The Project Life Cycle
Project Chronology/Anatomy of a Project

CSTM 102
Spring 2013
• Definition of Insanity-
  “Doing the same thing, the same way .. And expecting a different result”- Roger Milliken
## Orlando Condominium Conversions

<table>
<thead>
<tr>
<th>Year</th>
<th>Conversions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>514</td>
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<tr>
<td>2004</td>
<td>3,235</td>
</tr>
<tr>
<td>2005</td>
<td>18,220</td>
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<tr>
<td>2006</td>
<td>11,027</td>
</tr>
<tr>
<td>Total</td>
<td>32,996</td>
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*Apartment Finance Today*
“Housing is a very important sector for the construction industry. Historically, the residential sector has averaged around 45 percent of total construction. Housing is also a leading indicator for nonresidential construction. As housing booms and expands into new areas, demand for nonresidential segments such as schools, grocery stores, banks and other retail establishments follow.”
Non-Residential Segment in 2010
Construction Forecast FMI

- 18 billion for light rail Seattle
- 10 billion high speed rail California
- 4.3 billion light rail Honolulu
“The residential sector has good long-term growth prospects. The population in the United States is expected to grow from 300 million in 2006 to 400 million in 2039. That is an increase of 100 million people in 33 years. Multi-family construction will recover and begin to grow before single family construction, due to an increase in rental construction. Non-residential construction will experience an increase in the out years as the population will need highways and streets to drive on, power for homes, and water and sewer service. An infrastructure stimulus package would only cause this construction to occur sooner.”
Direct Project Objectives

• Time (Schedule)
• Money
• Performance
  – Scope (What are we providing?)
  – Value (Short term and long term)
  – Client Satisfaction (Designer & Contractor)
    • Can you have all of the above but still have an unsatisfied client?
The dictionary definition of a project is a plan or proposal; a scheme; an undertaking requiring concerted effort.

The proper execution and control of this project makes the undertaking a success or failure.

By examining the detail of a project you can devise a plan to accomplish the desired outcome.

By building the project by specific specifications and requirements you can complete your project successfully.

Without a critical analysis of the project prior to starting the process you will set yourself up for failure.
Remember projects can come in different types. Each type can alter the anatomy and chronology of the project. Construction projects fall under one of these types:

- **Modification/Expansion**
- **Relocation**
- **New Construction**
- **Multiple Projects/Phases of Development/Master Planning**
The dictionary definition of chronology is the arrangement (as of events) in order of occurrence.

The project chronology are the steps that occur during the life of the facility from a concept to the end of the life of the facility.

The life cycle of a facility, from concept through construction, to use and eventual deconstruction (demolition) of the facility.

We as designers and constructors in the beginning of the process through the construction of the project effect the remaining life cycle of a facility for potentially the next 20-30 years.

The involvement of designers and constructors throughout this life cycle is changing in today’s market.
The stage by stage progression following the life cycle of a facility is divided into the stages shown:

1. Project Conception
2. Project Delivery
3. Design
4. Construction Documents
5. Bidding/Negotiating/Procurement
6. Construction
7. Startup & Commissioning (Added by Professor Cherf)
8. Facility Management

As shown in the “Project Resources Manual of the Construction Specifications Institute (CSI)”
In the industry the term “Pre-Construction Services” is utilized when defining the first five stages of the project life cycle.

Pre-Construction Services
1. Project Conception
2. Project Delivery
3. Design
4. Construction Documents
5. Bidding/Negotiating/Procurement

This is where the industry and owners are beginning to see an opportunity to increase the success of the project by the integration of design and construction throughout these stages of the project life cycle.
Pre-Construction Services

The best time to impact the cost of a project is early in the project life cycle process.

It has been proven that the designers and constructors of a project can better influence the overall cost of the project in the early stages of the development of the project.

The following slide depicts the project cost influence curve.
Changing Roles and Responsibilities

• Contractor’s responsibility to provide constructability and expertise to reduce change orders and disputes.
  – Upfront review of costs and pricing of design alternatives during the pre-construction process.
  – More efficient development of design documents including plans and specifications.
  – Utilization of experienced subcontractors and supplier expertise during the planning process.
  – The optimum use of construction knowledge and experience in the planning, design, and procurement process
Ability to Influence Final Cost Over Project Life

(As your costs increase your ability to influence those costs decrease.)
“Constructability is …..the optimum use of construction knowledge and experience in planning, design, procurement, and field operations to achieve overall project objectives”

- Maximize concurrent construction
- Minimize rework
- Increase productivity
- Decrease construction equipment costs
- Design for less costly materials & less waste
- Startup & construction drive engineering & procurement
- Emphasize standardization & repetition
- Use of off-the shelf materials & equipment
- Simplify
- Promote accessibility
- Realistic specifications
- Minimize unscheduled activities
- Incorporate flexibility for field managers
- Work when & where it is most efficient
- Proactive attention, not just REVIEW
- Team effort by owner, engineer, architect, constructor & operator
1. Project Conception/Program Development

- Project Identification/Feasibility Studies
- Facility Investigation and Development
- Site Selection
- Project Planning
Programming Information

- Function
  - People
  - Activities
  - Relationships
- Form
  - Site
  - Environment
  - Performance Level
- Economy
  - Initial Budget
  - Operating Costs
  - Life Cycle Costs
- Time
  - Past
  - Present
  - Future

Construction Specifications Institute (CSI) Program Information Index
2. Project Delivery

Project Delivery is the process by which all of the procedures and components of designing and building a project are organized and put together in an agreement that results in a completed project.
3. Design

- Schematic Design/Project Definition
- Design Development/Detail Engineering

The American Institute of Architects (AIA) defines design as occurring in three distinct phases: schematic design, design development and construction documents.
Designer’s Role

• Designer’s responsibility to provide value regarding:
  – Performance
  – Efficiency
  – Sustainable (In recent years an academic and public discourse has led to the use of the word sustainability in reference to how long human ecological systems can be expected to be usefully productive.)
Performance Specifications

Form, Fit and Function

*Design, Build and it better function.*
4. Construction Documents

This is based on the owner-approved design development documents and any final adjustments to the project or project budget. This will be the documents used to build the project.

These will include:

- Construction Agreements (contracts)
- Project Manual
- Project Specifications
- Drawings
5. Bidding/Negotiating/Procurement

Procurement- (Procure means to buy or obtain.) It is the process or activities required to obtain labor, equipment and materials by a vendor/subcontractor selection process through delivery of all materials and services to the jobsite.
6. Construction

• A Program
• A Project
  • Management
  • Resources
  • Materials
  • Methods
  • Sequencing
7. Startup & Commissioning

A thorough understanding of all start up and commissioning requirements by the owner will allow for a better turnover of the project. Identifying and working closely with the owner, a start-up and commissioning plan, will reduce problems encountered at the end of the project to assure the facility is placed properly in service. This includes operations and maintenance procedures. This is the key to proper facility management at the beginning of the occupancy.
A traditional system review

Design
- Define
- Conceptual Design
- Approve Design
- Construction Documents

Bid
- Select Contractor
- Bid Period
- Invite Bidders
- Bid Packages

Construction
- Authorize
- Construction
- Turnover
- Startup
- Closeout
- Owner Accepts
Facility Life Cycle

1. Project Conception
2. Project Delivery
3. Design
4. Construction Documents
5. Bidding/Negotiating/Procurement
6. Construction
7. Startup & Commissioning
8. Facility Management
Project Chronology

- **Facility Life Cycle** - The three year process that will impact the facility for 35 years.
- **Pre-Construction Services** - The involvement of the Contractor through non-traditional phases including “Constructability”. (Cost Influence Curve)
- Integration of design and construction is not the norm but is changing the way we look at the project life cycle.
- **Upcoming Lectures**
  - Scope of work - Your responsibility in the life cycle.
  - Sustainability & Green Building - How it affects the Project Life Cycle.
  - Project Delivery - Defining the relationship between Owner-Designer-Contractor to complete the project.
  - Construction Documents - The documents to build the project.
  - The Procurement Phase - Setting up vendors and subcontractors for construction.
Rumor of a Quiz

• Know the project life cycle
• Pre-Construction Services and the first five stages
• Design Consists of:
  – Schematic Design (SD)
  – Design Development (DD)