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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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PROJECT PLANNING IN FURNITURE AND JOINERY INDUSTRIES[1/]

by

Antero Liusvaara
Jaakko Pöyry & Co. Consulting Engineers
Helsinki, Finland

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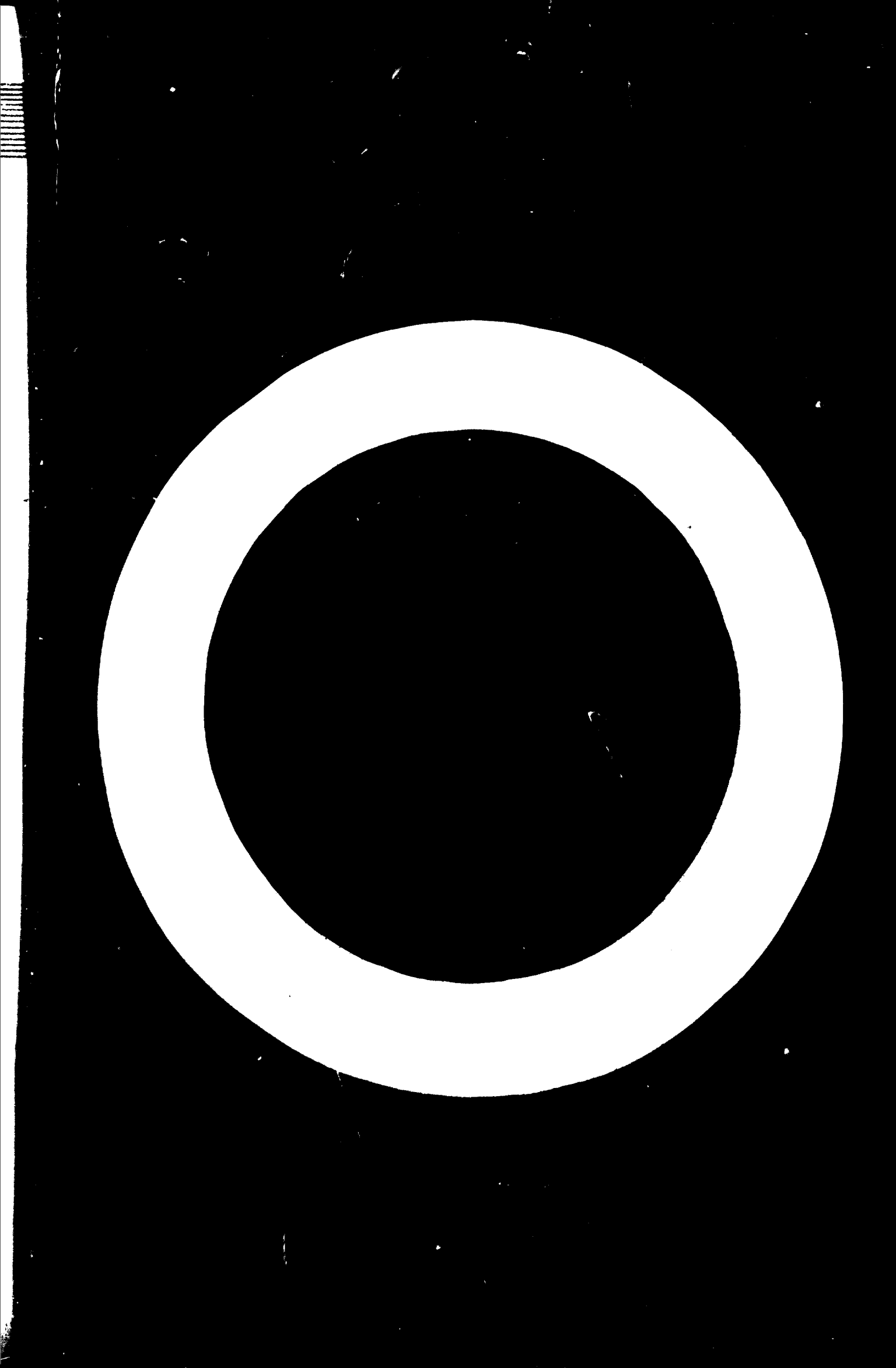

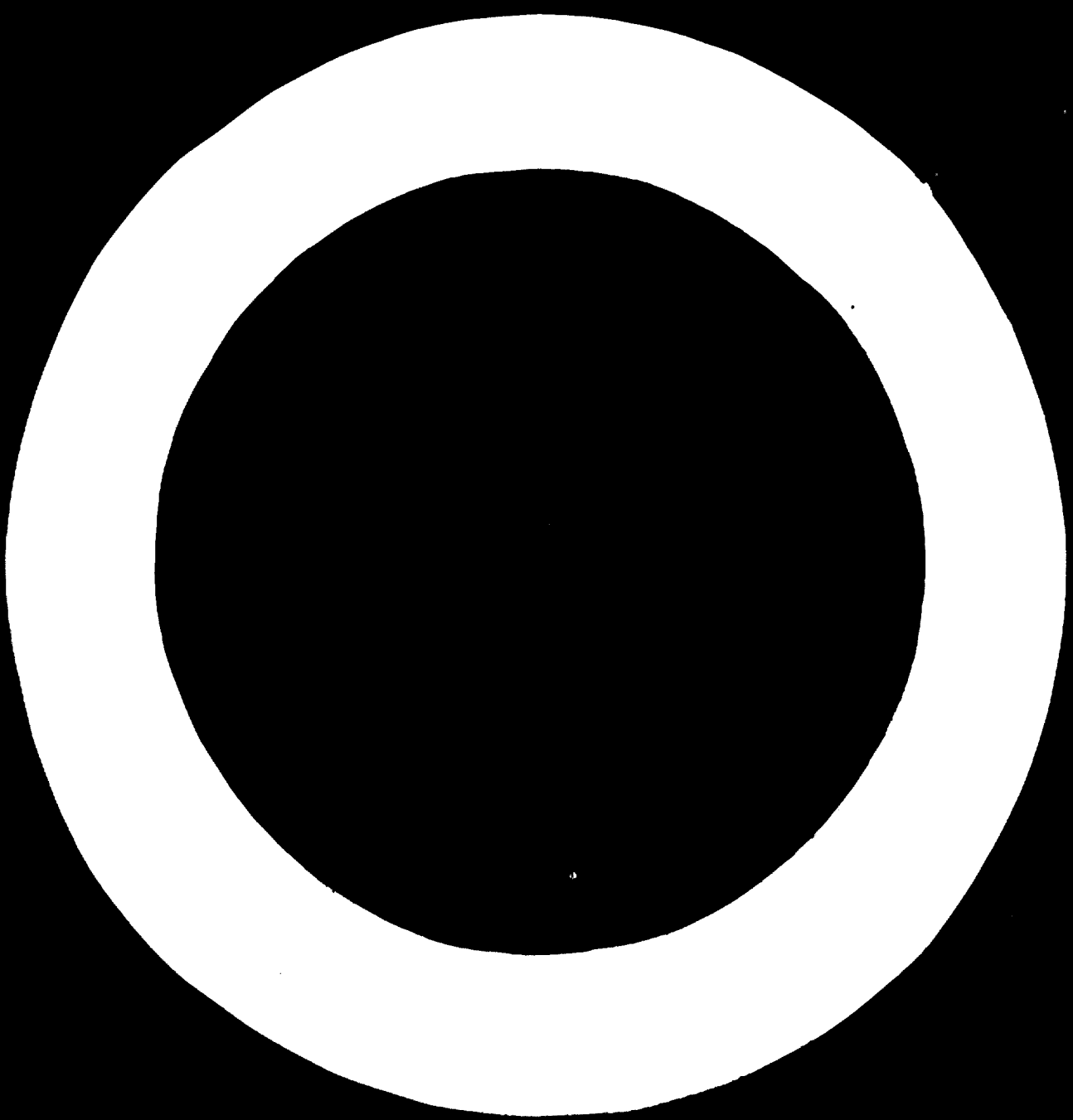

Industrial Project Planning is a long-range activity or, rather, a series of activity groups in their various stages. Project Planning can be divided into two main phases according to time, namely, one before and one after the investment decision. The subject of this presentation being the planning of a project in an industry which has been defined in advance, I will not in this connection deal with preliminary studies, but will assume that the the preliminary planning can be started by doing a so-called Prefeasibility Study of the industrial plant in question.

A. PREFEASIBILITY STUDY

The purpose of the Prefeasibility Study is to present the technical and economic conditions of projects identified in earlier studies prepared by the furniture and joinery industry. The economic evaluation of alternative projects is based on a detailed market projection, a reasonably complete raw material inventory, and a description of the production programs and processes. The economic calculations provide a basis for establishing a priority between the identified mill project alternatives, indicating their approximate profitability. The economic risks involved in the execution of the projects are indicated through sensitivity analyses.

The Prefeasibility Study is composed of the following parts:

1. Market Survey

The market survey should include a description of the historical development of production, trade, and consumption in the furniture and joinery industry. Based on this material, a projection is made concerning domestic demand, future production, and foreign trade. Depending on the supply and demand situation, selected export markets are covered. The analysis includes such factors as prices, quantities, grades as well as incentives and disincentives in foreign trade. The assessment of the competitive strength

of the project is the most critical task of the survey. The survey should give a complete breakdown of the prospective markets of the projected mill, stating total sales to each area, sales prices, market shares, and competitive position. The value of the project to the national economy should be pointed out in quantitative terms (export earnings/import substitution), since this will be an important issue when seeking financing.

2. Raw Material Resources

The resource inventory is reasonably complete, at least the total volume will not be changed anymore. Frequently, results of special investigations related to raw material availability (e.g., present consumption) are also accessible. Similarly, the availability of veneer and wood-based sheets has to be carefully investigated. (Above all, attention should be paid to the use of smaller and shorter wood.) The results of this survey will serve as a basis for the decisions to be made concerning the alternative possibilities of raw material utilization, and concerning the possible location of the contemplated industrial units. The salient factors determining or limiting the supply of raw materials are presented and evaluated in fairly great detail.

3. Technical Description

3.1 Mill Site Study

The number of mill sites will be confined to two or three. The relevant site factors should be subjected to a closer examination than in preliminary studies. The purpose of the study is to provide a basis for a technical and an economic comparison of the sites. The latter comparison requires an estimation of the unit prices of raw materials, power, and services. The impact of the transportation of wood raw materials on the selection of the final mill site is considered. The maximum loads and capacities of transportation elements, such as road connection, ports, and existing equipment, are evaluated in order to calculate the unit costs of transportation.

Furthermore, it is necessary to make suggestions as to how the investment costs for infrastructure, e.g., roads, ports, and community development, should be shared by the company and the government.

3.2 Production Program and Process Description

This chapter is intended to give all necessary technical information required for the establishment of priorities between alternative projects, and thus to serve as a basis for a Feasibility Study. The programs should constitute a rational synthesis of the information compiled in the previous chapters. Types of mills, end products, and capacities are specified. Block diagrams, process flow sheets, lists of major equipment, general and departmental layouts are presented. A brief written description is called for in order to tie the elements together and to give the reader, who may be a potential investor, a clear concept of the process and the production lines. It is understood that only the key items of the process are studied and that the scope is just adequate for a comparative economic analysis. The production program should define, besides the production rates of intermediate and end products and their specifications, also the operating ratios of the various production lines during the first years of operation.

4. Economic Calculations

4.1 Investment Requirements

Based on the technical description, the investment requirements by department or function are determined taking into account regional factors (coefficients or data collected for the project). The investment estimates are usually based on cost data obtained from the records, and sometimes specifications for the main machinery can be given.

The purpose of the investment estimates is to determine the total investment requirements of the plant at a given cost level. If required, the investment requirements are split over a number of periods or divided into

different groups for depreciation purposes. Furthermore, the assumptions regarding financing are considered.

4.2 Production Cost Calculation

The annual production costs are calculated on the basis of the production program and the process planned. Raw materials, packing materials, cost of energy and fuel are then taken into account as variable costs. Wages, maintenance and administration costs, again, are treated as fixed costs.

4.3 Profitability Calculation and Financial Statements

The profitability calculation is done using the discounted cash flow method. Thus, the economic life of the project is usually considered to be 15 years, and the annual earnings are calculated for this period. The discounted cash flow rate is determined before and after taxes both on total capital invested and on equity. A sensitivity analysis is performed for the assessment of the most critical profitability determinants.

B. FEASIBILITY STUDY

The Feasibility Study should contain all information required for making the investment decisions. Consequently, the report should convince potential investors that the project is technically, economically and financially viable and, if necessary, that the investment climate of the country satisfies potential foreign participants.

The comparison of feasible alternatives has been carried out in earlier studies, and at this stage only one basic solution is proposed. The work is performed with specific investors in mind, and thus it also considers their concepts of the project. In other words, the presentation follows the rifle approach.

In principle, the structure of the Feasibility Study follows that of the Prefeasibility Study, the difference being the depth of the presentation. Consequently, the report follows the same list of contents as the Prefeasibility Study.

C. EXECUTION OF PROJECT

On basis of the information contained in the Feasibility Study, an investment decision is made, whereafter the planning of the execution of the project proper can start. This phase is generally commenced by listing the work necessary for the execution of the project. In this connection, it should be emphasized how important it is for the execution of the whole project that the description of the various work phases be as accurate as possible. On the basis of the work description, a time schedule for the whole project is prepared with the various work groups programmed in chronological order. The total time schedule is thereafter split into sections according to the block diagram of the mill, and these sections, again, are divided into smaller and smaller sections and tasks. The more specified the time schedule already at an early stage, the easier the supervision of the execution of the project, and the smaller the amount of costly delays. In the working out of a schedule for the execution of a project of such magnitude as, for instance, a furniture or joinery plant, the PERT network should be used. Great attention should be paid already in the early stages of the project to the so-called critical times, i.e., to the amounts of time required for the execution of the work sections which, when exceeding the schedule, may cause the delay of the whole project.

For planning, machine procurement, etc., the plant should be divided into departments according to production. Such departments in a furniture and joinery plant are, for instance,

- mill site area
- reception and intermediate storage of sawn goods
- drying of sawn goods

- woodworking department
- pressing department
- assembly and mounting department
- surface treatment department
- product storage and dispatch department
- power generation
- electrical equipment and instrumentation
- heating, water, air conditioning and compressed air systems
- social facilities
- knife grinding and maintenance space

If we examine the work required to execute the project, it can been seen that the various steps can be placed in chronological order, although some of the activities are simultaneous and their duration may vary. In view of the scope of the matter, we have to content ourselves here with the following listlike presentation, which in the main follows the basic information given in the Feasibility Study:

- Soils analyses
- Technical specification of machines and equipment needed for the process
- Preparation of tender requisitions and their dispatch to vendors
- Preliminary block diagrams
- Final mill site drawing
- Specification of construction methods for plant buildings
- Comparison of tenders for machines and equipment, and negotiations with vendors concerning technical and commercial details of tenders
- Commencement of electric and instrumentation layout
- Preliminary investment budget
- Final preparation of block diagrams and preparation of construction cost estimate
- Purchase of main machinery and equipment

- Process description and preparation of department layouts
- Preparation of requisition for building subcontracts
- Checking of cost estimates for buildings
- Start of construction

After this, the technical details are checked during the construction phase.

Besides the actual technical engineering, plans for acquiring personnel and, if necessary, for their training, have to be initiated from the very start of the project. The training period has to end when the erection phase starts, so that the employees may participate in the erection together, e.g., with representatives of the machine suppliers. Thus, they can quickly and most efficiently acquire the special knowledge of the work, the machines, and the equipment that they will need when the mill is in operation.

On completion of the plant buildings, the erection of machinery and the general installation of electric, water, heating, and air conditioning systems for the plant building are started. The installation of the compressed air system and of sprinkler and other fire protection equipment is also started. When the erection of machinery is nearing completion, the installation of electricity and compressed air for the machines as well as the installation of chip and dust evacuators can be started.

When the erection phase has been completed, a mechanical trial run and trimming of the machinery and the equipment is performed at the mill. Thereafter follows the trial run with raw materials, and the actual production can gradually start.

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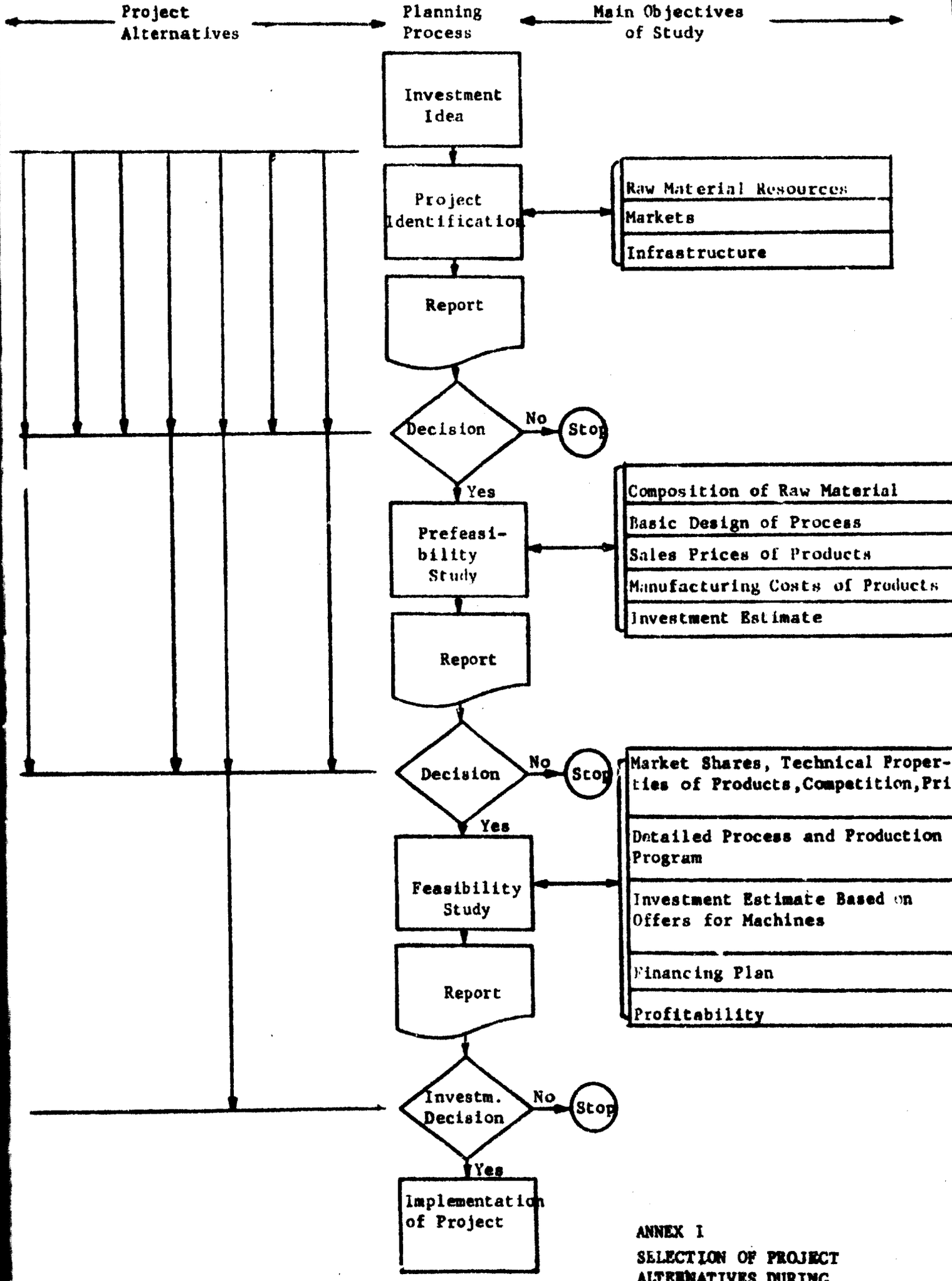


ANNEX I

SELECTION OF PROJECT ALTERNATIVES DURING INVESTMENT STUDIES

ANNEX II TYPICAL CONTENTS OF PREFEASIBILITY STUDY

1. OBJECTIVES AND SCOPE OF STUDY
   - 1.1 Terms of Reference
   - 1.2 Justification of Project

2. SUMMARY
   - 2.1 Conclusions
     - 2.1.1 Suitability of Fibrous Raw Material Resources
     - 2.1.2 Production Program and Processes Proposed
     - 2.1.3 Economic Aspects (markets and marketing, investment requirements and profitability, analysis of risk)
   - 2.2 Recommendations, covering the following types of items:
   - 2.3 Time Schedule for Project Implementation (Mini-PERT)

3. CULTURAL, POLITICAL, AND ECONOMIC BACKGROUND
   - 3.1 Geography, Climate, Population
   - 3.2 Education, Social Institutions
   - 3.3 Political System
   - 3.4 Economy
     - 3.4.1 Structure and Growth
     - 3.4.2 Foreign Trade
     - 3.4.3 Economic Integration
     - 3.4.4 Development Policies and Trends

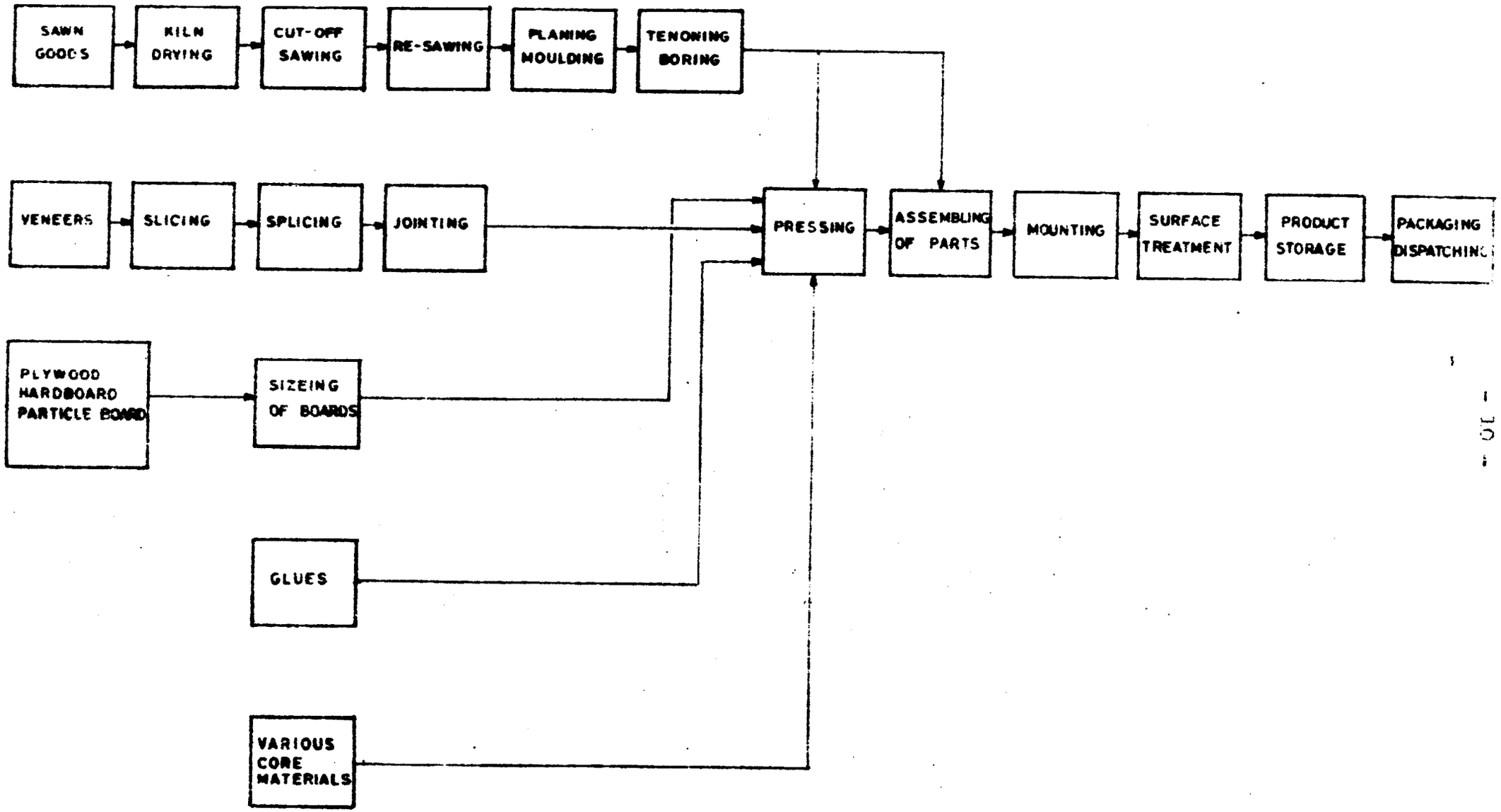
4. MARKETS
   - 4.1 Projected Domestic Demand and Market Structure
     - 4.1.1 Quantities, Grades, Prices
     - 4.1.2 Competitive Situation and Market Structure
     - 4.1.3 Import Substitution
   - 4.2 Export Markets
     - 4.2.1 Quantities, Grades, Prices
     - 4.2.2 Incentives and Disincentives
     - 4.2.3 Export Earnings

5. RAW MATERIAL RESOURCES
   - 5.1 Forest Resources
     - 5.1.1 Natural Forests
     - 5.1.2 Plantations
   - 5.2 Other Raw Materials
   - 5.3 Logging and Transport of Timber

6. TECHNICAL DESCRIPTION
   - 6.1 Mill Sites
   - 6.2 Production Program and Process
     - 6.2.1 Program
     - 6.2.2 Mill Descriptions
     - 6.2.3 Material Handling at Mill
     - 6.2.4 Heat and Power, Water and Effluent
     - 6.2.5 Personnel Requirements and Training

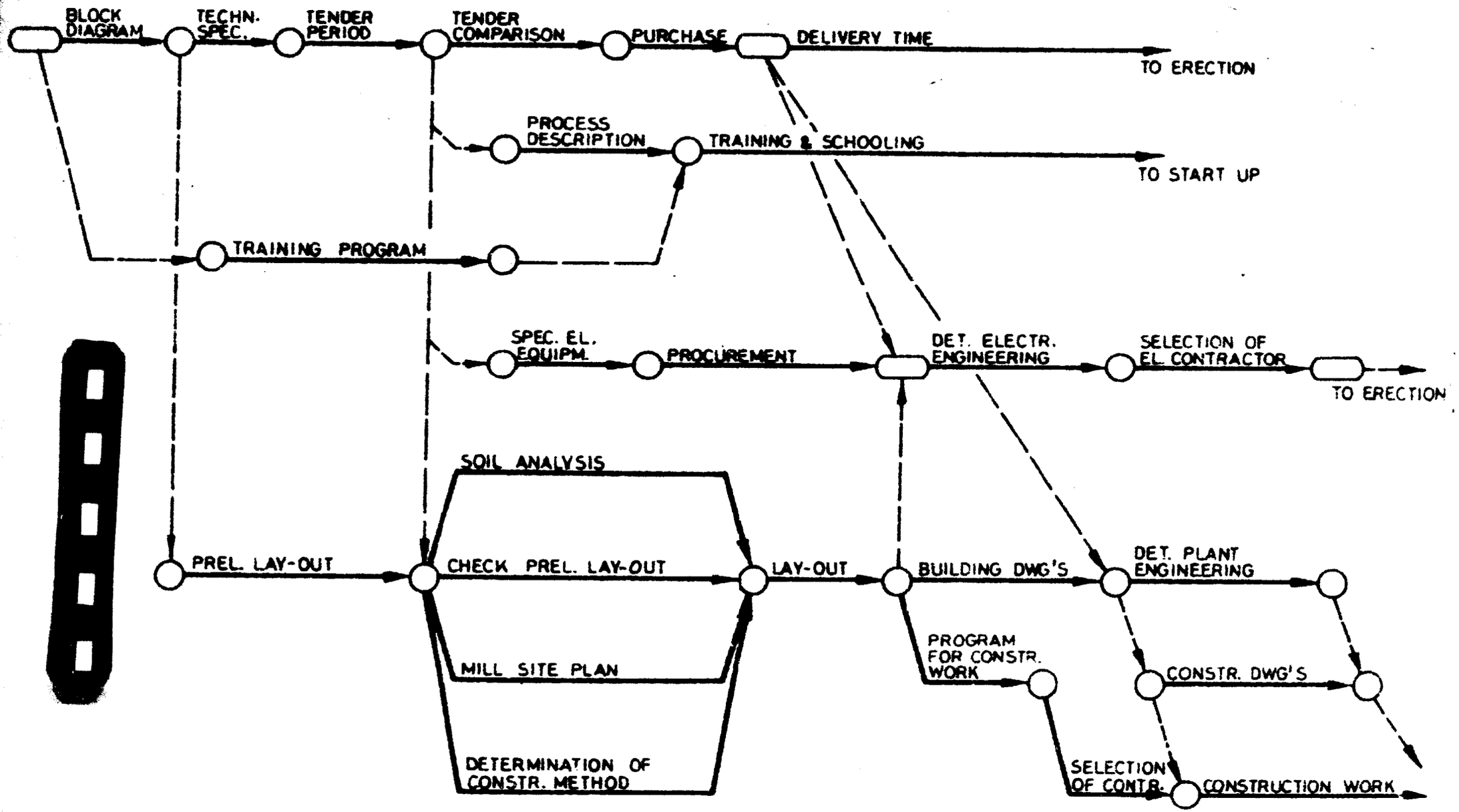
7. ECONOMIC CALCULATIONS
   - 7.1 Investment Requirements
   - 7.2 Production Costs
   - 7.3 Profitability and Sensitivity Analysis, Cash Flow Statement
   - 7.4 Financing Budget and Pro-Forma Balance Sheets
   - 7.5 Economic Evaluation

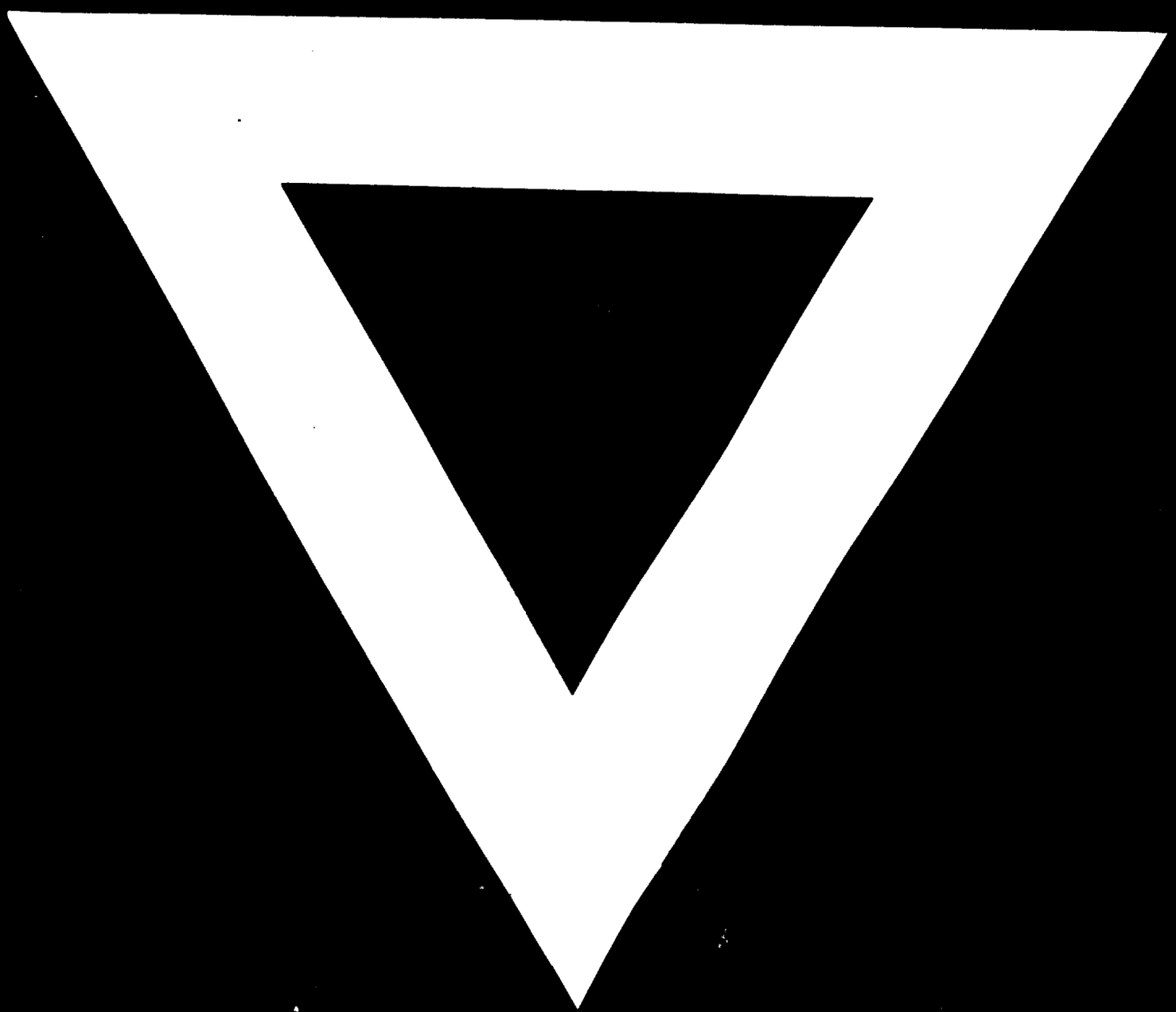
8. LEGAL ASPECTS



PROCESS FLOW
JOINERY FACTORY

ANNEX IV


BLOCK DIAGRAM
TECHN. SPEC.
TENDER PERIOD
TENDER COMPARISON
PURCHASE
DELIVERY TIME
TO ERECTION
PROCESS DESCRIPTION
TRAINING & SCHOOLING
TO START UP
TRAINING PROGRAM
SPEC. EL. EQUIPM.
PROCUREMENT
DET. ELECTR. ENGINEERING
SELECTION OF EL. CONTRACTOR
TO ERECTION
SOIL ANALYSIS
PREL. LAY-OUT
CHECK PREL. LAY-OUT
LAY-OUT
BUILDING DWG'S
DET. PLANT ENGINEERING
PROGRAM FOR CONSTR. WORK
CONSTR. DWG'S
MILL SITE PLAN
SELECTION OF CONTR.
CONSTRUCTION WORK
DETERMINATION OF CONSTR. METHOD



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