Leadership Techniques for Senior Design

Project Leadership Overview
&
Project Management Overview

Prof. Ralph V. Locurcio, PE
Project Management Tasks

1. Identify leaders & roles
2. Project planning
3. Risk Analysis & Management
4. Project organization
5. Develop a system of coordination
6. Work Breakdown
7. Work Schedule
8. Cost analysis, estimating & control
9. Quality control & supervision
10. Engineering
11. Production drawings & documents
12. Construction operations
13. Project delivery & closeout
Project Management Tasks

1. Identify leaders & roles
2. Project planning
3. Risk Analysis & Management
4. Project organization
5. Develop a system of coordination
6. Work Breakdown
7. Work Schedule
8. Cost analysis, estimating & control
9. Quality control & supervision
10. Engineering
11. Production drawings & documents
12. Construction operations
13. Project delivery & closeout
Project Leadership

- Leadership Principles
  - Team Dynamics
  - Team Leadership Methods

- Project Planning
  - Project Organization
  - Work Breakdown Structure
  - Project Scheduling

- Project Execution
Introduction to Leadership...

What can you tell me about leadership from this cartoon?
Introduction to Leadership...

Here are some clues... what’s going on here?
Introduction to Leadership...

So... what’s the caption here?
The caption is....

When pulling a sled, unless you are the lead dog, all of the scenery looks the same.
A leader is a person you will follow to a place you wouldn’t go by yourself...

(author unknown)

Ralph V. Locurcio, P.E.
Leaders perform most of their duties by leading, or taking part in, groups... i.e. interacting with others.

Therefore they need to:

- Understand their own behavior
- Improve their social skills
- Understand (and appreciate) other people’s behavior
Individual behavior
Fryer, p.111

- Is partly determined by personality;
  - Who you are; what makes you tick...

- Greatly influenced by the situation;
  - How you react to externalities...

- Greatly influenced by others.
  - How you interact with other personalities...

- So... personality is a dynamic set of attributes; heavily influenced by experiences.

Ralph V. Locurcio, P.E.
Short Exercise

☐ To demonstrate these “preferences” take 10 sec for the following exercise...

☐ Take a blank piece of paper... sign your name as you normally would.
Short Exercise

☐ Now sign with the opposite hand... how does it “feel”???
  ■ Are you **comfortable**?
  ■ **Confident**?
  ■ Would you **prefer** to sign this way?
  ■ Does this signature represent the **real you**?
  ■ Could you **learn** to sign this way?
The Basis of MBTI...

The MBTI measures these preferences...

- **Focus of attention**: Extraversion or Introversion
- **Acquiring information**: Sensing or Intuition
- **Making decisions**: Thinking or Feeling
- **External orientation**: Judging or Perceiving
Student Assignment...

- **Homework Exercise:** Complete MBTI Test.

- Go to: [www.humanmetrics.com](http://www.humanmetrics.com). Home page for HUMANMETRICS.
  
  - In the upper left of the home page, click on “Jung Typology Test”.
  
  - Scroll down to the and click the “Do It” box.
  
  - This will lead you to an online test with 72 questions. You should answer the questions from the standpoint when you are “at work”.
  
  - When completed click on “Score It”, print the page with the four letter designator for your personality type and bring it to class for discussion.
  
  - Also click on the buttons for the Kiersey and Butt descriptions of your personality type. Print these out and bring these to class.

Ralph V. Locurcio, P.E.
MBTI Exercise for Homework
ACEC Survey: What clients expect...
(American Consulting Engineers Council)

1. 34% **People skills**: leadership, motivated, excited, responsive
2. 23% **Communication skills**: clarify issues, alternatives, participation
3. 15% **Ethical considerations**: mutual respect, trust, honesty
4. 17% **Project mgt. skills**: scope, scheduling, changes, claims, etc.
5. 6% **Technical expertise**: knowledge & experience
6. 5% **Budget experience**: project controls, design to budget

Ralph V. Locurcio, P.E.
Locurcio’s Definition of Leadership...

Leadership is the **process** of accomplishing a **task** by clearly specifying the intended **outcome** and then **motivating** and **directing** an **enthusiastic** workforce to achieve an **optimum** result.

Ralph V. Locurcio, P.E.
Team Performance Dynamics

Tuckman & Jensen Model

- Forming
  - Working Group
- Storming
- Norming
  - Potential Team
- Performing
  - Real Team
- Hi-Performing Team
  - Adjourning
  - Mourning

Pseudo Team

Team Effectiveness
Team Leadership Methods

- Project Manager - control
- Co-leadership - technical & process
- Rotating leaders
  1. Participation
  2. Support
  3. Balance
- Facilitated – neutral + prof. advice
- Ombudsman – avoid blind spots
System of Coordination...

Defined positions show relative power

Top Manager

Middle Manager

First-Line Manager

Work Group

Work Group

Work Group

Work Group

Formal lines of communication reach all workers

First-Line Manager

Work Group

Work Group

Work Group

First-Line Manager

Work Group

Work Group

Work Group

First-Line Manager

Work Group

Work Group

Work Group
Leadership Styles

1,9 Country club management

9,9 Team management

5,5 Organization man management

1,1 Impoverished management

9,1 Authority-obedience

Concern for production

Concern for people

Laid Back

Loafer

Leader

Compromizer

Dictator

Ralph V. Locurcio, P.E.
Choosing the Correct Style...

- Hi Task - Low Relationship
  - Delegating
  - Participating
- Hi Relationship - Low Task
  - Telling
  - Selling

Ralph V. Locurcio, P.E.
Directing & Delegating

- Essential for **action**... to assign tasks
- **Transmits authority** to subordinates
- Must **tailor** to task and subordinates
- **Releases** total capacity of the enterprise
- Enables employee **motivation**
Degrees of Delegation (worst to best)

- **Boss decides all – employee executes**
- **You Make recommendation – boss decides**
- **You Make recommendation – joint decision**
- **You Decide – info boss **before** acting**
- **You Decide – info boss on outcome only**
Choosing the Correct Style...

- **Follower's Capabilities**
  - High Relationship: Able, willing, secure
  - High Relationship: Able but unwilling, insecure
  - Low Relationship: Unable, unwilling, insecure
  - Low Relationship: Able but unable

- **Task Difficulty**
  - Low Task: Delegating
  - High Task: Telling

- **Decision Styles**
  - **Joint Decision**
    - Participating
  - **Recommendation**
    - Selling
  - **Employee Decides**
  - **Boss decides**

The diagram illustrates the relationship between follower capabilities, task difficulty, and the appropriate decision styles.
Project Directives – 6 W’s

1. **What** – needs to be done
2. **Who** – should do it
3. **When** – it needs to be completed
4. **Where** – will it be done
5. **Why** – establishes importance
6. **Wow** – what does success look like
Project Management Tasks

1. Define leaders & roles
2. Project planning
3. Project organization
4. System of communications
5. Work Breakdown
6. Work Schedule
7. Cost analysis, estimating & control
8. Design operations & supervision
9. Production drawings & documents
10. Risk Management
11. Quality control
12. Project delivery & closeout
13. Construction
Project Management Tasks

- Project Planning
- Work Breakdown
- Project Schedule
- Project Budget
- Construction Cost
How do you eat an elephant?
One bite at a time!!!

You break the total project down into measurable tasks...
Project Delivery Process...

Programming Process

- Need for a project is recognized
- Owner appoints Project Manager
- Project Manager develops project program objectives and parameters
- Owner approves program
- Project is entered into an annual capital program
- Project Manager advertises for designer

Design Process

- Project Manager advertises for construction bids
- Owner orders bid documents
- Designer completes plans and specifications
- Owner authorizes final design
- Owner hires designer

Construction Process

- Contractors assemble team, prepare & submit bid
- Bids reviewed by owner (with designer)
- Owner selects builder
- Builder's credentials & bonding approved
- Notice to Proceed
- Construction begins

Owner accepts facility

Final payment
- All work completed, final inspection met
- Progress payment
- Project phase(s) completed
- Resident Engineer oversees construction
Planning phase

- Clearly defines the **goals** of a project
- Baseline for all project **decisions**.
- Essential to project **success**.
Simple example

- Construction of a Fido’s house

- What are the goals?

- What needs to be considered???
Programming Phase

- What type of dog is Fido?
- How big is he or she?
- What’s the local climate?
- Where will you put the house?
- How much room do you have?
- What style of dog house do you want?
- Are there special functions or needs?
What are Fido’s needs...

Police?  Latino?  Family?  Italiano?

Engineering phase...
Plans & Specifications...
Construction Phase...
Construction phase

Planning
- Cost
- Timing
- Quality
- Safety
- Labor
- Weather
- Siting
- Transportation

Tools
- Tape measure
- Hammer
- Square
- Circular saw
- Table saw (optional)
- Paintbrush
- Dust mask
- Goggles
- Hearing Protection

Const Opns
- Permits
- Schedule
- Organize
- Budget
- Hire workers
- Equipment
- Inspection
- Safety

Purchase & Deliver Materials
- 4'x8' sheet of 5/8" exterior siding
- 1—8' 2x4 (to be cut into 2x2's)
- 1—10' 2x4, rated for outdoor use
- Nails—16d for base, 8d for house, and short roofing nails if using shingles
- Shingles (optional)
- Finishing material (paint or nontoxic wood preservative)
It’s all needed to achieve...

Project Success!!!!
WBS – the key planning tool

- The first step in planning is the description of the all tasks that need to be done to accomplish the project goals.

- This task breakdown forms the basis of the work plan... what we call the **Work Breakdown Structure (WBS)**
Work Breakdown Structure

- The purpose of the work plan is to prevent activities from “falling through the cracks.”

- It answers the 6 W’s:
  1. **What** – needs to be done
  2. **Who** – should do it
  3. **When** – it needs to be completed
  4. **Where** – will it be done
  5. **Why** – establishes importance
  6. **Wow** – what does success look like ($$)$
PM Tasks

The project manager must accomplish six things when developing the work plan:

1. Break the work into **manageable** tasks

2. Define the work as **independent elements** that can be assigned, sequenced, scheduled, and monitored.
PM Tasks (continued)

3. **Integrate** the work elements into a **logical system** with a beginning and an end.

4. Present the sequence of tasks in a form that can be **easily communicated** to workers involved in the project.
PM Tasks (continued)

5. Define the tasks at a level of detail appropriate for the length and complexity of the project.

6. Ensure that the completion of all tasks will result in achieving all project goals.
Developing the WBS...

- The WBS divides the total project into "activities" or "work packages".

- Dividing the project into work packages makes it possible to assign task responsibility, and prepare project schedules and cost estimates.
Basic guidelines (continued)

- Work that will be performed by team members should be **clearly** identified.

- WBS should define **measurable** tasks & deliverables.

- WBS should be **flexible**.
Typical WBS for Senior Design

<table>
<thead>
<tr>
<th>Task</th>
<th>Who</th>
<th>When</th>
<th>Pln Hr</th>
<th>Act Hr</th>
<th>Plan $</th>
<th>Act $</th>
<th>%Com</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1</td>
<td>John</td>
<td>8/22/10</td>
<td>5</td>
<td>4</td>
<td>$500</td>
<td>$400</td>
<td>100</td>
</tr>
<tr>
<td>Sub-task a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-task b</td>
<td>Jane</td>
<td>8/28/10</td>
<td>8</td>
<td>6</td>
<td>$800</td>
<td>$600</td>
<td>50</td>
</tr>
<tr>
<td>Task 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## WBS for Senior Design Project

<table>
<thead>
<tr>
<th>Activity or Task</th>
<th>Duration (hrs or days)</th>
<th>Assigned</th>
<th>Planned Start</th>
<th>Actual Start</th>
<th>Planned Finish</th>
<th>Actual Finish</th>
<th>Float</th>
<th>% Done</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase-1 (5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.10 Task 1</td>
<td>12</td>
<td>Mohammad</td>
<td>23-Aug</td>
<td>24-Aug</td>
<td>3-Sep</td>
<td>3-Sep</td>
<td>0</td>
<td>100</td>
<td>X</td>
</tr>
<tr>
<td>1.20 Task 2</td>
<td>6</td>
<td>Kahlid</td>
<td>23-Aug</td>
<td>23-Aug</td>
<td>29-Aug</td>
<td>4-Sep</td>
<td>-5</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>1.30 Task 3</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-2 (15%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10 Task 4</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11 Subtask 4.1</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12 Subtask 4.2</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-3 (50%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-4 (95%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-5 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# WBS for Senior Design + Budget

<table>
<thead>
<tr>
<th>Activity or Task</th>
<th>Duration</th>
<th>Assigned</th>
<th>Pay Rate</th>
<th>Planned Start</th>
<th>Actual Start</th>
<th>Planned Finish</th>
<th>Actual Finish</th>
<th>Float Lag</th>
<th>Planned $$</th>
<th>Actual $$</th>
<th>Over/Under</th>
<th>% Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase-1 (5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.10 Task 1</td>
<td>12</td>
<td>Mohammad</td>
<td>125</td>
<td>23-Aug</td>
<td>24-Aug</td>
<td>3-Sep</td>
<td>3-Sep</td>
<td>0</td>
<td>$1,500</td>
<td>$1,500</td>
<td>$0</td>
<td>100</td>
</tr>
<tr>
<td>1.20 Task 2</td>
<td>6</td>
<td>Kahlid</td>
<td>85</td>
<td>23-Aug</td>
<td>23-Aug</td>
<td>29-Aug</td>
<td>4-Sep</td>
<td>-5</td>
<td>$510</td>
<td>$561</td>
<td>$51</td>
<td>90</td>
</tr>
<tr>
<td>1.30 Task 3</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-2 (15%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10 Task 4</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.11 Subtask 4.1</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.12 Subtask 4.2</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-3 (50%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-4 (95%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-5 (100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$2,010</td>
<td>$2,061</td>
<td>$51</td>
<td></td>
</tr>
</tbody>
</table>
## Simple Bar Chart Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
<th>Month 4</th>
<th>Month 5</th>
<th>Month 6</th>
<th>Month 7</th>
<th>Month 8</th>
<th>Month 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavate</td>
<td>xxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation</td>
<td>xxx</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slab</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>xxxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>xxxxxxxx</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doors</td>
<td>xxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td>xx</td>
<td>xx</td>
<td>xx</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior Walls</td>
<td>xxxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceilings</td>
<td>xxxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor Tile</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td>xxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furniture</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punch List</td>
<td>xx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close out</td>
<td>xxxxxx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
My Definition of Leadership...

Leadership is the **process** of accomplishing a **task** by clearly specifying the intended **outcome** and then **motivating** and **directing** an **enthusiastic** workforce to achieve an **optimum** result.

Ralph V. Locurcio, P.E.
A Simpler Definition...

A leader is a person you will follow to a place you wouldn’t go by yourself...

(author unknown)
In Conclusion...

Leadership is...

the *vision* to welcome chance,
the courage to *adjust* to mistakes,
and the *confidence* to stay out of step, when everyone else is...

*marching to the wrong tune!!*

Ralph V. Locurcio, P.E.
That’s all folks!!!!