Leadership Techniques for Senior Design

Project Leadership Overview & Project Management Overview

Prof. Ralph V. Locurcio, PE
Project Management Tasks

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

- Leadership Principles
  - Team Dynamics
  - Team Leadership Methods

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

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

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

Ralph V. Locurcio, P.E.
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.

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.
A Simpler Definition...

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

*(author unknown)*

Ralph V. Locurcio, P.E.
Team Leadership

- Every team needs to identify a leader... normally called the:
  
  **Project Manager (PM)**

- The PM’s job is to:
  1. Organize the team & work plan
  2. Make decisions
  3. Monitor progress
  4. Make adjustments to the team or plan
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.
Team Leadership Methods

- Project Manager – one person controls
- Co-leadership - technical & process
- Rotating leaders
  1. Participation
  2. Support
  3. Balance
- Facilitated – neutral + prof. advice
- Ombudsman – avoid blind spots
Leadership Styles

Ralph V. Locurcio, P.E.

- Laid Back
- Loafer
- Country club management (1,9)
- Team management (9,9)
- Organization man management (5,5)
- Impoverished management (1,1)
- Authority-obedience (9,1)
- True Leader
- Compromizer
- Dictator

Concern for production
Choosing the Correct Style...

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Team Organization...

- Defined positions show relative power
- Formal lines of communication reach all workers

Diagram:
- Top Manager
  - Middle Manager
    - First-Line Manager
      - Work Group
    - First-Line Manager
      - Work Group
  - Middle Manager
    - First-Line Manager
      - Work Group
    - First-Line Manager
      - Work Group
    - First-Line Manager
      - Work Group
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**
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
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...

**Hi Relationship**
- **Hi Task**: Joint Decision (Participating)
- **Low Task**: Delegating

**Low Relationship**
- **Hi Task**: Worker Decides all
- **Low Task**: Leader decides all

**Task**
- **Unable, unwilling**: Telling
- **Willing but unable**: Delegating
- **Able but insecure**: Participating
- **Able, willing, secure**: Recommendation (Selling)

**Leadership Capabilities**
- Joint: Hi Relationship, Low Task
- Recommendation: Low Relationship, Hi Task
- Worker Decides all: Low Relationship, Low Task
- Leader decides all: Hi Relationship, Hi Task
Project Management Tasks

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

Your Project Dashboard

They enable you to be proactive rather than reactive...
Project Management Tools

- Project Flow Diagram
  your road map/GPS

- Project Schedule
  your speedometer

- Project Budget
  your fuel gauge
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, scope & cost 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 & specifications
- Owner authorizes final design
- Designer prepares concept design & preliminary cost estimate
- 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 made
- Progress payment
- Project phase(s) completed
- Resident Engineer oversees construction
Planning phase

- Clearly defines the **goals** of a project
  
  - Called the **scope** of the project – what’s included
  
  - Baseline for all project **decisions** – when to say no
  
  - Essential to project **success** – when are you done
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...
Engineering phase...
Plans & Specifications...

Plans

Details

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 to list all tasks that need to be done to achieve the project goals or scope.

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

- The purpose of the WBS 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 timing and skills of the assigned engineer.

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

- Divide the project into individual tasks:

  1. Assign task responsibility
  2. Determine timing for each task
  3. Integrate tasks into project schedule
  4. Estimate cost of all tasks = project budget
## 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>
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### WBS for Senior Design Project

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<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>
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## WBS for Senior Design + Budget

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<th>Assigned person</th>
<th>Pay Rate $$</th>
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<th>Actual $$</th>
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Adding budget data...
## Bar Chart Schedule

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Team Performance Dynamics

Tuckman & Jensen Model

- Forming
- Storming
- Norming
- Performing
- Adjourning
- Hi-Performing Team
- Mourning

- Pseudo Team
- Real Team
- Potential Team
- Working Group

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!!!!