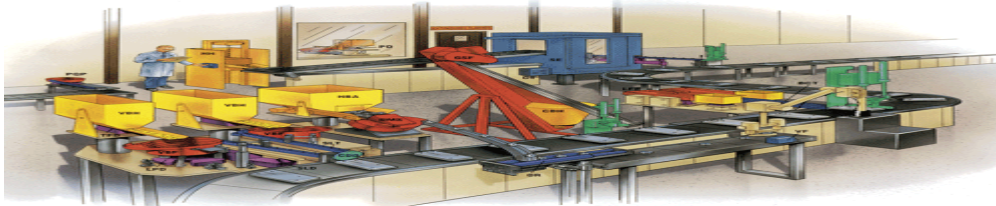
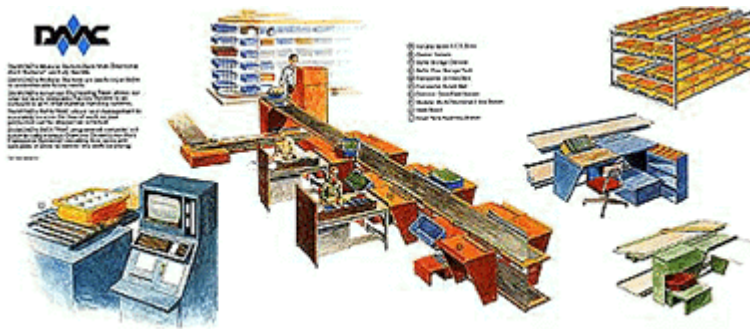


**JD GRAY ASSOCIATES
MANUFACTURING PRODUCTIVITY CONSULTANTS**

**MANUFACTURING AUDIT
OF
SEMI-AUTOMATION MACHINERY**



MATERIALS HANDLING EQUIPMENT



DIRECT LABOR CONTROLS

**METHODS AND STANDARDS, SHORT-INTERVAL-SCHEDULING,
LABOR REPORTING, PACED ASSEMBLY, PACED ASSEMBLY WITH ROBOTICS,
PICK AND PACK SYSTEMS & INDUSTRIAL INCENTIVES**

-PROPOSAL-

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MANUFACTURING AUDIT

PROPOSAL

I. Purpose

The purpose of this proposal is to present to your management comprehensive assistance in the evaluation of your company's current status regarding semi-automation machinery, materials handling equipment and direct labor controls for the profitable manufacturing of your company products of the highest degree of reliability, with optimum lead times and unit cost, within the space confines the current facility for the volume levels and efficiency of operations projected.

II. Scope

A. Survey

1. General

- a) Review and understand company objectives and short and long-term goals, as they relate to program areas defined
- b) Review and understand company product line and sales forecast

2. Specific

- a) Existing manufacturing facility building plan auto cad drawings including building walls, square footage, column location, utilities locations (will need local power and air pressure requirements) for the listed departments:
 - 1) Stockroom Area
 - 2) Fabrication Department
 - 3) Assembly Department
 - 4) Finished Goods Department
- b) Analyze, review and evaluate, by application of sound engineering/management techniques, the fabrication and assembly requirements at various anticipated production levels for space, manpower, shift and machine utilization. Operational assessment including materials handling alternatives and productivity areas of semi-automation and direct labor control systems will be closely scrutinized within the following areas:

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1) Component Prep Area, Work-In-Process, Finished Goods and Stockroom

- (a) Handling, dispatch and stocking components in the most cost effective manner.
- (b) Live Storage and Retrieval Systems

(1) Horizontal, Revolving Parts Carousel



(2) Horizontal, Revolving Skid Carousel



(3) Vertical Revolving Parts Carousel

(4) Order Picking Vehicle servicing stationary shelving

- (c) Electrical and/or Mechanical Aisle Savers
- (d) Live and Conventional Skid Rack Application
- (e) Component part picking methodology
- (f) Shelving and Flow Rack Application
- (g) Use of cubic capacity and space optimization
- (h) Programmed and computer controlled robot picking and replenishment of tote trays
- (i) Sortbars and Lighttrees



- (j) Material Flow
- (k) Storage and queue requirements
- (l) Staffing and organization chart

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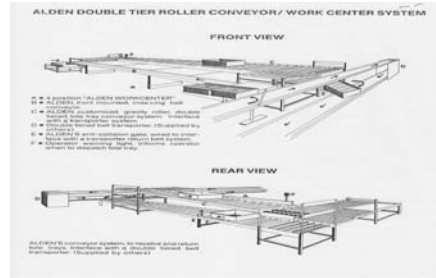
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2) Fabrication, Subassembly, Final Assembly, Quality Control and Packaging Operations

(a) Paced Assembly Conveyor Applications

(1) Work Center



(2) Rotary with or w/o pick & place robot



(3) Straight Line with or w/o pick & place robot



(4) Overhead Monorail



(b) Bench-Progressive Line Applications

(c) Supply, Storage and Interface with prior and subsequent operations

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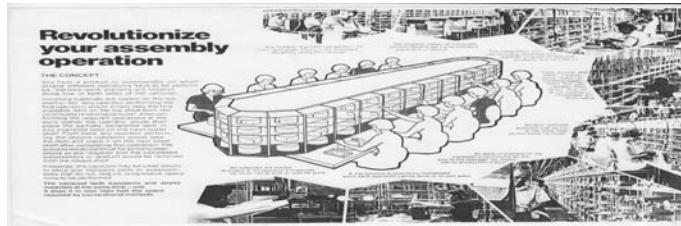
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(d) Transporter Conveyor System Applications



(e) Progressive Assembly Carousel Applications



(f) Guided Vehicle Applications

(g) Work-In-Process Computer Control

(1) Lot Tracking System

(2) Inventory System

(h) Computer Interface with total conveyor network feasibility

(i) Automatic Cleaning

(j) Production Flow

(k) Staffing identification and organization chart

(l) Machinery Identification and Costing

(1) Work benches

(2) Shelving

(3) Materials Handling Systems

(4) Fabrication Machinery will be identified and costed



Furnace

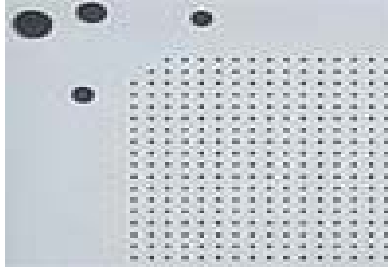
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(5) Assembly Systems will be identified and costed



Precision Fixturing



Vibration Tooling

B. Report and Recommendations

1. From the accumulation and analysis of data obtained from the survey, a comprehensive report will be submitted and reviewed with the your management. It will contain:
 - a) Productivity Recommendations
 - (1) Work Station
 - (a) Methodology
 - (b) Manual vs Semi-Automatic Machinery Quotations/Cost
 - (c) Fixturing / Tooling Drawings
 - (2) Industrial Engineered Standards



- (3) Paced Assembly
- (4) Short-Interval-Scheduling
- (5) Labor Reporting
- (6) Work Flow
- (7) Industrial Incentives

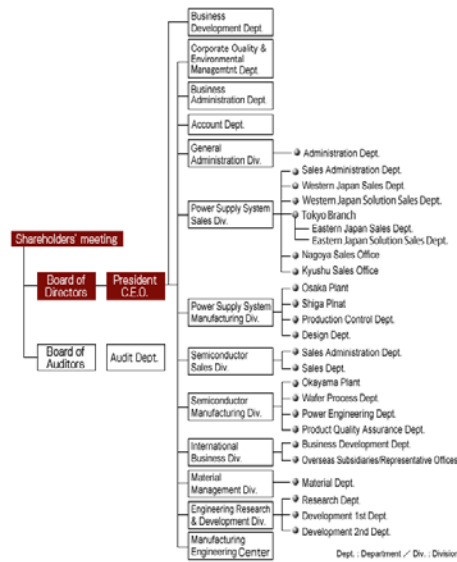
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- b) Materials Handling Recommendations and Production Process Alternatives for fabrication and assembly
- c) Order Management Recommendations for Material/Product Tracking, Planning and Scheduling.
- d) Inventory and WIP storage requirements.
- e) Modular Program Phases within selected alternative.
- f) Implementation actions required with suggested personnel and responsibilities.
- g) Customized Layout of recommended alternative.
- h) Installation Pert Chart.
- i) Storage Rack and/or Conveyor System, Machinery and Miscellaneous specifications and Quotations.
- j) Projected Staffing and Organization Chart Recommendations.



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III. Survey and Report

A. Consulting Activity, Fees and Expenses

	FABRICATION (stockroom & w-i-p)	ASSEMBLY (stockroom, w-i-p & finished goods)	<u>TOTAL</u>
1. On-site Data Collection - Days	5	5	10
2. Departmental Sizing based On five year sales forecast - Days	5	10	15
3. Machinery & Materials Handling Equipment Specifications/Quotations - Days	5	15	20
4. Building Plan Auto Cad Drawings - Days	3	7	10
5. Report Preparation, alternative development including phased implementation/costing - Days	7	15	22
6. Report and Layout Presentation - Days	→	3	3
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Total Days	25	55	80
Total Consulting Fee	\$25,000	\$55,000	\$80,000

(Actual On-Site Expenses to be billed separately)

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Quotation Number	Q1867	Q1868	Q1869
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B. Payment Schedule

1. 20% upon approval, Purchase Order And Irrevocable Letter of Credit	\$5,000	\$11,000	\$16,000
2. 20% end of 1 st month	\$5,000	\$11,000	\$16,000
3. 20% end of 2 nd month	\$5,000	\$11,000	\$16,000
4. 20% end of 3 rd month	\$5,000	\$11,000	\$16,000
5. 20% upon report presentation	\$5,000	\$11,000	\$16,000

IV. AGREEMENT:

- A. JD Gray Associates shall submit detailed service fee invoices to company. Said invoices shall contain a detailed itemization of the date(s) on which services were provided and a description of tasks completed during the period with respect to which the invoice is submitted.
- B. Each compensation payment made by company to JD Gray Associates shall be within 10 days.
- C. Company Property – JD Gray Associates agrees that any confidential information furnished by company to JD Gray Associates or acquired by JD Gray Associates during the period in which JD Gray Associates is retained by company is and shall remain the sole and exclusive property of company and shall be placed in the hands of company by JD Gray Associates upon termination of this Agreement including any copies made thereof.
- D. Confidentiality – JD Gray Associates agrees that at no time, either during or after the period in which JD Gray Associates is retained by company shall JD Gray Associates utilize or disclose to any third party any of the confidential information of company.

Date: _____

Purchase Order Number: _____

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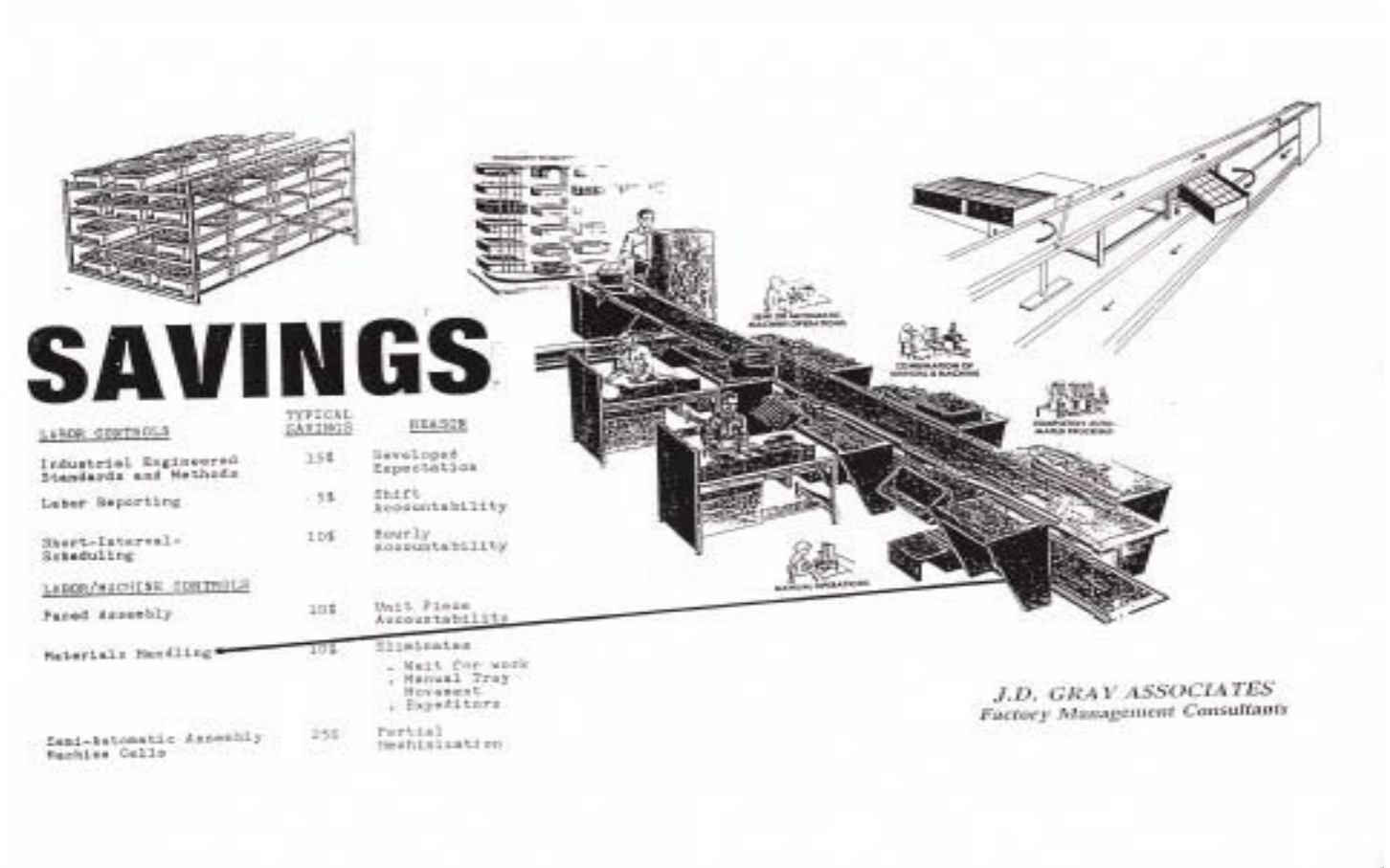
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V. IMPLEMENTATION

- A. Implementation is separate from the manufacturing audit on a cost and activity basis.
- B. With company personnel, participate in planning, scheduling and method determination of approved alternative program.
- C. Perform implementation elements as outlined and agreed upon in survey and report including: complete final equipment specifications, time study, work station balance, visual aids and task instructions, tote and shelf part patterns, routing sheets and picking lists, traffic and station leveling, training and installation to ensure attainment of maximum benefits and return-on-investment.
- D. Perform follow-up.



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