Internal processes are developed by Structure Construction (SC) to produce products and perform services for our customers. SC’s business processes are identified by SC Top Management and assigned to SC Technical Teams for development. The following are instructions to SC Technical Teams for developing a process using the PDD.

Process development consists of three stages:

2. Develop the draft PDD.
3. Develop the draft Change Letter.

PDDs are documents used to ensure conformance with the requirements for process development stated in the SC Quality Manual, Section 4.4, SC’s Business Processes, and Section 8, Operation. PDDs contain the following sections, as stated in the SC Quality Manual, Section 8.3, Development of Processes:

1. Background.
3. Criteria.
4. Resources.
5. Responsibilities and Authorities.
6. Risks and Opportunities.
7. Procedure.
10. Improvement.
11. Attachments.

Change Letters are used to describe changes made to existing SC documented information as a result of development of the PDD.

SC Technical Teams begin development of a process when a PDD template is received from the SC Technical Manual Manager (TMM). The PDD template provided by the SC TMM has the Background section filled out. This defines the scope of the process.

SC Technical Teams are advised to review related processes to ensure information already documented is not repeated in the new process.
Process development has two end products:

1. Draft PDD and attachments when needed.
2. Draft Change Letter.

Each of these products is delivered to the SC TMM when the SC Technical Team has completed development of the process.

Bridge Construction Memos (BCM) are the distilled version of the PDD and provide the essential sections for SC staff to complete the process. BCMs consist of the following sections of the PDD:

1. Background.
3. Procedure.
5. Attachments.

SC Technical Teams are not required to complete the BCM. BCMs are completed by the SC TMM upon approval of the PDD by the SC Deputy Division Chief.

**Process Development Planning**

Before beginning work on the draft PDD and Change Letter, SC Technical Teams must consider process development planning. Process development planning activities include the following:

1. The expectations, nature, duration, and resources of the process development activities.
   
   SC Technical Teams must determine:
   
   a. What is SC trying to achieve with this process?
   b. What needs to be done in order to develop the process?
   c. How long will it take to develop the process?
   d. What resources will be required to complete development of the process?

2. The required process development stages, including applicable development reviews.
   
   SC Technical Teams must consider the following:
   
   a. Research existing documented and undocumented information:
      
      i. [Existing BCMs](#)
      ii. [Revised Standard Specifications](#)
      iii. Applicable [Standard SSPs](#)
iv. **Outline of Field Construction Practices**
v. **SC technical manuals**
vi. **Winter Training presentations**

vii. **CT Construction Manual**

viii. **Construction Policy Bulletins** (not yet inserted into Construction Manual)
ix. **Construction Procedure Directives**

x. **Director’s Policies**

xi. **Deputy Directives**

xii. **CT Health and Safety Manual**

xiii. Other Caltrans manuals

xiv. External agency requirements, such as [CCR Title 8](#)
xv. The tribal knowledge of Team members and other stakeholders.

b. The logistics needed for the Team to combine the results of the research. Will there be Team meetings? If not, how will information be shared?

c. What reviews need to be conducted during process development and at what frequency?

3. The required process development evaluation, verification, and validation activities.

   SC Technical Teams must consider the following:

   a. How will process development be evaluated and when?
   b. How will the Team verify that process development is being performed?
   c. How will the Team validate the process development work performed to ensure that the process does what SC is trying to achieve?

4. The responsibilities and authorities involved in process development:

   a. Which Team members will be responsible for each component of process development?
   b. What authority will each Team member have? Will individual Team members have the authority to edit the work of other Team members?

5. The internal and external resource needs for process development.

   a. Are other stakeholders involved in the process?
   b. How will the SC Technical Team integrate and align development of the process for procedures performed by other stakeholders?
   c. What responsibilities and authorities will other stakeholders have in the development of the process?
6. The need to control interfaces and participation between persons involved in the development process:
   a. This combines Steps 4 and 5 by setting boundaries on the interaction of Team members and other stakeholders involved in process development.

7. The need for involvement of customers and users in the development process:
   a. SC Technical Teams must consider what the outputs of the process are, who the customers of the outputs are, and how to involve them in the development of the process.
   b. SC Technical Teams must also consider who the users of the process will be and how to involve them in the development of the process. It’s generally considered a best practice to not develop a process that the users cannot understand or perform.

8. The level of control expected for the development process by customers and other stakeholders:
   a. If the SC Technical Team decides to involve customers and other stakeholders in the development of the process, how much control will they be given? Advisory authority? Veto authority?

9. The documented information needed to demonstrate that design and development requirements have been met and maintained:
   a. How will the SC Technical Team document process development? Team meeting minutes? Records of conversations with customers and other stakeholders?

Once process development planning has been completed, proceed with process development.

**Develop the Draft PDD**

A process is defined as any activity or set of tasks that uses resources to transform inputs from stakeholders into outputs for customers. SC Technical Teams are responsible for identifying “the activity or set of tasks”, “resources”, “inputs”, and “outputs” for each process.

SC’s processes describe WHAT the person(s) performing the process is expected to do. SC’s technical manuals and process attachments describe HOW the user performs the process. Information ascribed to WHAT includes SC’s expectations for the procedural steps SC staff are expected to perform. Information ascribed to HOW are the instructions, calculations, case studies, and other information that describe SC’s best practices for performing the process. The distinction between different types of documented information is described in detail in The WHAT and HOW Document. For example, the PDD for SC Technical Team Operation describes WHAT is required (Develop SC’s business processes using Process Development
Diagrams) and references this attachment. This attachment describes HOW to develop SC’s business processes.

When information used to describe HOW to perform a procedural step within a process is contained in an SC Technical manual or other source document, use hyperlinks within the PDD to link the technical document that contains the HOW as shown below:

1. To link to a form, document the link in the PDD as shown in the following example: Form CEM-3101, Notice of Materials to be Used.

2. To link to a BCM, document the link in the PDD as shown in the following example: BCM B-2.02, Structure Construction Technical Team Operation.

3. To link to a SC Technical manual, document the link in the PDD as shown in the following example: Foundation Manual, Chapter 9, Slurry Displacement Piles.

4. If the specific portion of a technical document cannot be directly linked, reference the section of the technical document within the procedural step. For example, if the SC Technical Team wanted to link a procedural step for Cast-In-Drilled-Hole pile acceptance to additional information in Chapter 9-9, Pile Acceptance Testing, of the SC Foundation Manual, the closest hyperlink available is to Chapter 9 of the SC Foundation Manual. In cases like this, use a reference, such as “Link to Chapter 9-9, Pile Acceptance Testing, of the SC Foundation Manual” in the procedural step. The actual hyperlink to the specific reference in Chapter 9-9 of the SC Foundation Manual will be established in SC HQ during the review and preparation for publication of the BCM.

When developing each process, write the PDD in accordance with the requirements of the Style Guide for Structure Construction Technical Manuals.

When writing a new or revised PDD, use the PDDs in the SC PDD Library for guidance.

Be cognitive of language that will remove responsibility from the Contractor or other stakeholders and place it on SC. Limit the use of words like “ensure” to actions and outcomes SC directly controls. “Confirm” or “verify” are preferred for actions or outcomes under the control of other stakeholders. When in doubt, contact the Caltrans Legal Division for an opinion.

Be sure to cite outside sources. In some cases where information is cited from outside Caltrans, permission may be required prior to using a link to their website in a PDD in support of a BCM.

Following is a description of how to develop each section of the draft PDD:

**Background**

The Background section of the draft PDD is used to identify the scope of the process and any Caltrans policy addressed within the process. The scope of the process can be narrow, such as the...
process for administering a Contract Standard like Welding Quality Control. The scope of the process can also be wide, such as the process for SC Technical Team operation.

The Background section is developed by the SC Quality Management Representative (QMR) after the process has been identified by SC Top Management. The SC QMR submits the Background section to the SC TMM for delivery to the appropriate SC Technical Team. SC Technical Teams can add information to the Background section, but should not alter the language provided by the SC QMR. The language provided is in conformance with the Style Guide for Structure Construction Technical Manuals and is intended to provide consistency with other SC processes.

Below is an example of a Background statement from PDD 49-2.01D, Driven Piling – General – Payment:

This process establishes Structure Construction (SC) responsibilities and procedures for measurement and payment of all types of driven piling shown on the project Bid Item List, including payment for Materials on Hand.

**Process Inputs**

Process inputs signal the start of a process. Process inputs can be physical objects, such as a Contractor submittal or test samples. Process inputs can also informational, such as a contract requirement or an event. In either case, process inputs are often the result of outputs from a precedent process. For example, a Contractor submittal is the input for a submittal review process, and the output of that process is the authorized submittal. The authorized submittal then becomes the input for the materials acquisition, fabrication, or construction processes.

List all process inputs in bullet form. Keep it general. For example, all types of submittals do not need to be listed as process inputs. “Contractor submittals” is sufficient.

Below is an example of Process Inputs from PDD 49-2.01D, Driven Piling – General - Payment:

1. Form CEM-3101, Notice of Materials to be Used.
3. Completed Form SC-4803, Pile Quantity and Driving Record (Driven Piles).

Following are several of the process inputs for this PDD:

1. *Draft specifications*: A new draft specification or a significant proposed change to an existing specification signals the beginning of the SC Technical Team Operation process. Whether the draft specification results in a new or revised SC business process depends on the results of the procedural steps performed by the SC Technical Team.
2. **Project issues and Lessons Learned**: These are often the raw material that result in draft specifications, but they may also provide input for identification of a process improvement that results in a new or revised PDD.

3. **DES / SC Top Management direction**: Management direction can be the result of a change of Caltrans or FHWA policy, a regulatory change, or anything else that provides a reason to change an SC business process.

### Criteria

The criteria for a process provides the basis for how the process will be judged and is used to evaluate whether the process achieved the requirements it is trying to meet.

Most criteria is based on laws, regulations, or contract standards. For example, for most construction field processes, the criteria for the process is the contract documents. Did the process achieve the requirements of the contract documents? Other examples include CCR Title 8 regulations. Did the process achieve the safety goals and requirements of the regulations?

Criteria supports the Procedure section of the PDD. SC Technical Teams must review the criteria when writing procedural steps to verify the process achieves the requirements it is trying to meet.

List all criteria in bullet form. Keep it general. For example, “Contract documents” is adequate for describing all criteria that may be included within the hierarchy of documents listed in *Standard Specifications*, Section 5-1.02, *Contract Components*.

Below is an example of Criteria from PDD 49-2.01D, *Driven Piling – General - Payment*.

2. Change Order for revised tip elevation, if applicable.

### Resources

Resources are the people, infrastructure, and environment needed to complete the process. These resources should be known and acquired in advance of performing the process. Without the necessary resources, the process might abruptly stop.

People include the persons who perform the process. Typical persons include the Structure Representative, Assistant Structure Representative, the Bridge Construction Engineer, and the Area Construction Manager. They may also include the Designer, the Geoprofessional, other staff from METS or GS, District staff, and others who have a role in the process.

However, it is not enough just to list the persons who perform the process. Per the *SC Quality Manual*, Section 7.1, *Resources*, and Section 7.2, *Competence*, the persons must be competent and have the ability to perform the process. Competence and ability are achieved through
education, training, counseling, and experience. Describing the abilities a person who performs the process must have is a good way of identifying the education, training, counseling, and experience requirements necessary.

Infrastructure includes the physical facilities and equipment necessary to perform the process. This often includes office space, electronic communication equipment, computers, and vehicles, but can also include testing equipment, personal protective equipment, survey equipment, and other tools. It’s hard to perform a process if you don’t have the necessary tools.

Environment includes the physical environment the process is performed in. Office space is needed for some processes, but is it adequately lit, does it have internet connectivity, are there sanitary facilities, etc. Consider the job site, is there safe access for SC staff to perform the process. Other environmental factors may apply, such as weather conditions.

Resources support the Procedure section of the PDD. SC Technical Teams must review the resources when writing procedural steps to verify the process includes all needed resources.

List all required resources in bullet form for each category (People, Infrastructure, and Environment.)

Below is an example of Resources from PDD 49-2.01D, Driven Piling – General – Payment:

1. People:
   a. Structure Representative:
      i. Ability to administer structures work.
      ii. Ability to utilize Form CEM-3101, Notice of Materials to be Used, and Form TL-29, Report of Inspection of Material, for Materials On Hand payment.
      iii. Ability to utilize Form SC-4803, Pile Quantity and Driving Record (Driven Piles), and Form SC-4806, Pile Layout Sheet, for payment.
   b. Assistant Structure Representative:
      i. Ability to utilize Form CEM-3101, Notice of Materials to be Used, and Form TL-29, Report of Inspection of Material, for Materials On Hand payment.
      ii. Ability to utilize Form SC-4803, Pile Quantity and Driving Record (Driven Piles), and Form SC-4806, Pile Layout Sheet, for payment.
   c. SC Substructure Engineer:
      i. Ability to provide assistance as required.

2. Infrastructure (Tools, physical assets):
   a. Computer.
   b. Forms.
3. Environment (Physical, social, safety & health as applicable):
   a. Suitable field office.

Responsibilities and Authorities

You just listed all the People needed as resources to perform the process. Each person bears some responsibility for and has authority to perform the process. What are their individual responsibilities and authorities?

For example, in the “Resources” section above, the Structure Representative must have the ability to perform an engineering review of shop drawings. This means they must have the education, training, and experience necessary to perform the engineering review. In this section, the process assigned responsibility and authority for performing the engineering review of the shop drawings to the Structure Representative.

The difference between this section and the “Resources” section is that the “Resources” section describes the competency the person must have to perform the process, whereas this section describes the responsibility and authority the person actually has to perform the process.

Responsibilities and Authorities are used to support the Procedure section of the PDD. SC Technical Teams must review the responsibilities and authorities of each person when writing procedural steps to verify the process can be performed by the people expected to perform it.

List all responsibilities and authorities each person has to perform the process in bullet form.

Below is an example of Responsibilities and Authorities from PDD 49-2.01D, Driven Piling – General – Payment:

1. Structure Representative:
   b. Prepare contract item payment based upon completed Form SC-4803, Pile Quantity and Driving Record (Driven Piles), and Form SC-4806, Pile Layout Sheet.
   c. Draft Change Orders for payment of piling beyond specified tip elevation.

2. Assistant Structure Representative:
   b. Assist Structure Representative with preparation of contract item payment based upon completed Form SC-4803, Pile Quantity and Driving Record (Driven Piles), and Form SC-4806, Pile Layout Sheet.
c. Assist Structure Representative with preparation of draft Change Orders for payment of piling beyond specified tip elevation.

Risks and Opportunities

Risk in this context is any uncertainty that can affect our ability to perform the process. Risk management is how we evaluate and address each risk. Risks generally have negative connotations, but can also have positive connotations, which become opportunities. In both cases, uncertainty is involved, both in knowing when or if a risk will come to pass and how it will affect us.

In this context, consider only those risks and opportunities that affect each individual process. What could possibly go wrong (or right) during the performance of the process?

For example, submittal review is a common process. One of the risks associated with submittal review is not being able to complete the review in the required timeframe. Your task as a Technical Team is to assess the following:

1. What is the probability of this risk occurring and what is the impact?
2. How could the performer of the process assess whether this risk arises?
3. How is this risk addressed?

For submittal review, the probability of not completing the review in the required timeframe is low, but the impact to the contract schedule could be high if the submittal review is on the critical path. Assessing whether this risk arises is straight-forward if the submittal review is within our control, but some submittals are reviewed by others. Addressing this risk requires tracking submittal review progress and communication with all parties involved with review of the submittal. All of these considerations are documented in the table included in this section.

Risks and opportunities are used to support the Procedure section of the PDD. SC Technical Teams must review the risks and opportunities inherent to the process and include possible mitigation when writing procedural steps to address risks and opportunities whenever possible.

List all risks and opportunities in the table as shown in the example from PDD 49-2.01D, Driven Piling – General – Payment, below, including probability, impact, assessment, and mitigation for each risk or opportunity.
### R/O | Description | Probability | Impact | Assessment Method (if applicable) | Mitigation
---|---|---|---|---|---
R | Since driven piling is not a “Final Pay” item, there may be disagreements between the Contractor and the Structures Representative. | 3 | 3 | The day before the payments are due. | Keep pile logs accurate and discuss with the Contractor.
R | Disagreements regarding Material on Hand payment vs. Furnish Piling. | 2 | 3 | Progress Payment dispute. | Develop consensus with the Contractor prior to progress payment.
R | Poor documentation of driven piling records. | 3.5 | 3.5 | Insufficient information to produce a payment. | Keep accurate driven pile records.
O | Good documentation used to dispute Contractor claims. | 3 | 4 | Audits of records. | Continuous inspection.

### Procedure

Procedures are a step-by-step list of tasks that set forth WHAT needs to be done to convert process inputs into process outputs.

Keep in mind all procedures are for what SC staff need to do to perform the process – NOT what the Contractor does.

Each of the precedent sections of the PDD establish what goes in this section. The “Background” section sets the scope of the process. The “Process Inputs” section establishes what can be expected to initiate or continue the process. The “Criteria” section establishes the parameters or requirements of what the process is to achieve. The “Resources” section establishes the people,
infrastructure, and environment needed to perform the process. The “Responsibilities and Authorities” section establishes the responsibilities and authorities of each person that participates in the process. The “Risks and Opportunities” section establishes the potential risks and opportunities to the process and what can be done to mitigate them.

Your task as a Technical Team is to capture all of the above in a step-by-step list of tasks.

The first task listed is associated with all processes: how to charge time for performance of the task. Choose from one of the four types listed (Project-Direct – Construction, Project-Direct – Preconstruction, Overhead, or CapCorp). Most processes are associated with only one of the types of time charging. Occasionally a process may require more than one of the types, in which case you need to list each possible charging type and the portions of the process associated with each type.

The second task listed is associated with processes that have a field inspection component. Choose from one of the three types of inspection listed (Benchmark, Intermittent, or Full-Time). Provide an explanation of the portion of the process associated with each inspection type.

The remaining tasks listed in this section depend on the type of process.

In general, processes associated with the performance of the construction contract, listed in Bridge Construction Records and Procedures, Volume II, are organized in subsections as follows:

1. Before construction begins.
2. During construction.
3. Following construction.

The subsection “Before construction begins” is associated with all procedure steps that take place before construction associated with the process begins. These include preparatory procedures, such as preconstruction meetings, submittal reviews, materials fabrication and release, discussions with the Contractor, and preparation of forms and other documentation needed for construction.

The subsection “During construction” is associated with all procedure steps that take place during construction associated with the process. These include completion of forms and other documentation based on construction performed, inspection of the work performed, any testing performed during construction, and writing the Daily Reports.

The subsection “Following construction” is associated with all procedure steps that take place after construction associated with the process is completed. These include filing forms and documents in the project records and any measurement and payment requirements associated with the process.
Below is an example of a procedure from PDD 49-2.01D, *Driven Piling – General – Payment*, which does not have a field inspection component:

1. All work associated with this process is charged as **Project-Direct – Construction**.
2. Before construction begins:
   a. Prior to each progress payment period, discuss driven piling materials inspection, release for construction, delivery to the job site, and piles already driven with the Contractor to determine payment for Materials on Hand per Attachment 1, *Driven Piling – Measurement and Payment*, and BCM 9-1.16, *Payment – Progress Payments*.
3. Following construction:

In general, processes associated with the requirements of SC, listed in *Bridge Construction Records and Procedures, Volume I*, are organized in subsections as follows:

1. **SC Staff**.
2. **SC Supervisors**.
3. **SC Managers**.

The subsection “SC Staff” is associated with all procedure steps performed by SC staff. For example, SC staff are responsible for completing and forwarding a Travel Expense Claim for expenses incurred during the course of their duties. This subsection captures the procedure steps SC staff need to perform this task.

The subsection “SC Supervisors” is associated with all procedure steps SC supervisors are responsible for. Using the example above, SC supervisors are responsible for reviewing the Travel Expense Claim approving it, and forwarding it to SC Headquarters in Sacramento. This subsection captures the procedure steps SC supervisors need to perform this task.

The subsection “SC Managers” is associated with all procedure steps SC managers are responsible for. Using the example above, SC managers are responsible for ensuring SC staff and SC supervisors perform their tasks in conformance with the requirements of the process. They also establish when travel expenses are authorized. This subsection captures the procedure steps SC managers need to perform this task.
Below is an example of a procedure from PDD B-1.07, *Fair Labor Standards Act*, which does not have a field inspection component.

1. All work associated with this process is charged as Overhead, unless otherwise directed.

2. SC staff:
   a. When your Headquarters address or reporting location is changed, or if short-term travel is required:
      i. Review the FLSA Implementation Handbook
      ii. Discuss whether FLSA requirements for additional compensation apply with your supervisor
      iii. If the FLSA requirements apply, complete appropriate FLSA travel time calculation worksheet

3. SC supervisors:
   a. Discuss completion of the FLSA travel time calculation worksheet with your SC staff
   b. Uniformly and correctly apply FLSA requirements (link to FLSA Implementation Handbook)
   c. Forward completed FLSA travel time calculation worksheet to the SC manager
   d. Review and approve overtime entries on SC staff timesheets due to FLSA requirements
   e. Monitor SC staff for compliance
   f. Notify SC managers of SC employee non-compliance, take action to attain compliance as necessary
   g. Notify SC managers of problems with or improvements that can be made to FLSA travel time calculation worksheets

4. SC managers:
   a. Establish procedures for completing FLSA travel time calculation worksheets and evaluate results for improvement
   b. Approve and retain FLSA travel time calculation worksheets
   c. Monitor SC staff and SC supervisors for compliance, take action to attain compliance as necessary

There are many possible procedure steps that could be identified as part of a process. As Technical Team members, your tribal knowledge as well as your knowledge of previously documented procedures is essential to fully capture the procedures necessary to fulfill the requirements of the process. Extracting this information from your heads and documenting it is the expected outcome.
**Process Outputs**

Process outputs signal the conclusion of a process. Like process inputs, outputs can be physical objects, such as an authorized Contractor submittal or test samples. Process outputs can also informational, such as a contract requirement or an event. In either case, process outputs are often the inputs for the subsequent process.

The customer of the process output must be identified, as well as the customer’s expectations for the process output. Customer expectations cannot be assumed. They are derived from communication with the customer.

List all process outputs in bullet form. Keep it general. For example, all types of authorized submittals do not need to be listed as process outputs. “Authorized Contractor submittals” is sufficient.

Below is an example of process outputs from PDD 49-2.01D, *Driven Piling – General – Payment*.

1. Monthly Materials on Hand payment:
   a. Customers: District, Contractor.
   b. Customer Expectations: Paid in accordance with the requirements of the contract documents.

2. Monthly Progress Payment for piles driven:
   a. Customers: District, Contractor.
   b. Customer Expectations: Paid in accordance with the requirements of the contract documents.

Following are several of the process outputs, customers, and customer expectations for this PDD:

1. **Review comments on draft specifications**:
   a. A new draft specification or a significant proposed change to an existing specification signals the beginning of the SC Technical Team Operation process and is considered a process input. “SC Technical Team review comments” is the process output.
   b. The customer of the review comments must be identified. Generally, the customer is “DES Specification Development.”
   c. The customer’s expectations must also be identified. Generally, DES Specification Development wants to know if the draft specification has a potentially negative consequence on constructability or contract administration. Their expectation is that the review comments will address these considerations.
2. **New or revised PDDs:**

   a. Management direction provides the reason to change an SC business process and is considered a process input. SC Technical Team Operation produces a new or revised PDD based on the guidance provided in this attachment. The process output is the “New or revised PDD”.

   b. The customers of the new or revised PDD must be identified. SC staff are the customers we most often think of when developing new or revised PDDs, but there are other stakeholders that use our business processes, including others in DES, the Division of Construction, local agencies and consultants.

   c. The customer’s expectations must also be identified. Generally, the expectation is that the PDD will include sufficient information to perform the process in accordance with SC’s organizational expectations.

**Measurement and Evaluation**

Measurements are what will tell us whether the process is performing as expected – or being performed as expected. Evaluation is comparing the actual results from measurement with the intended results of the process and identifying whether there is a gap.

There are three parameters SC Technical Teams are expected to address in this section:

1. Intended results of the process
2. Measurements needed to evaluate the process
3. Evaluation of the process

The intended results of the process is simply what the process is trying to achieve. For example, this process intends for each SC Technical Team to produce a scheduled number of PDDs within each fiscal year. The number of PDDs expected is measurable. However, for some processes, the intended results are more subjective and may require some thought about how to determine measurements that are meaningful.

The measurements needed to evaluate the process are necessary to determine the actual results of the process. For example, a measurement for this process that corresponds to the intended results described in the above paragraph is the actual number of PDDs produced by each SC Technical Team within each fiscal year. Again, for some processes, measuring the actual results may be difficult if the results are subjective.

The evaluation of the process to determine whether the process is working as intended is the difference between the actual measured results and the intended results – for each measurement tool.
Start with the measurement tools SC already uses. For example, we use the *Project Record Review* form to measure a number of parameters, which in turn correspond to a number of processes. There are other measurement tools in SCEMS and VISION that can also be used to measure the results of SC processes. SC Technical Teams do not necessarily need to reinvent measurement tools, unless one does not currently exist for the process.

List all intended results of the process, measurements needed to evaluate the process, and evaluation of the process in bullet form under the respective parameter.

**Improvement**

Improvement is a difficult thing to address. Generally, if we are creating or modifying a process, we would already build in any improvements that we came up with while developing the PDD.

This section is intended to address more general categories of future improvement. Could the process be made more efficient, perhaps through a Lean-6 Sigma analysis? Could the process be simplified to reduce nonconformities? Could the process be revised to address enterprise-level risks and opportunities? These are items that the SC Technical Team may not be able to immediately address, but can be listed as considerations for future development.

List all improvement categories in bullet form within this section.

**Attachments**

Recall from above that PDDs address the WHAT, while attachments and SC’s technical manuals address the HOW. Attachments to PDDs are intended to capture instructions and other information that is necessary for release of the new or revised PDD that is not currently contained in SC’s Technical manuals. Attachments are intended to be used as an intermediate step to capture technical information that cannot be immediately transferred to a technical manual. Attachments are a great way to capture tribal knowledge and other organizational information that might otherwise be lost.

What if there is no technical manual that supports the process? Then attachments are required to explain HOW to perform the procedural steps of the process. This PDD is a good example of a PDD that is unlikely to have an SC Technical manual to provide the HOW, so attachments are necessary.

Attachments can provide a variety of information, including:

1. Information on HOW to perform the procedural step.
2. Information on HOW to fill out forms and other documents.
3. Sample calculations in support of the procedural step.
4. Commentary on the governing specifications or other requirements.
5. Case studies describing how the process was performed on other projects.
6. Historical information on the origins of the process.

Below is an example of an attachments from PDD 49-2.01D, Driven Piling – General – Payment:

**Driven Piling – Measurement and Payment**

**Measurement**

Driven piling that fails to reach tip elevations shown on the plans, but has been determined to be adequate and approved by the Designer, is measured along the longest side, from the tip elevation shown on the plans to the plane of cut-off elevation.

**Payment**

**Materials on Hand**

When the contract special provisions qualify the material for *Materials on Hand* and it does not meet the requirements for “furnishing”, payment may be made as *Materials on Hand* at the Contractor’s request.

Steel piling and precast concrete piling are typically listed in the contract special provisions as being eligible for payment for *Materials on Hand*, but not yet incorporated in the work.

**Section 3-906E, Materials on Hand, of the Construction Manual**, states: “...In general, accept only completely fabricated units, ready for installation on the project with the following exceptions:

*Piling—Steel plate used for steel pipe piling and driven steel shells filled with concrete and reinforcement as described in Section 49-3.03 of the Standard Specifications may be considered acceptable as raw material. However, pay for such material as raw material only until shop fabrication of the pile is 100% complete. After shop fabrication is complete, the estimated fabricated value may be paid, subject to other specified restrictions and administrative guidelines.*

**Furnish and Drive Piling Contract Item Payment**

When steel or precast concrete piling of proper length are delivered to the job site ready for driving, the specification requirements for furnishing have been met and the material should be paid under *furnish piling* item on the monthly progress pay estimate. Piles stored offsite, or onsite but not ready for driving, are to be considered as *Materials on Hand*. 
For steel pipe piling, full payment on the furnish item will not be made until the piling is on site and all field welds are completed and approved. This work includes welding of splices, and shear rings, when required in the contract documents.

There is no “one size fits all” type of attachment. When attachments are necessary, each PDD will have attachment(s) that are unique to the process.

Ultimately, the goal is to eventually migrate information contained in attachments into the respective SC Technical manual – unless there is no SC Technical manual that supports the process.

**Develop the Draft Change Letter**

Change letters are used to describe changes made to SC’s documented information. Change letters are intended to provide a historical record of WHAT was changed, WHEN it was changed, and WHY it was changed. The Change Letter also conforms to the requirements for change management specified in the *SC Quality Manual*, Section 6.3, *Managing Changes to the QMS*.


The Change Letter can be used to describe five different types of BCM revisions regarding new processes or process revisions listed below. As described below, more than one type of change may apply to a new or revised process. “Existing BCM” refers to BCMs written prior to the implementation of SC’s QMS.

**Revisions**

1. **Information (policy, procedure, or process) from an existing BCM that is included in a new PDD**

   This refers to information from an existing BCM that tells the user WHAT is expected of them in the performance of the process. This information is transferred directly to the procedural steps of the new process.

   If the new process completely replaces the existing BCM, editing the existing BCM is not required. The existing BCM is archived upon publication of the new process.

   If the new process partially replaces the existing BCM, refer to Item 5 below.

2. **Information (instruction, commentary, examples, calculations) from an existing BCM that is moved to or included in an SC technical manual**
This refers to information from an existing BCM that tells the user HOW to perform a process. Sometimes this information is already included in the respective SC technical manual. More often than not, the information from the existing BCM needs to be transferred to the SC technical manual. Generally this will be done using an attachment to the new PDD to capture the information the existing BCM.

If the new process completely replaces the existing BCM, editing the existing BCM is not required. The existing BCM is archived upon publication of the new process.

If the new process partially replaces the existing BCM, refer to Item 5 below.

3. **Information (incorrect, superfluous, not needed) from an existing BCM to be discarded**

This refers to information from an existing BCM that is not included in the new or revised process. This is used when the information in an existing BCM is out of date or otherwise incorrect.

If the new process completely replaces the existing BCM, editing the existing BCM is not required. The existing BCM is archived upon publication of the new process.

If the new process partially replaces the existing BCM, refer to Item 5 below.

4. **New information (policy, procedure, or process) that is being added to the new PDD**

Use this revision type when writing a new process, whether it replaces existing BCMs or when there is no existing BCM.

5. **Information from an existing BCM that needs to remain until the information can be incorporated into a new PDD or an SC technical manual**

This refers to information from an existing BCM that is being incorporated into several new processes. SC Technical Teams must capture what information is being transferred to the new process as well as the information to remain in the existing BCM.

Editing the existing BCM is required as shown below to inform the SC TMM of the disposition of information from the existing BCM. The markup on the existing BCM must clearly delineate:

a. What information is being kept in the existing BCM?

b. What information is being discarded from the existing BCM?
c. What information is being transferred to the new process?

d. What information is being transferred to an attachment to the new process or to an SC technical manual?

Handwritten edits were used in the example below, but SC Technical Teams can use electronic comments to .pdf documents if preferred. The important thing is to clearly delineate the disposition of the information in the existing BCM.

Below is an example of disposition of existing BCM 130-6, *Measurement and payment for piling*, which was identified as partially replaced by PDD 49-2.01D, *Driven Piling – General – Payment.*
Measurement and Payment for Piling

Measurement and payment clauses are in the Standard Specifications (SS), the Special Provisions (SP) and the Construction Manual. Review these documents.

Measurement

The SS\(^1\) specify how piles are measured and paid for. However, the requirements of the SS vary depending on the version used when the contract was written.

Contracts using Section 49-6.01 of the 2006 SS provide for measurement of piling as follows:

*The length of timber, steel, and precast prestressed concrete piles, and of cast-in-place concrete piles consisting of driven shells filled with concrete, shall be the greater of the following:*

**A.** The total length in place in the completed work, measured along the longest side, from the tip of the pile to the plane of pile cut-off.

**B.** The length measured along the longest side, from the tip elevation shown on the plans or the tip elevation ordered by the engineer, to the plane of pile cut-off.

Piling that extends beyond the tip elevation shown on the plans, as ordered by the Engineer, to meet design requirements, will be measured under the provisions of Part A; while piling that fails to reach the tip elevation shown on the plans, but has been determined to be suitable for the design, will be measured in accordance with Part B.

Contracts using amended versions of Section 49-6.01 of the 2006 SS provide for measurement of piling as follows:

*The length of timber, steel, and precast prestressed concrete piles, and of cast-in-place concrete piles consisting of drive shells filled with concrete, shall be measured along the longest side, from the tip elevation shown on the plans to the plane of pile cut-off.*

Contracts using revised versions of Section 49-2.01D of the 2010 SS provide for measurement of piling as follows:

*Furnish piling is measured along the longest side of the pile from the specified tip elevation shown on the plans to the plane of pile cutoff.*

\(^1\) 2010 SS, Section 49-2.01D, Payment, or 2006 SS, Section 49-6, Measurement and Payment.
Piling that fails to reach tip elevations shown on the plans, but has been determined to be adequate and approved by the Designer, will be measured along the longest side, from the tip elevation shown on the plans to the plane of cut-off elevation.

**Payment**

**Materials on Hand**

Bridge Construction Memo (BCM) 6-4.0, *Partial Payments*, addresses the differences between *Materials on Hand but not yet incorporated in the work*, and payments for furnishing materials. Refer to BCM 6-4.0 prior to making payments for piling.

When the SP qualify the material for *Materials on Hand* and it does not meet the requirements for “furnishing”, payment may be made as *Materials on Hand* at the Contractor’s request.

Precast concrete piling, steel piling, steel shells for cast-in-steel-shell concrete piling, and permanent steel casing for cast-in-drilled-hole concrete piling are typically listed in the SP as being eligible for payment for *Materials on Hand but not yet incorporated in the work*.

Bar reinforcing steel used in cast-in-place concrete piling is typically listed in the SP as being eligible for payment for *Materials on Hand but not yet incorporated in the work*.

Section 3-906E, *Materials on Hand*, of the *Construction Manual*, June 2013, states: “...In general, accept only completely fabricated units, ready for installation on the project with the following exceptions:

Piling—Steel plate used for steel pipe piling and driven steel shells filled with concrete and reinforcement as described in Section 49, “Piling,” of the Standard Specifications may be considered acceptable as raw material. However, pay for such material as raw material only until shop fabrication of the pile is 100% complete. After shop fabrication is complete, the estimated fabricated value may be paid, subject to other specified restrictions and administrative guidelines.”

**Furnish and Drive**

The following guidelines have been established to ensure uniform practice throughout the State for partial payments for piling. Refer to BCM 6-4.0, *Partial Payments*, for additional instructions regarding payment for Furnish Piling items.

- When steel or precast concrete piling of proper length are delivered to the job site ready for driving, the specification requirements for furnishing have been met and the material should be paid under furnishing piling item on the progress pay estimate. Piles stored offsite, or onsite but not ready for driving, are to be considered as Materials-on-Hand.
- Portions of piling, such as steel shells for cast-in-place concrete piles, as described in Section 49-3 of the 2010 SS, are not complete piling and cannot be paid under the furnishing contract item. When the steel shells for cast-in-steel-shell concrete piles have

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2 2010 SP, Section 9-1.16C or 2006 SP, Section 5.
been driven and the concrete and reinforcing steel have been placed to provide a complete pile, the contract item for furnishing may be paid.

- For steel pipe piling, full payment on the furnish item will not be made until the piling is on site and all field welds are completed and approved. This work includes welding of splices, and shear rings, when shown on the plans or required in the Special Provisions.
- The concrete filling material for cast-in-steel-shell concrete piling is paid under the furnish item while the placement of said material is paid under the drive item. This is particularly important when making item adjustments.
- For cast-in-drilled-hole concrete piling, permanent casing is paid as a separate item, but temporary casing is fully compensated in the piling item. Rock sockets are paid as a separate Cast-In-Drilled-Hole (Rock Socket) item.
- Bar reinforcing steel for cast-in-place concrete piling greater than or equal to 24 inches or 600 mm diameter is paid as a separate item. For smaller diameter cast-in-place concrete piling, bar reinforcing steel is included in the cast-in-place concrete piling item.
- For Cast-In-Drilled-Hole (CIDH) concrete piling constructed using the Wet Method (refer to BCM 130-7.0, *CIDH Concrete Piling*, for definition), payment for the CIDH concrete piling item and rock socket item (if applicable) will be made only after acceptance testing has been performed and the pile is accepted by the Engineer.

**Pile Tip Revisions**

The SSŚ specify how piles are paid for when the Engineer revises the pile tip.

Contracts using amended versions of the 2006 SS provide for payment for piling as follows:

> When pile tips are revised by the Engineer for timber, steel, and precast prestressed concrete piles, and for cast-in-place concrete piles consisting of driven shells filled with concrete, the additional length required, including all materials, equipment, and labor for furnishing, splicing, and installing the piling, will be paid for as extra work as provide in Section 4-1.0D, “Extra Work”.

Contracts using the 2010 SS provide for payment for piling as follows:

> If the Engineer revises the pile tip elevation for driven piles, the work involved in furnishing, splicing, and driving the additional length of pile is change order work.

The length of piling that extends beyond the tip elevation shown on the plans, as ordered by the Engineer to meet design requirements, will be paid for as Extra Work or change order work.

**Revision Table**

Fill in the Revision Table for the type of revision required for the new or revised process.

For example, a new process with no existing BCM would only be listed in the “NEW” columns. If the new process completely replaces an existing BCM, the existing BCM would be listed in the “EXISTING” columns and the new process listed in the “NEW” columns. Partially replacing an existing BCM is a little more complicated. List the existing BCM being partially replaced in the “EXISTING” columns, the new process in the “NEW” columns, and the revised existing BCM in the “NEW” columns.
Below is an example of Revision Table from PDD 49-2.01D, *Driven Piling – General – Payment*:

In the example BCM 130-6.0 is being partially replaced. The remaining portion of BCM 130-6.0 will be published until it is replaced in the future, along with the new process, BCM 49-2.01D, which partially replaces BCM 130-6.0.

<table>
<thead>
<tr>
<th>EXISTING BCM (or portion of)</th>
<th>Issue Date</th>
<th>NEW QMS-BCM or SC Technical Manual</th>
<th>Issue Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCM 130-6.0, Measurement and Payment for Piling</td>
<td>06-30-14</td>
<td>BCM 130-6.0, Measurement and Payment for Piling</td>
<td>xx-xx-xx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCM 49-2.01D, Driven Piling – General - Payment</td>
<td>xx-xx-xx</td>
</tr>
</tbody>
</table>

**General Revisions**

Use the format shown on the BCM Change Letter template to describe general revisions to be made to existing BCMs that are being partially replaced.

**Revisions Unique to Each Revised and/or Deleted BCM**

This section applies to any existing BCM that has been altered as a result of the new process. In most cases, the existing BCM is being replaced, but in some cases, the existing BCM may be partially replaced.

Use this section to describe the disposition of the documentation from the existing BCM to the new process, technical manual, or to be discarded.

Below is an example of the language used for disposition of the documentation from BCM 130-6.0.

**BCM 130-6.0, Measurement and Payment for Piling**

Modify existing BCM as follows:

1. Under “Measurement” section,
   a. Delete paragraphs 1-7, refers to the 2006 Standard Specifications, which are no longer used.
   b. Delete paragraph 9, now incorporated into BCM 49-2.01D, Attachment 1.
2. Under “Payment” section,
a. Modify paragraph 3 of the “Materials on Hand” section, precast concrete piling and steel piling are now incorporated into BCM 49-2.01D, Attachment 1.
b. Delete bullets 1 and 3 of the “Furnish and Drive” section, now incorporated into BCM 49-2.01D, Attachment 1.
c. Delete entire “Pile Tip Revisions” section, all material referenced is included in the 2015 Standard Specifications.

Note that the description of the disposition of the documentation incorporated into the new process or deleted from the existing BCM matches the graphic depiction of BCM 130-6.0 shown on Pages 22-24.

**New BCM**

This section is used to describe the new process. Enter the “Background” section of the new PDD.

Below is an example from PDD 49-2.01D:

*This process establishes SC responsibilities and procedures for measurement and payment of all types of driven piling shown on the project Bid Item List, including payment for Materials on Hand.*

**Pending Revisions**

The section is used to describe information to remain in an existing BCM when the existing BCM is being partially replaced by the new process.

Use this section to describe the disposition of the documentation to remain in the existing BCM until it is replaced by a future new process.

Below is an example of the language used for disposition of the documentation to remain in BCM 130-6.0:

**BCM 130-6.0, Measurement and Payment for Piling**

Modify existing BCM as follows:

1. Under “Measurement” section,  
2. Under “Payment” section,  
   a. Retain “Materials on Hand” section, except as stated in “Revisions Unique to each Revised and/or Deleted BCM” section above.
   b. Retain “Furnish and Drive” section, except as stated in “Revisions Unique to each Revised and/or Deleted BCM” section above.
Information retained will be incorporated into future BCM 49-3.01, *Cast-In-Place Concrete Piling – General*, future BCM 49-3.03D, *Driven Steel Shells Filled with Concrete and Reinforcement – Payment*, and Sections 6 and 9 of the *Foundation Manual*.

### Submission of the Initial Draft PDD Package

Upon completion of the PDD, the SC Technical Team Sponsor submits the following components of the Initial Draft PDD package to the SC Technical Manual Manager (TMM):

1. New PDD.
2. Attachments to the new PDD.
3. Disposition of existing BCMs associated with the new PDD.

### Instructions for Submitting PDD Packages:

1. All PDD packages must be submitted to the SC TMM through the SC Shared Drive.
   a. Where? Under the OSC Manual Revision – Technical Team x folder, **Initial Draft PDD to TMM**.
   b. What do you do in this subfolder? Within the **Initial Draft PDD to TMM**, create a sub-subfolder for each of your PDD package that you are submitting.
   c. How do you name the items in your PDD package?
      1. New PDD: **Initial Draft PDD x.xx Title (Short) yymmdd TT x**
      2. Attachments to the new PDD: **Initial Draft Attch x.xx Title yymmdd TT x**
      3. Disposition of existing BCMs: **Initial Draft Dispo existg BCM x.xx Title yymmdd TT x**
      4. Change Letter: **Initial Draft CL x.xx Title yymmdd TT x**
   d. Only one final copy of all the items in the PDD package is needed.
2. Once the PDD package is posted for the SC TMM, the Technical Team Sponsor (or Chair) notifies the SC TMM by email, please cc Marty Cook and Dave Keim.
   a. On the subject line of the email, please follow this format: TT x Initial Draft PDD x.xx package for TMM.
3. Any revisions from this point on will be communicated to the Technical Team Sponsor/Chair from the SC TMM or representatives.
   a. Any corrections or revisions must be posted in the shared drive under Technical Team x, Revisions – TMM to TT or TT to TMM.
i. The SC TMM will communicate with the TT Sponsor/Chair if a PDD requires rework.

ii. The PDD then will be returned to the TT in its Initial Draft form with review comments or questions. It will be placed in the Revisions folder under the subfolder of TMM to TT.

iii. Once the Technical Team is finished with your rework/revision, place it back in the Revisions folder but in the TT to TMM subfolder.

iv. Name your revised file as: \texttt{R1 Draft PDD x.xx Title yymmdd TT x}

b. Repeat step 2 for notifications.