Project Management

[[YELLOW BAR (DESCRIPTION OF SESSION)]]

This session will present an overview of the project management discipline and will allow Explorers to participate in a project management case study.

CATEGORY

- Engineering
- Project Management

OBJECTIVES

By the end of this session, participants will be able to:

- Define project management.
- Understand what project managers do.
- Demonstrate a key project management concept.

SUPPLIES

- Computer with Internet access

RESOURCES

Reminder: *Any time you use an outside source, be sure you review the content in advance and follow the content owner's or website's permission requirements and guidelines.*

The following are suggested resources that Advisors may find helpful in planning this session:

- Suggested website: Bureau of Labor Statistics Occupational Outlook Handbook for Architectural and Engineering Managers, http://www.bls.gov/ooh/architecture-and-engineering/home.htm

ADVISOR NOTE: Text in italics should be read aloud to participants. As you engage your post in activities each week, please include comments, discussions, and feedback to the group relating to **Character, Leadership,** and **Ethics**. These are important attributes that make a difference in the success of youth in the workplace and in life.

ACTIVITY 1

What Is Project Management?

Ask participants:

Have you ever tried to plan a big family event, community service project, or school project before? How did you approach the project—where did you start? What did you enjoy about the process? Which parts of the process were challenging? Did you learn any lessons that you could apply to future projects? There are many parts involved in a large project of any kind, and good planning is the best

way to make sure a project will be a success. Let's look at how this relates to managing projects in an engineering job.

Discuss these key points with participants.
Project managers coordinate the various aspects of a project to ensure its successful completion on time and within budget. While much of the work is carried out by specialized workers, the project manager oversees the project in its entirety and coordinates the numerous moving parts. When problems arise, the project manager is the go-to person responsible for getting things back on track. Many industries have roles for project managers, so although some skills of an engineering project manager will be specific to engineering, other skills would be important for project managers across a wide range of industries.

The information that follows in Activity 1 and Activity 2 is from the Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016–17 Edition*, Architectural and Engineering Managers at: http://www.bls.gov/ooh/management/architectural-and-engineering-managers.htm (retrieved March 15, 2016).

What Do Project Managers Do?

Architectural and engineering managers typically do the following:

- Make detailed plans for the development of new products and designs.
- Determine staff, training, and equipment needs.
- Propose budgets for projects and programs.
- Hire and supervise staff.
- Lead research and development projects to produce new products, processes, or designs.
- Check the technical accuracy of their staff's work.
- Ensure the soundness of methods their staff uses.
- Coordinate work with other staff and managers.

Architectural and engineering managers use their knowledge of architecture or engineering to oversee a variety of activities. They may direct and coordinate production, operations, quality assurance, testing, or maintenance at manufacturing sites, industrial plants, engineering services firms, and research and development laboratories.

Architectural and engineering managers are responsible for developing the overall concept of a new product or for solving the technical problems that prevent the completion of a project. To accomplish this, they must determine technical goals and produce detailed plans.

Architectural and engineering managers spend a great deal of time coordinating the activities of their staff with the activities of other staff or organizations. They often confer with other managers, including those in finance, production, and marketing, as well as with contractors and equipment and

materials suppliers.

In addition, architectural and engineering managers must know how to prepare budgets, hire staff, and supervise employees. They propose budgets for projects and programs and determine staff, training, and equipment needs. These managers must also hire people and assign them specific parts of each project to carry out. Architectural and engineering managers supervise the work of their employees, set schedules, and create administrative procedures.

Work Environment

Most architectural and engineering managers work in offices, although some may also work in laboratories and industrial production plants or at construction sites.

Most architectural and engineering managers work full time, and about half worked more than 40 hours a week in 2014. These managers are often under considerable pressure to meet deadlines and budgets.

ACTIVITY 2

How to Become a Project Manager

Architectural and engineering managers typically need at least a bachelor's degree and considerable work experience as an architect or engineer. They usually have experience working on difficult or complex projects, developing designs, solving problems, and making decisions. Before moving up to a management position, they also typically gain experience leading engineering teams.

Most architectural and engineering managers have at least a bachelor's degree in an engineering specialty or a professional degree in architecture.

Many also gain business management skills by completing a master's degree in engineering management (MEM or MsEM) or technology management (MSTM) or a master's degree in business administration (MBA). Some workers earn their master's degree before advancing to management positions, and others earn it while they work as a manager. Employers will sometimes pay for such education. Typically, those who prefer to manage in technical areas pursue an MsEM or MSTM and those interested in more general management skills earn an MBA.

Engineering management programs usually include classes in accounting, engineering economics, financial management, industrial and human resources management, and quality control.

Technology management programs typically provide instruction in production and operations management, project management, computer applications, quality control, safety and health issues, statistics, and general management principles.

Important Qualities

- Analytical skills: Architectural and engineering managers must evaluate information carefully and solve complex problems.
- Communication skills: Architectural and engineering managers oversee staff and work together with other levels of management. They must communicate orders effectively and lead teams to meet goals.
- Detail oriented: Architectural and engineering managers must pay attention to detail. Their duties require an understanding of complex systems since a minor error can cause major problems.
- Math skills: Architectural and engineering managers use calculus and other advanced mathematics to develop new products and processes.
- Organizational skills: Architectural and engineering managers keep track of many workers, schedules, and budgets simultaneously.

Pay

The median annual wage for architectural and engineering managers was $130,620 in May 2014. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than $83,580, and the highest 10 percent earned more than $187,200.

In addition, architectural and engineering managers, especially those at higher levels, often receive more benefits—such as expense accounts and bonuses—than workers who are not managers.

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ACTIVITY 3

Plan an Explorer Event

For the hands-on activity, Explorers will work in teams to make plans for a mock fundraising event, such as a carnival. Teams will need to work together to establish a task list, develop a timeline, and consider how all details of the event would be handled in order to make the event a success.

Tell Explorers:

Today you'll be working with a team to make plans for a mock carnival fundraiser. A big project might seem overwhelming when you think of everything there is to do, but that's why you'll work in a team to break it down into smaller pieces. You'll need to share ideas, assign roles, and work together to make sure all of the necessary plans are in place.

1. Divide Explorers into groups of four or five.

2. Give teams 15 minutes to brainstorm ideas for planning the carnival. At this early stage, encourage teams to focus on listing categories and topics that will need to be addressed—without evaluating or getting into details.

3. Next, have groups outline a plan that creates a timeline and assigns roles. If groups become stuck, ask questions such as:

- *Where will you hold the carnival? Will you need permission there?*
- *Who must approve the date and time?*
- *How much time will you need to allow for setting up and tearing down?*
- *How will volunteers communicate?*
- *How will people find out about the carnival? Will you need to create signage or advertise?*
- *Do guests need to RSVP? Will you sell tickets?*
- *Do you need corporate sponsors to help fund the event?*
- *What will people do at the carnival (food, games, entertainment, etc.)?*
- *Will people use money or tickets for various items? How will people be able to pay (cash, credit, etc.), and, if cash, how will you be prepared to offer change as needed?*
- *Will you need to rent equipment or purchase supplies?*
- *Who will help at the various booths? Will someone be in charge of managing and training volunteers?*
- *How will you address safety? What emergency plans will be in place?*
- *How will the carnival raise funds, and how will the money raised be used? (Should this purpose be stated on your advertising?)*

4. Allow groups to spend another 10 minutes discussing their plans in more detail. Then come back together as a group to share plans. Have each team present a brief overview of their event plans.

ADVISOR NOTE

Some sample questions above and below will help the participants get the most out of the session and make them think. The questions are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own questions that relate to your post or specific focus area.

REFLECTION

Focusing Questions	▪ *What was the purpose of the activity? Why did we do it?* ▪ *Which parts of today's session did you enjoy most?* ▪ *What new things did you learn?*
Analysis Questions	▪ *What was most surprising to you about trying to plan an event?* ▪ *Which parts seemed to be the most challenging?* ▪ *Which parts did you enjoy most?* ▪ *Why do you think project management is important in the field of engineering?* ▪ *What are some challenges you expect engineering project managers encounter? How might they overcome them?*
Generalization Questions	▪ *What aspects of engineering project management would you like to learn more about?* ▪ *What subjects in school do you believe you will need in order to pursue a career in engineering project management?*

ADVISOR AND OFFICER REVIEW

After the meeting, address the following:

- Identify what was successful from the meeting.
- Identify what needed improvement.

Schedule an officer and Advisor planning meeting to prepare for next the post meeting or activity.