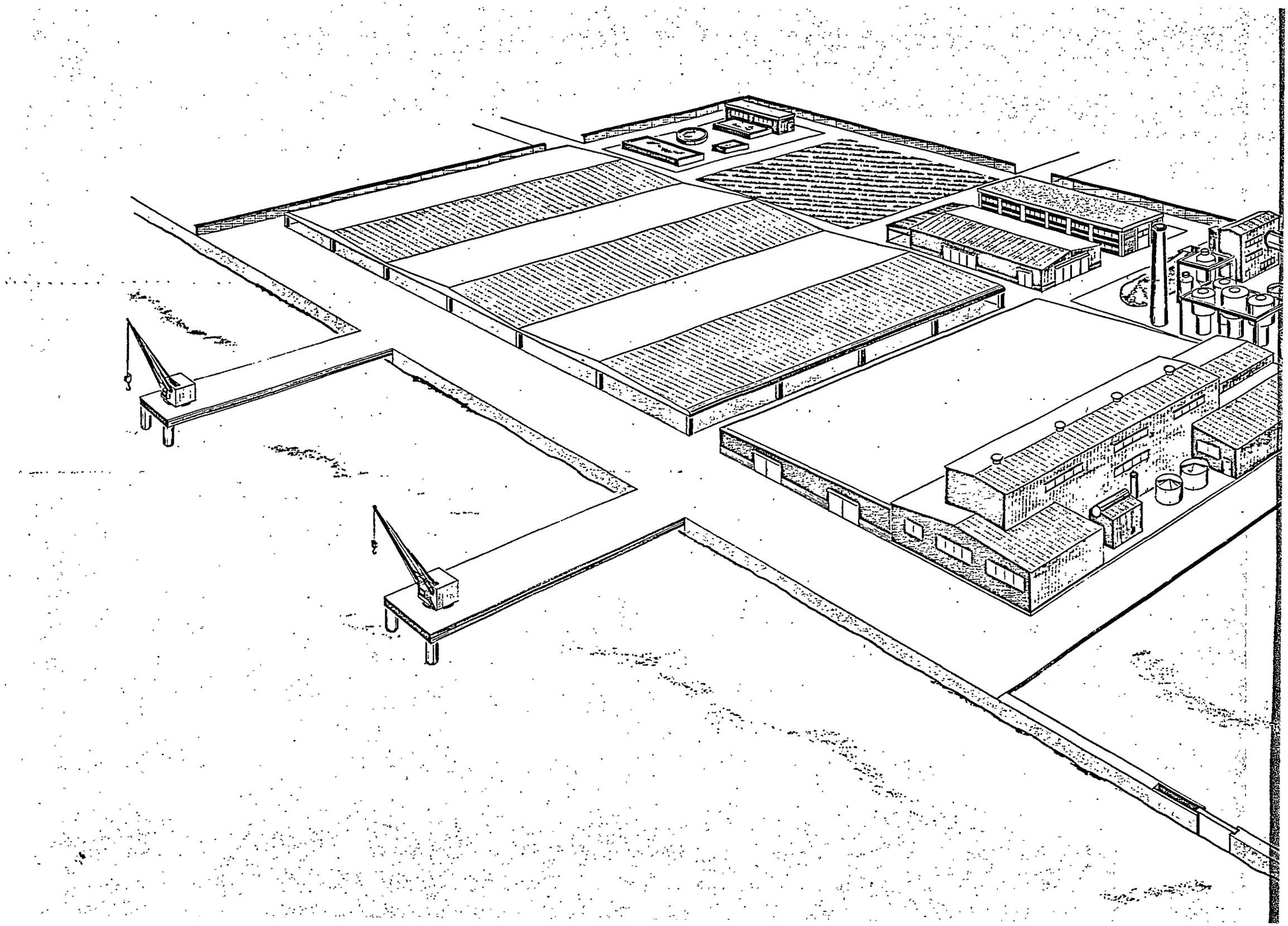

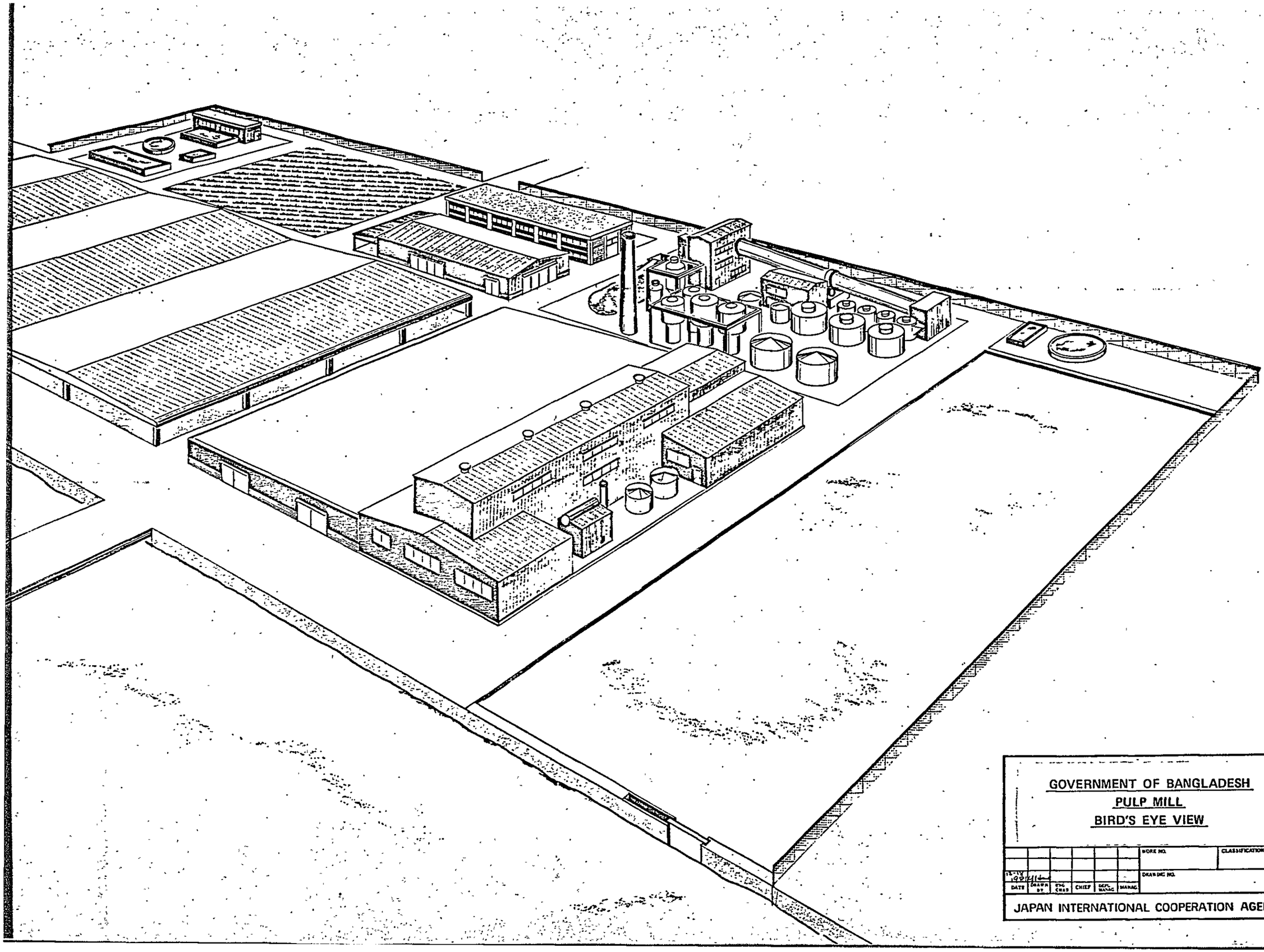

GOVERNMENT OF BANGLADESH

PULP MILL

BIRD'S EYE VIEW

| | | | | | | WORK NO. | CLASSIFICATION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 15-12-92 | | | | | | DRAWING NO. | |
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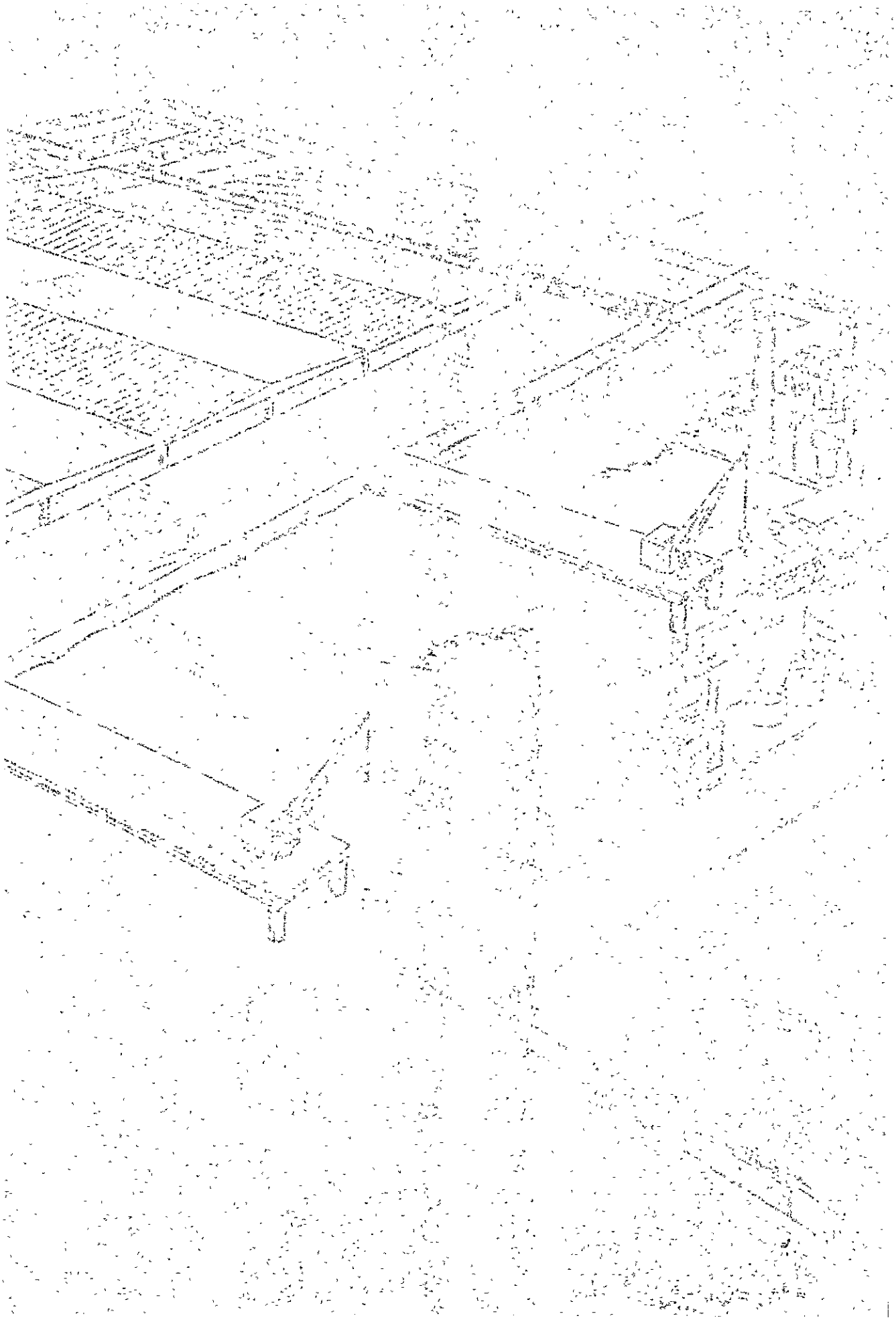

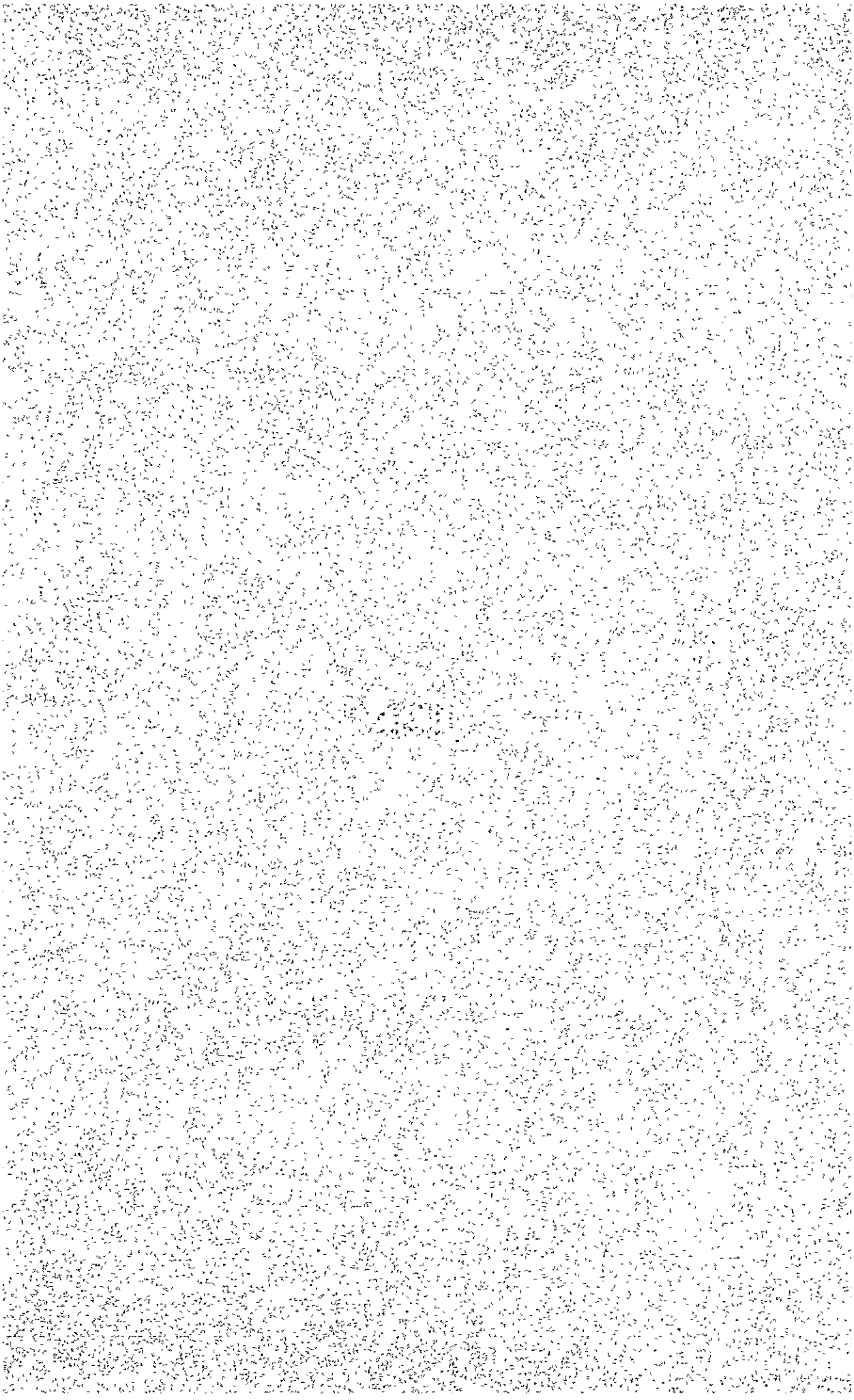

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