



# Engineering Projects, Programs, and Portfolios

An Online Continuing Education Course for Engineers

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# Engineering Projects, Programs, and Portfolios

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## 1. Introduction

In the 21<sup>st</sup> century, there has been an increased focus on the management of groups of related engineering projects. Groups of projects are referred to as programs and portfolios. Applying special management methods to groups of projects usually results in gains in efficiency, quality improvements, and risk reduction.

Hence, engineering projects may be subject to all of the following:

- Project management
- Program management
- Portfolio management

Engineering projects are normally executed in accordance with an organization's standard procedures to help ensure projects achieve business goals while minimizing risk. Standard procedures include governance structure, change approval requirements, protocols, standard forms and templates, and budget reporting requirements. Such procedures form the basis for program and portfolio management of projects. Applying program and portfolio management for groups of projects can make a big difference in the success of each project.

Industry norms and standards have been developed and defined for program and portfolio management. Many organizations have reorganized their staff and business models to align more closely with these standards, with the hopes that business goals can be better achieved. Some organizations have created a Project Management Office (PMO) to manage the development and enforcement of standards and to provide training for program managers, project managers, design managers, and other project professionals.

This course introduces and compares project, program, and portfolio management. For each, the following are reviewed: standards, principles, performance domains, phases, management plans, and key performance indicators. The reader will gain an understanding of how portfolios, programs, and projects fit together to bring about the success of engineering projects.



*Figure 1: Reviewing program information with a feeling of success.*

*Source: commons.wikimedia.org/wiki/File:Schriever\_Program\_Management\_Directorate\_acquires\_%E2%80%98pathfinder%E2%80%99\_contracts\_(5732563).jpg, p.d*

## 2. Portfolio vs Program vs Project

Most organizations manage a “portfolio” of multiple projects. Projects that are closely related can be grouped together to form a “program.” The management of the portfolio and any programs is just as important as the management of the projects, and together, a well-managed portfolio has a big impact on achieving goals for an organization.

The following definitions help distinguish between portfolios, programs, and projects:

*Portfolio* management = Oversight of multiple projects and programs

*Program* management = Oversight of multiple related projects with overlapping schedules and common objectives

*Project* management = Management of a single project with specific objectives

### Example Portfolio

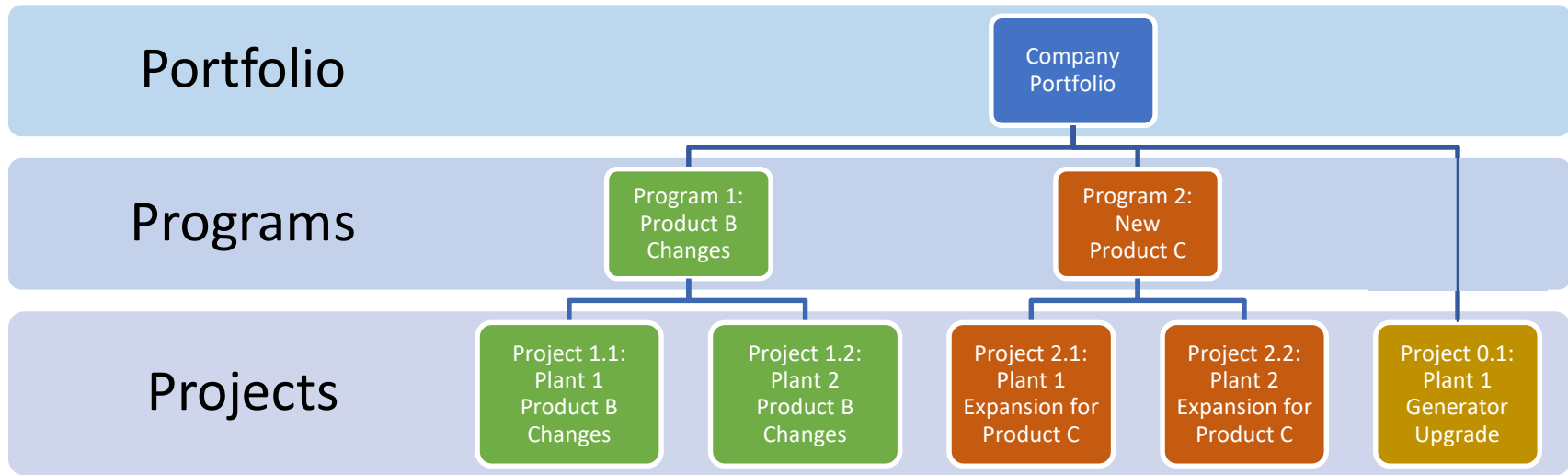
Figure 2 shows an example of an electronic parts production company with a portfolio of projects and two programs. The first program in **green** is for changes needed in the production of Product B, both to increase production efficiency and to add new features. There are two projects for this program, each at a different facility.

The second program in **orange** is to expand two facilities to allow for the production of a new item called Product C. There are currently two facilities to be upgraded: Plant 1 and Plant 2. Thus, the Product C program has two projects, one for Plant 1 and one for Plant 2. If an additional facility upgrade is needed in the future, a third project would be added to the Product C program.

The last project in **brown** is for an upgrade to the standby generator at Plant 1. Since there are no related projects, it is not considered part of a program. If the company had an initiative to assess and upgrade several standby generators, then together those projects could be considered a program.

A standalone improvement project that is broken into multiple stages (study, preliminary design, final design, bidding, construction) is NOT considered a program.

Note that each program is assigned a number, and the projects within that program have a related number. This makes document management easier.



*Figure 2: Depiction of a company with a portfolio of projects.  
 The program in **green** has projects related to revisions needed for Product B.  
 The program in **orange** has projects related to the production of a new Product C.  
 The project in **brown** is unrelated to all other active projects and so is not part of a program.  
 Source: Author*

The following table helps to compare portfolios, programs, and projects at a high-level.

Table 1: Comparing Portfolios, Programs, and Projects			
	Portfolio	Program	Project
Definition	A portfolio is a collection of projects and programs managed as a group to achieve common goals.	A program is a group of related projects that are managed together and have some common goals.	A project is a temporary endeavor with a beginning and an end, aiming to create a unique product, service, or result.
Responsible	Portfolio Director	Program Manager	Project Manager
Management	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.	Programs are managed by program managers who ensure that program benefits are delivered as expected by coordinating the activities of a program's components.	Project managers manage the project team to meet the project objectives.
Scope	High-level scope that changes over the organization's program life cycle.	Program scope is defined at the start of the program and changes throughout the program life cycle.	Project requirements defined. The project scope is progressively refined and changed throughout the project life cycle.
Planning	Portfolio managers create and manage high-level processes relative to the organization's strategy.	Program managers progressively refine high-level information into detailed plans throughout the program life cycle. A work breakdown structure (WBS) helps manage tasks.	Project managers progressively refine high-level information into detailed plans throughout the project life cycle. A work breakdown structure (WBS) helps manage tasks.
Management Plan	A portfolio management plan is sometimes created. The plan will issue guidance on the processes and resources for the portfolio.	A program management plan is developed, with sections on budget, schedule, risk, communication, etc.	A project management plan is developed, with sections on budget, schedule, risk, communication, etc.
Changes and Adding Components	Portfolio managers monitor changes in the organization's strategy and internal and external environments.	Program managers monitor and adapt to change as necessary to optimize the delivery of benefits as the program's components deliver outcomes and/or outputs.	Project managers expect change and implement processes to keep change managed and controlled.
Monitoring	Portfolio managers monitor strategic changes, resource allocation, performance results, and risks for the overall portfolio.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits will be met.	Project managers monitor and control the work of producing the agreed deliverables within schedule and budget constraints.
Achieving Goals	Success is measured in terms of the performance and benefit realization of the overall portfolio.	Success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness.	Success is measured by deliverable quality, timeliness, budget compliance, and the degree of customer/client/user satisfaction.
Benefits to the Organization	Portfolios provide strategic alignment, resource optimization, improved decision making, efficiency, and risk management.	Programs help ensure that the component outcomes are delivered in a coordinated and complementary manner.	Projects have defined objectives and defined benefits to the organization, per the business case.

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