

MATERIAL MANAGEMENT

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Objective

Recognize professional issues such as material management process.

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Agenda

- Material Management Process
- Order
- Approval Process
- Fabrication & Delivery Process
- Installation Process
- Material Types

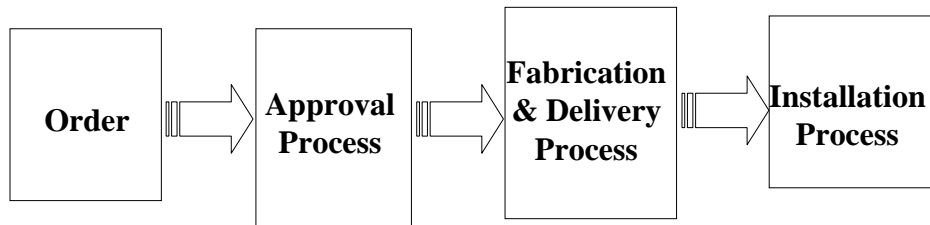
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Introduction to Material Management

- What is material management?
 - Determining what materials are needed
 - Receiving quotes from suppliers
 - Developing purchase orders
 - Ordering materials
 - Managing the delivery of materials
 - Identifying storage locations for materials

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Material Management Process



Phases of Material Life Cycle

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Selecting Materials

- Review quantity takeoff (BOM) for:
 - Quantities of materials
 - Special or long-lead-time materials and equipment
 - Machinery needed to install materials and equipment
 - Potential substitutions

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Selecting Suppliers

- Most contractors have established relationships with a few suppliers
- Review past delivery performance
- Review pricing
- Understand quality of materials
- Select best suppliers using above criteria

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ORDER

- When the contract for construction is awarded, the contractor immediately begins awarding **SUBCONTRACTS** and preparing **PURCHASE ORDERS** for the various parts of the work.
- The subcontract agreement defines the specialized portion of the work to be performed and binds the contractor and subcontractor to certain obligations.
- The subcontractor, through the agreement, must provide all materials and perform all work described in the agreement.
- See Appendix G for AGC *Standard Subcontract Agreement*

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ORDER

- All provisions of the agreement between the owner and contractor are made part of the subcontract agreement by reference.
- Article 6.17 (Appendix A) of the General Conditions is particularly important concerning material supplied by a subcontractor or supplier.
- Paragraph 6.17C provides that "Where a Shop Drawing or Sample is required by the Contract Documents. . . , any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR."

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Develop Purchase Orders

- The purchase order is a purchase contract between the contractor and the supplier. This document depicts the materials to be supplied, their quantities, and the amount of the purchase order.
- Purchase orders vary in complexity and can be as simple as a mail order form (e.g., Department Store Catalogue) or almost as complex as the construction contract itself.
- When complex and specially fabricated items are to be included in the construction, very detailed specifications and drawings become part of the purchase order.
- See Figures (16-3) and (16-4)

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Elements of Purchase Order

Five items can be identified as follows:

1. Quantity or number of items required.
2. Item description. This may be a standard description and stock number from a catalogue or a complex set of drawings and specifications.
3. Unit price.
4. Special instructions
5. Signatures of agents empowered to enter into a contractual agreement.

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FOB location

- Price quotations normally establish an FOB location at which point the vendor will make the goods available to the purchaser.
- FOB means *Free on Board* and defines the fact that the vendor will be responsible for presenting the goods free on board at some mutually agreed on point such as the vendor's sales location, factory, or the purchaser's yard or job site.
- The vendor may quote the price as cost, insurance, and freight (CIF), i.e. the quoted price includes item *Cost* plus *Insurance* expenses and the shipment cost to include *Freight* to the FOB location.

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The Bill of Lading

- The bill of lading is a contractual agreement between a common carrier and a shipper to move a specified item or group of goods from point A to point B at a contracted price.
- If ownership passes to the purchaser at the vendor's location, the contract for shipment is made out between the purchaser and the common carrier.
- In cases in which the vendor has quoted a CIF price, he acts as the agent of the purchaser in retaining a carrier and establishing the agreement on behalf of the purchaser.

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The Bill of Lading

- If goods are to be paid cash on delivery (i.e., COD), the title of ownership passes at the time of payment.
- In such cases, the bill of lading is between vendor and common carrier.
- If damage should occur during shipment, recovery of loss falls to the vendor as owner.
- See Figure (16-5)
- A typical bill of lading memorandum is shown in Figure 16.6.

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Invoice

- The invoice normally states the payment procedures and establishes trade discounts that are available to the purchaser if he pays in a timely fashion.
- Trade discounts are incentives offered by the vendor for early payment. If the purchaser pays within a specified period, he must pay the stated price minus a discount.
- Failure to pay within the discount period means that the full price is due and payable.
- Trade discounts received are treated as earned income in financial statements.
- See Figure 16.7.

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Terminology Relating to Trade Discounts

- **ROG/AOG**: The discount period begins upon receipt of goods (ROG) or arrival of goods (AOG).
- **2/10 NET 30 ROG**: This expression appearing on the invoice means 2% can be deducted from the invoiced amount if the contractor pays within 10 days of AOG/ROG. Full payment is due within 30 days of AOG/ROG.
- **2/10 PROX NET 30**: A 2% cash discount is available if invoice is paid not later than the 10th of the month following ROG. Payment is due in full by the end of the following month.
- **2/10 E.O.M.**: The discount (2%) is available to the 11th of the month following ROG. Payment in full is due thereafter.

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APPROVAL PROCESS

Details that further amplify the contract drawings, submitted by Subs & suppliers are:

- (1) shop drawings,
- (2) product data, and
- (3) samples.

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Shop Drawings

- Shop drawings are defined as "All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work."
- The detailing, production, and supplying of shop drawings are the sole responsibility of the contractor or the contracted agent.
- The design professional is responsible for verification that the supplied shop drawings correctly interpret the contract documents.
- Dimensions, quantities, and coordination with other trades are the responsibility of the contractor.
- Approved shop drawings become the critical working drawings of a project and are considered a part of the contract documents.
- Typically, shop drawings are submitted for materials such as reinforcing steel, formwork, pre-cast concrete, structural steel, millwork, casework, metal doors, and curtain walls.

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Product Data

- Product data may be submitted to illustrate the performance characteristics of the material items described by the shop drawings or may be submitted as verification that a standard product meets the contract specifications.
- Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the contractor to illustrate a material, product, or system for some portion of the work.
- Mill test reports, concrete mix designs, masonry fire rating tests, curtain wall wind test reports, and mechanical equipment performance tests are examples of product data.

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Samples

- Samples usually involve the finishes of a project and are physical examples of materials to be supplied.
- The architect may require samples of plastic laminate finishes for doors and counters, flooring, wall coverings, paint, pre-cast concrete, ceilings, and other items.
- These are used by the architect in developing the overall building finish scheme.

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Stages of the Approval Process

1. submission by the subcontractor or supplier,
2. review of the submittal by the contractor,
3. review by the architect or design, professional, and
4. return of submittal to the subcontractor or supplier.
 - Approved.
 - Approved with noted corrections; no return submittal needed.
 - Approved with noted corrections; however, a final submittal is required.
 - Not approved; resubmit.

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FABRICATION AND DELIVERY PROCESS

- Of the four phases of a material's life cycle the fabrication and delivery process is the most critical.
- Generally, the largest amount of time is lost and/or gained in this phase.
- The duration of the fabrication and delivery process depends directly on the nature of the material and the amount of physical transformation involved.
- For these reasons, the contractor must employ every available method of monitoring materials throughout the fabrication and delivery process.

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FABRICATION AND DELIVERY PROCESS

- Materials delivered are checked for compliance with the approved submittal as regards quality, quantity, dimensions, and other requirements.
- Discrepancies are reported to the subcontractor or supplier.
- These discrepancies, whether they be shortages or fabrication errors, are subjected to the same monitoring and controlling process as the entire order.

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INSTALLATION PROCESS

- The installation process involves the physical incorporation into the project of a material item.
- Materials arriving at the job site may be installed immediately, partially installed and partially stored, or completely stored for later installation.
- When storage occurs, the installation process becomes directly dependent on the effective storage of materials.
- One of the most important aspects of the effective storage of materials is the physical protection of material items.

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Select Storage Sites

- For expansive sites:
 - Storage may be at a location adjacent to the site
 - Storage may be at the point of installation
- For small/tight sites:
 - Storage may be in a room inside the new facility
 - Storage may be in rented buildings or land nearby

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MATERIAL TYPES

1. bulk materials that require little or no fabrication,
2. manufacturer's standard items that require some fabrication, and
3. items that are fabricated or customized for a particular project.

See Tables 16-1, 16-2 & 16-3

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Questions

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Special Purchase Order

HCBC HENRY C BECK COMPANY

VENDOR: _____

DATE: _____

SHIP TO: 1210 S. Old Dixie Highway / Jupiter, Florida 33458

CHG. TO JOB # 21330 _____

QUANTITY	ARTICLE	U.P.	AMOUNT	COST CODE

STATE AND LOCAL SALES TAXES MUST BE SET OUT SEPARATELY ON INVOICE

Invoice in Triplicats
To Above Address

No Later Than 25th of Month — Vendor's Acceptance (when required)

Show S.P.O. Number On Invoice

WHITE (ORIGINAL) - VENDOR'S COPY
CANARY - JOB OFFICE COPY
(MAIL TO DALLAS WITH INVOICE)

SUPT. OR PROJECT MGR.
PINK - SUPERINTENDENT'S COPY
GOLDENROD - PROJECT MANAGER'S COPY

MAIL INVOICE TO:
HENRY C. BECK COMPANY
1210 S. Old Dixie Highway
Jupiter, Florida 33458

Figure 16.3 (p. 277)
Field purchase order (courtesy of Henry C. Beck Co.).

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Figure 16.4 (p. 278)
 Formal purchase order
 (courtesy of Henry C. Beck
 Co.).

Letter or transmittal form accompanying this order when mailed to Vendor should show the number of shop drawings and/or samples to be furnished and the address to which they must be sent, also the address to which Vendor is to mail correspondence relating to this order.

PURCHASE ORDER No. _____

HCB HENRY C BECK COMPANY

VENDOR ADDRESS _____

Please ship the following to HENRY C. BECK COMPANY, at _____

SHIP VIA: _____

It is agreed that shipment will be made on or before _____ or right is reserved to cancel order.

IMPORTANT NOTE: It is IMPERATIVE in the interest of prompt payment that all invoices be rendered in the original with two (2) copies. Mail together with two (2) copies of bills of lading and/or other papers to FOB at address above.

ITEM NO.	QUANTITY	DESCRIPTION	UNIT	AMOUNT

SALES or USE TAX (if not included in amounts shown above) _____ HENRY C. BECK COMPANY

F.O.B. _____ By: _____

TERMS: _____

See above IMPORTANT NOTE for invoicing instructions. They MUST be complied with.

Show above order number on invoices, and on the outside of each package containing shipment.

Accepted: _____

By: _____

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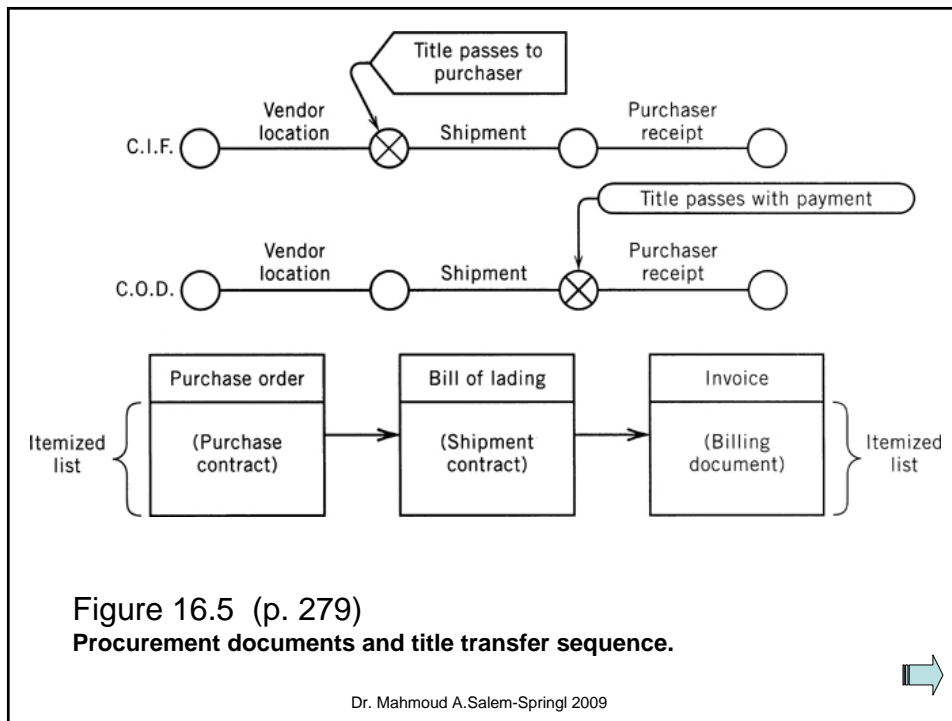


Figure 16.5 (p. 279)
 Procurement documents and title transfer sequence.

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This Shipping Order Carbon, and retained by the Agent.

Shipper's No. _____

Carrier's No. _____

(Name of Carrier)

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

at HALLANDALE, FLA. Date 20xx From MEADOW STEEL PRODUCTS, INC.

The property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery of said destination, if on its own route, otherwise to deliver to another carrier on route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western and Illinois Freight Classification in effect on the date thereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assignee.

Consigned to _____

(Mail or street address of consignee—For purposes of notification only.)

Destination _____ State _____ Zip _____ County _____ Delivery Address* _____


(*To be filled in only when shipper desires and governing tariffs provide for delivery thereof.)

Route _____

Delivering Carrier _____ Car or Vehicle Initials _____ No. _____

Figure 16.6 Typical bill of lading (courtesy of Augusta Meadow Steel Products, Inc.).

Figure 16.6 (pp. 280-281)
Typical bill of lading (courtesy of Augusta Meadow Steel Products, Inc.)
(Continued on next slide.)



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Bibb Steel & Supply Company
INCORPORATED
FABRICATED STRUCTURAL STEEL

INVOICE

AREA CODE 812-788-7373
 PO BOX OFFICE BOX 3007
 4105 BROADWAY
 MACON, GA. 31208

SELL TO: Bellamy Brothers Contracting Co., Inc. DATE: December 29, 1978

ADDRESS: P. O. Box 218 Ellenwood, Georgia 30049 CUSTOMER'S ORDER NO. _____

SHIP TO: State of Fulton-Clayton City's, Georgia Proj. # ACI-85-1 (154) 72 & PR-8500-2 (121)

VIA: O. T. TERMS: NET 10th PRIN. 15% DISC. INTEREST CHARGED AFTER MATURITY.

QTY	DESCRIPTION	UNIT PRICE	NET AMOUNT
	Revised internal bracing connection for bridge #1 as designed by Bibb Steel and approved by Georgia D.O.T.		\$ 11 672 00
	3% Georgia Sales Tax		350 16
	1% MHTA Tax		116 72
			\$ 12 138 88


RECEIVED 1-12-79
 DATE _____
 BELLAMY BROS. INC.
 1684 SULLY RD. S.E.
 COLLEGE PARK, GA. 30039

Complete Contract-Bridge #1

INVOICE NO. 801 RECEIVED ABOVE IN GOOD CONDITION

RECEIVED BY _____
 T H A N K S

Figure 16.7 (p. 282)
Typical invoice (courtesy of Bibb Steel & Supply Company).



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