



# Project Management and Managing Change

An Online Continuing Education Course for Engineers

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# Project Management and Managing Change

Jeffrey S. Caudill, P.E.

## Understanding Project Change

Project scope change occurs after the client and the Project Manager have an agreed scope of work defined. This is usually found in a written document that details key elements of the scope, schedule, and budget. Changes to any of these three items is a change. Some examples are:

- ✓ The client requests that the project be completed several days, weeks, or even months ahead of the original schedule and/or delayed. This scope will affect the budget, and the scope may be reduced as well.
- ✓ A client decides to add new equipment, additional space, or location change to a project. The project team will evaluate the scope, schedule, and budget impacts and meet with the client to agree on impact changes.

Change can be more subtle, which is why it is so important to recognize it early. Some changes can be expected on any project. You cannot be perceived by clients to needle them on every minor change. This is part of the scope, schedule, and budget agreement. They should be documented and become part of any contingency dollars or schedule float.

Sometimes, project changes also meet the definition of OSHA's 29 CFR 1910.119(l) change. Managing change in many organizations that are regulated or consulting engineering companies that support OSHA regulated facilities are required to have a MOC (Management of Change Process).

MOC changes are defined as the addition, modification, or replacements that involve chemistry, process technology alterations, procedure, and/or personnel organization changes that affect key positions, any change that could potentially affect safety are considered changes. That is a long definition and does require some explanation.

In short, if you are touching anything in an OSHA regulated facility, then a MOC is required short of a replacement in kind. What is a replacement in kind? These are changes that keep the same fit, form, and function as the original. We will discuss this in more detail later, but as an example, if I change out piping for the same piping spec, this is a replacement in kind. If I add a valve, orifice plates, or change metallurgy, then this is a change.

At this point, you may be asking yourself how these two things are related. Consulting firms prepare project charters, define the scope, define the risks, set a schedule, and agree to a budget.

Once feasibility design is completed, they then opt for an early hazard review called a PHA (Process Hazard Review). The PHA is another of OSHA's 14 process safety management (PSM) elements. During this phase, control valves will be added or deleted, pumps will be changed, protection devices added/modified/deleted, and so on. Whole scope additions such as fire suppression or emergency interlocks are also added. Piping can change, such as coatings, insulation, etc. Any one of these, or the combined list, can result in a scope change to the overall project.

Managing these changes and knowing how to deal with these difficult conversations can greatly impact your career. Even though they may be necessary, how you discuss them with supervisors, clients, and upper management *can be a career-maker or a career-breaker*.

According to the Synovve Vandal blog project statistics list, the top 4 causes of project failure are:

- Poor or incomplete scope definition
- Scope Creep
- A lack of structured project management methodology
- Lack of change control

Regardless of who you ask, whenever a list of reasons for project failure is compiled, scope change is sure to be on the list. Common causes, such as incomplete and poorly defined scope definition, lack of scope verification, and scope creep, are all symptoms of poor scope management and scope change control.

### **Scope Change vs. Scope Creep**

The phenomenon of scope creep is similar to the normalization of deviance in that it is gradual and goes relatively unnoticed in the novice Project Manager's eye. These are small incremental changes that seem to be a part of a normal project, but then you review the project scope and charter in a project review, and it is so off base from the original you wonder how you got there. This phenomenon is where the project scope grows beyond the original defined statement of work. Scope creep is a lack of proper planning, costing, and approval processes.

Scope change is an agreement between the project manager and the client to change a feature, to expand or reduce the design functionality. This requires making adjustments to scope, schedule, and budget. Knowing this difference separates great Project Managers from former Project Managers.

Scope Creep and scope change both must be documented and managed. The best defense against finding yourself in a Scope Creep DeJa'Vu is to set up a defense against it. Having a formal change process and documenting change, no matter how small or large is preventative management. Appropriately addressing changes requires following the steps below like a Project Management religion:

1. Clearly define the Project Scope - *Essential*
2. Gain agreement with the client on scope, schedule, budget, and quality metrics
3. Develop a keen sense of scope change
4. Document, document, document
5. Set up weekly reviews to discuss potential scope changes with the client
6. Revise scope documents and update schedule, budget, and quality measures
7. Stay vigilant but not rigid. Everything is a negotiation

You must know what can be leveraged in a negotiation. The client has “wants” and “needs.” Knowing what “needs” the client requires and negotiating on “wants” gives you the upper hand. I was recently separated from my employer of almost 19 years due to Covid-19. I had several job offers quickly. Job offers are basically scopes of employment. Even though one stood out more than the others, I knew they stretched to get near my salary requirements. I could have negotiated here, but it would look unprofessional of me. Instead, I negotiated softer areas, such as vacation days. This methodology is employed in project scope negotiations. Remember, your goal is to work with the client without bending till you break. Repeat business is where the money is, rather than a one-and-out. I was once told in negotiations that if both sides feel they gained something and gave up something, then the process was fair. If one side gets everything they want, and the other feels like they lost, then the relationship is now permanently scarred and may not be repairable.

When designing a new office building, a client may ask you to add a small feature to the lobby. This is an example of scope creep, a seemingly small change that was not defined well in the scope document. And while scope creeps are small incremental change, eventually, they will impact the budget.

An example of scope change would be when your client decides to redo the entire lobby, changing the stairs, and adding a water feature. These are obvious changes in scope.

With scope creep, small changes must be documented. When you collect a few, then have the client discussions. Remember, it is a negotiation. “Negotiation” means that you agree on the scope, schedule, and budget impacts, not on whether the topic of discussion is a change or not. This should be your first conversation and should be guided by a well-defined scope document and work breakdown structure.

## Understanding Process Change

Process change does not occur in the fields of architecture and most non-industrial manufacturing projects. This specialized change evolves from OSHA 29 CFR 1910.119 (I) Process Safety Management change. Known as the 14 elements of process safety, these changes can and often are scope changes.

Scope Creep can occur with these types of projects as well. For example, you have a project designed with an air pneumatic control valve. It is determined that you are now going with mechanical throttling valves, like globe valves or an orifice plate. This may seem like cost savings but can still create the same amount of work on top of the work you have already performed. Determined during the project hazard review, this is a change, but you have to determine if the scope, schedule, and budget are impacted before you decide if it is a wash or not.

A common definition of process change is additions, modifications, alterations, or replacements that affect equipment, process chemistry, technology, procedures, training, or other PSM elements like safety, facility siting, and environmental programs that are not replacements in kind. The beauty of managing a design project for an OSHA regulated site is that these changes are tracked. They are reviewed multiple times during the different project stages of conceptual, feasibility, definition, and final plan submittals to the client. In this respect, process change management is much easier to recognize and manage. There are so many eyes on the ball it is difficult to miss.

Here is an example of a Novice owner's representative Project Engineer and a consulting Project Engineer. In review meetings with the owner and design firm, many changes or alternations can be discussed. Below is a tip for the novice Project Engineer.

***TIP: Anytime there is a project review meeting of any kind, immediately sit down with the consulting Project Engineer and discuss any perceived changes after the meeting. Let them know this will happen after every meeting. Early in my career as a Project Engineer, the consulting lead working for me would begin texting changes to their team during the meeting. They were already preparing scope change documents and getting their team working on the changes. However, these were not formally agreed to by my Supervision or my company. Having to use my entire contingency by the time the project was completed, I learned by trial and error to not only watch for this behavior but put a stop to it before it began. To be fair, the consulting firm thought they were being proactive and addressing our needs. However, we were building a scope creep and project changelog that was not managed. It only takes one of these projects for most Project Engineers to correct this issue.***

Let us define replacement in kind for process changes. "A replacement in kind is one that replicates the design parameters of the item it is replacing. A replacement in kind is one that is identical in critical areas such as fit, form, function, and metallurgy.

Here are some examples:

- Changing from a Schedule 40 to Schedule 80 pipe is a change.
- Installing a pipe clamp is a change.
- Changing a pump seal design is a change.
- Changing gasket material from, say, graphite wound to Cam-profile is a change.
- Changing pump impeller size is a change.
- Changing or modification of programming logic is a change.
- Updating a piping or equipment specification and the associated equipment to match is a change.
- Changes to PSI (Process Safety Information) is a change.
- Changes made after the final design is issued and PHA (Process Hazard Review) are changes to both the Process Safety but Project as well.

The tables below provide some additional comparisons for process changes versus replacement in kind. If the scope is defined, these could be project changes as well.

Some additional Process Change Information:

Change Type	Changes will include:
Decommission / Remediation	Decommission or remediate a whole Process unit
<b>Equipment Type Changes below include Changes associated with the particular equipment and materials and any continued operation beyond normal design basis with equipment unavailable on a temporary basis</b>	
Equipment - Civil / Structural	Stability of structure, marine, and floating systems
Equipment - Electrical	Generation, transmission, distribution equipment, motors, and especially overloads, relay trip settings, fuse sizes, or protective relaying
Equipment - Fixed	Piping, storage tanks, exchangers, fired heaters, furnaces, vessels, cooling towers, etc.
Equipment - General /Support	mobile cranes, process unit elevators
Equipment - Instrument / Control	Operating control philosophy including use of and change to a computer control system
Equipment - Rotating	Turbines, pumps, compressors
Facilities	Buildings, intended occupancy
Chemicals	
Protective Systems - General	Systems such as rapid dump, Catalytic Reduction (SCR)
Protective Systems - IPS/ SIS	Installation, modification, removal, interlocks, SIS
Protective Systems - Relief	Risk, including replacing a capacity or type, and at an RV.
Technology - IT / Communication	Operational Knowledge; schedule/ track system
Technology - Process	Integration with systems out of operations outside

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