

BENEFITS OF A SITE VISIT: CONSTRUCTION PROJECT VALUE STUDIES

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Abstract

Experience a construction project with a site visit. Insights and knowledge gained from a site visit is irreplaceable. A site visit improves all phases of the Job Plan thus improving the overall Value Study results. Persuade a project owner to invest in a site visit today!

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As a Value Study workshop facilitator, have you ever wanted more reasons to convince a project owner to include a site visit for the Value Study Team? If so, here are the many benefits to performing a site visit during a Value Study workshop on construction projects. The basic function of a site visit is to Expand Knowledge, as shown later in the FAST diagram. Expanding knowledge of the Value Study Team will result in a superior product similar to Benjamin Franklin stating [1]:

An investment in knowledge pays the best investment.

Investing in a site visit to expand your knowledge will improve workshop outcomes and all six phases of the Job Plan: Information Phase, Function Analysis Phase, Creative Phase, Evaluation Phase, Development Phase, and Presentation Phase.

Information Phase:

The information phase of any Value Study workshop includes three main activities: introduction, project overview, and assessment of data gathered. The introduction activity initiates the workshop with welcoming of the Team, administrative announcements, and providing an overview of the process. The project overview activity contains project background, objectives, and constraints typically in a presentation from the design team, which encompasses the current state of the project. During the assessment of the data, the Team reviews all the documents, such as drawings, reports, specifications, and cost estimates related to the project. It is most beneficial for the Value Study workshop to include a site visit following the assessment of the data. Due to budget, weather, and/or schedule constraints, timing of the Value Study workshop, and other reasons, a site visit may not be possible, although it should always be encouraged. During a site visit for a project, the Team is able to verify data including assumptions made by designers, expand their knowledge via improving their understanding of construction logistics, get a “big picture” view of the project by visualizing the project, converse with local stakeholders, and potentially observe the facility in operation.

Verification of data including assumptions can be crucial for a project, if the Team does not get the opportunity to see existing conditions for themselves they are forced to believe the given assumptions from the design team. For example, if the designer was given a survey of a site, which was used for a new grading plan, but unfortunately the survey data, did not include a utility pole within the site. A site visit with the Team could result in noticing the missing utility pole on the drawings and be able to give the design team options for a redesign. This could potentially save construction schedule time and money.

Similarly, by allowing the Team a site visit creates an improved understanding of construction logistics, such as potential access issues, construction laydown areas, and/or temporary construction needs. Sometimes on construction projects access to the project features could be a cost driver. A site visit allows the Team to examine the site and even take measurements. By expanding the Team’s knowledge, the result could be identification of a new haul route that was originally unknown. The new haul route could generate substantial savings of time to the construction of the project, resulting in numerous dollars saved.

A site visit also affords a potential for communication with the local stakeholders. This communication with stakeholders often enhances the information provided to the Team, by adding their reasons for the project, clarifying details that the designers may otherwise not have known, and allow an avenue for the stakeholders to vent about their needs and issues related to the project. In addition, while preparing for a site visit there can be some additional discussion topics realized by the coordinator/facilitator related to safety and site visit logistics that can be brought up to the Team and help create a better understanding of the overall project. For example, while preparing a Job Hazard Analysis for the site visit it is discussed that air monitors will be required due to some confined spaces the Team will tour. This could spark new ideas for ways to access particular parts of the project while avoiding construction in confined spaces, that otherwise might not have been realized.

Design engineers have a tendency to work on the many details of a construction project and therefore sometimes lose sight of the overall objective that the project is trying to accomplish. Allowing a Value Study Team to visit a site can give them a “big picture” view of the project that is otherwise very difficult to get by just looking at paper documents of the project. It could happen that because of a site visit the

Team discovered that an upstream facility could use a different discharge location, therefore eliminating the need for the current project as a whole. Moving the discharge of the upstream facility may still include some construction cost, but might be much less than the treatment that was designed to be required at the current project.

A site visit also supports the Team in analyzing data from a constructability standpoint. Without a visit to the site in some cases, fatal flaws within the design could theoretically go unnoticed and result in extremely expensive change orders from the construction contractor and perhaps a tarnished reputation to the owner. A site visit during a Value Study workshop will not always result in finding fatal flaws of constructability, but having the additional experts from the Value Study Team looking directly at the project in the field gives more reassurance that the project will be built with limited delays or setbacks. One outcome of the Value Study workshop could be a recommendation for the design team to gather more data to better characterize the existing conditions prior to putting the project out to bid.

Even with a site visit, not all Teams will get to observe the particular facility in operation, but having a chance to see it operate can be invaluable to a Value Study Team. Information gathered by watching an operator actually maneuver a particular valve, could lead a Value Study Team to come up with innovative ideas to enhance and make more efficient the operations that they otherwise never would have thought about to include in the design.

The Information Phase typical outcome, as defined by the SAVE International Body of Knowledge [2]:

This phase brings all team members to a common, basic level of understanding of the project, including tactical, operational, and specifics of the subject. The functional understanding establishes the base case to identify and benchmark alternatives and mismatches and set the agenda for innovation.

A site visit enhances the outcome of the Information Phase by allowing the Team as a whole to see for themselves the project and seed the Team with a more functional awareness for the project. This better functional awareness primes the Team for the next workshop phase: Function Analysis Phase.

Function Analysis Phase:

The function analysis phase is known as the heart of a Value Study workshop by Theodore C. Fowler, F-SAVE. The purpose of function analysis is to understand the project from a functional perspective (e.g. what must the project do?) and to change the thought process of the Team to think more like the client. The client requests a particular project because they are looking to get a particular job accomplished with a level of reliability and performance. Thus, if the Team can think more like the client and understand the true functions of the project they have the potential to come up with a very different solution than the current design. Similar to function analysis, a site visit for a particular project could create a change in the Team's perspective and thought process.

Here are three examples of a Team changing its perspective because of a site visit.

1. The project was to lower an intake structure within a reservoir to increase the available quantity of water to be delivered downstream of that structure. The Value Study Team realized, while on-site, that the project would cost less and provide more benefit, if a water treatment plant was built instead of lowering the intake structure. This scenario shows the change in functional perspective of the Team from the current volumetric type design to a water quality design. With just a relatively minor change in perspective, the Value Study Team gave a solution that not only saved construction cost but also delivered a larger quantity of usable water to the downstream users. Who does not like more function (in this case, benefit) for less money?
2. During a site visit on a project, the Value Study Team noticed that all the structural solutions to the project were going to be extremely expensive due to proximity of residents and wilderness area. The Team changed its perspective by focusing on non-structural solutions to the project, such as operational changes, which would increase the life-cycle cost of the project, but not as much, relative to the high construction cost of the structural solutions.

- Another Value Study Team changed its perspective because of a site visit on a project on a very large valve. The goal of the project was to allow lower flows through the valve, but due to its large size needed some modifications. The baseline design included a relatively complex bypass system constructed around the valve. Once on-site, the Team saw there was another identical large valve located just adjacent to the one under study. One recommendation from the Value Study Team was to completely eliminate one value and replace it with the required lower flow valve, knowing there was a duplicate large valve to make the higher releases. That particular recommendation became the idea for the final design of the project and thus owing the change in perspective of the Team during their site visit.

Function Analysis was performed about a construction project site visit proposing its functions and giving potential reasons why owners or project managers would want to include them in their Value Studies. Here is a list of randomly identified functions associated with a construction project site visit.

Table 1: Functions of a Construction Project Site Visit

<i>Active Verb</i>	<i>Measurable Noun</i>	<i>Active Verb</i>	<i>Measurable Noun</i>
Create	Synergy	Define	Limits
Generate	Ideas	Change	Perspective
Change	Thought	Enhance	Job Plan
Visualize	Project	Increase	Ideas
Develop	Perspective	Improve	Creativity
Analyze	Design	Encourage	Teamwork
Validate	Data	Integrate	Knowledge
Increase	Movement	Promote	Teamwork
Improve	Understanding	Visualize	Project
Increase	Familiarity	Create	Ideas
Improve	Function Analysis	Analyze	Design
Expand	Mind	Facilitate	Collaboration
Eliminate	Boundaries	Expand	Knowledge
Evaluate	Design	Improve	Ideas
Report	Change	Maintain	Safety
Examine	Site	Minimize	Error
Evaluate	Evidence	Verify	Data
Observe	Facility	Measure	Features
Ask	Questions	Integrate	Knowledge
Enlighten	Team	Identify	Opportunities

From the randomly identified functions listed above (Table 1), those functions were used to produce a FAST Diagram to show the relationship of those functions and evidence of how a construction project site visit can enhance the Job Plan through each of the six phases. The functions and associated colors representing each phase of the Job Plan were taken from Section F: FAST Diagram of Value Methodology Module I Workshop in the Function Analysis Guide by SAVE International and Miles Value Foundation [3].

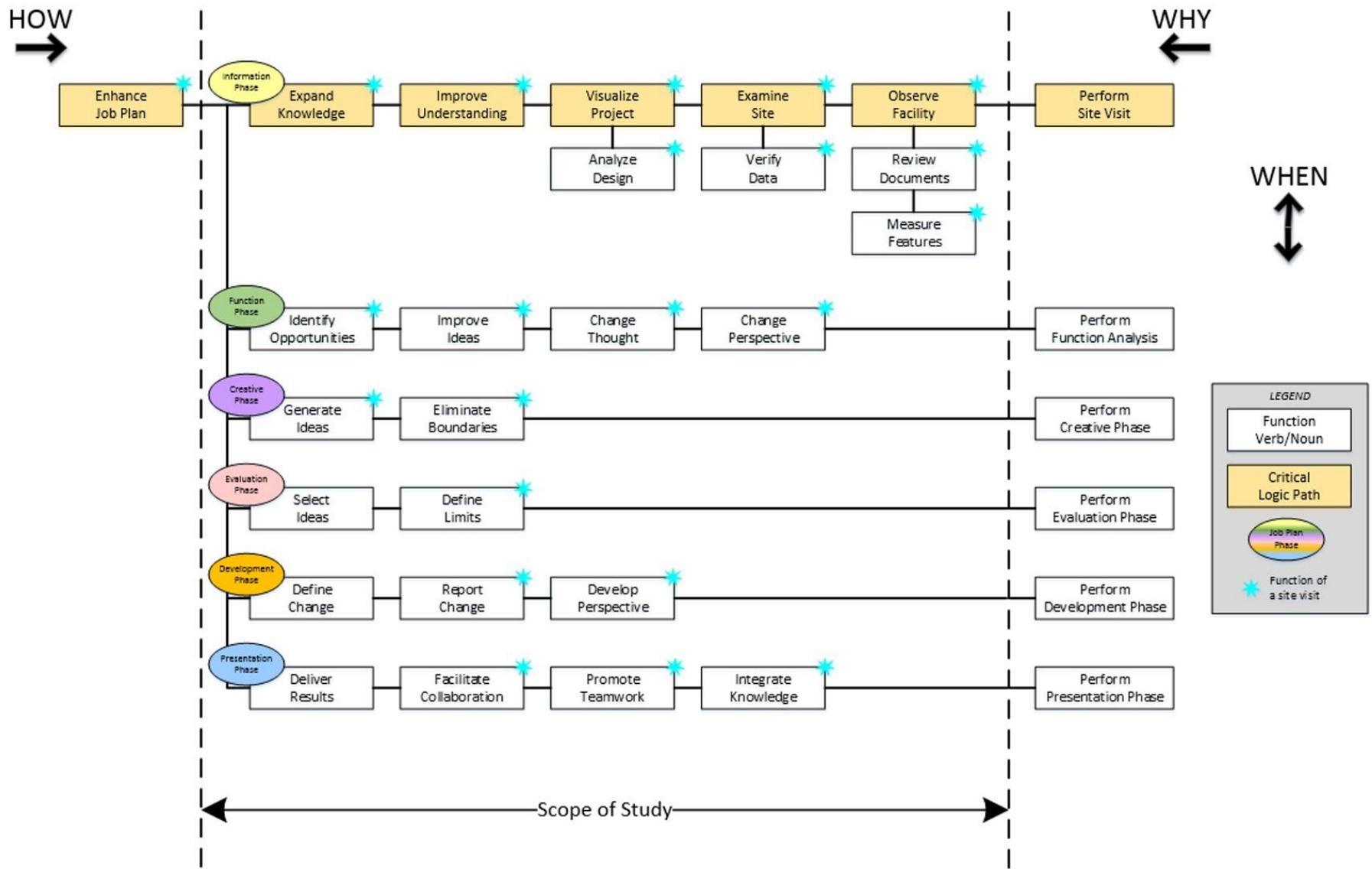


Figure 1: Construction Project Site Visit FAST Diagram

Creative Phase:

The Creative Phase of the Job Plan is defined as generating a large quantity of ideas related to ways of performing the identified functions from the Function Analysis Phase. Brainstorming is a typical technique used for the Creative Phase with the following rules:

- Establish an open-minded atmosphere
- Disallow criticism by deferring judgement
- Allow wild and crazy ideas
- Promote combinations of ideas
- Encourage large quantity of ideas

One of the functions, as shown in the FAST Diagram (Figure 1), of a construction project site visit is to generate ideas. Much like what happens during a brainstorming session in a Value Study workshop, a site visit on a construction project helps to generate ideas. While a Value Study Team is out touring a particular site, their observations spur questions and thoughts that promote ideas to improve the project. Without being on-site and seeing certain constraints to the construction project, ideas related to that constraint may not be generated. Each Team member will notice similar attributes and very different attributes of the site. Combining those similarities and differences from the site visit eases the formation of valuable ideas during the Creative Phase.

As described in the rules of brainstorming, it is imperative in the Creative Phase that there are no boundaries limiting ideas. By having a site visit on a construction project, it allows certain blinders to be removed from the Team. If a Value Study Team is only given information directly from the design team including project documents, the Team is strapped with blinders to information that may not show up on those drawings, relative scale, or potential redesign ideas that could better accomplish the functions of the project. For example, a construction project adding a bypass around a large valve only shows that particular valve. It would be much less expensive if the bypass were installed on another identical large valve at the same location due to its configuration. A Value Study Team would not know there was a second valve, if that information was not included in the design package or a site visit was not performed, preventing a potentially very valuable idea.

It is difficult for the Team to “think outside the box,” meaning come up with ideas beyond the current design when there was not a site visit. Usually, without a site visit the Team will be wrapped up in the details of the current design and have a much more difficult time thinking about the true functions of the project. To help eliminate those boundaries for the Value Study Team a site visit is a relatively inexpensive tool.

Data shows that performing a site visit during a Value Study workshop vastly improves the Creative Phase. After reviewing 33 recently completed Value Study reports on construction projects ranging from an estimated \$700,000 to \$190,000,000 [Permissions were not obtained, therefore project specifics are not provided], including a site visit during a Value Study workshop does not necessarily result in more ideas, but definitely results in identified opportunities with improved ideas. There are more alternatives written to add value to the project when a site visit was conducted, than when there was not a site visit. It is typically at least a 50 percent increase in the number of alternatives offered and upwards of 400 or more percent.

Evaluation Phase:

Opposite of the Creative Phase, the Evaluation Phase is all about reducing the quantity of ideas by limiting those ideas to those with the greatest potential to add value to the project. A site visit can enhance the Evaluation Phase by defining limits that may not have been noticed or explored prior to the Value Study. A site visit can confirm or negate whether or not an idea is feasible and reasonable. Discussions and ideas on paper sometimes seem to be great, but are not practical when you put them into real world practice. A site visit can help to evaluate those ideas to allow only the truly best and most valuable ideas to be developed in the next phase of the Job Plan.

Development Phase:

The Development Phase of the Job Plan is meant to discuss the potential change the best alternatives have on the project in order to add their value. This documentation includes a description of the alternative, critical items to consider or particular ways the alternative should be implemented, specific differences in the alternative from the baseline design, potential risks, advantages and disadvantages, and cost implications for construction, operations, and maintenance. All this documentation is strengthened when the Value Study Team goes on a site visit during the workshop. One of the other functions, as shown on the FAST Diagram, of a construction project site visit is report change. The Development Phase is exactly where the Team can record all information from the site visit that was interpreted differently in the design. The Team can record all the possible changes to be made to give increased value to the project based on the Value Study and site visit.

Presentation Phase:

Lawrence Miles once said, *Feelings always influence and often control decisions* [4]. This is important to understand when discussing the Presentation Phase. The Presentation Phase is about selling all the valuable ideas and alternatives that the Team developed over the course of the workshop to decision makers. The Presentation Phase is generally the first opportunity to deliver results. Although, to make a good presentation there needs to have been good collaboration, teamwork, and integrated knowledge between team members leading up to and during the presentation. The power of a Value Study is its team effort and without the entire Team on the same page, the presentation could fall short of its marketing objectives. Teams that have participated in a site visit during a Value Study workshop start the process of collaboration, teamwork, and integrated knowledge far sooner in the process than workshops without a site visit. This gives the Team an opportunity to align as a group sooner and therefore likely create a smoother execution of the Value Study workshop and more specifically the Presentation Phase. In addition, a site visit allows the Team to take photos, talk to operators, “touch and feel” parts of the project, and see more of the site than is shown in drawings, which can be paramount to giving a great presentation and selling the value added ideas.

Based on the same research discussed previously of the 33 recently performed Value Study workshops on construction projects [Permissions were not obtained, therefore project specifics are not provided], it was found that there is an additional 4:1 return on investment when a site visit was incorporated into the workshop. It was favorable to include a site visit no matter the estimated project or study costs. There seemed to be no true difference in cost of the study whether or not a site visit was completed. There was a larger maximum potential savings when a site visit was performed. Moreover, Value Study workshops were more likely to include a site visit during final design stages versus during the planning stages of a construction project.

The only way to “experience” a construction project during the planning or design stages is to take part in a site visit. According to Albert Einstein [5]:

The only source of knowledge is experience.

Thus, it is imperative to a Value Study workshop and specifically the Information Phase to have a site visit to expand the knowledge of the Team.

In conclusion, a site visit on any construction project can be a precious tool to improve value. The site visit has potential to connect missing pieces of the project, reveal overlooked aspects, reduce overall risks, contribute insight not gained in any other way, remove bias, or change a Value Study Team’s perspective. A site visit should be encouraged on all Value Study workshops no matter the size, complexity, scope, or cost. Including a site visit in a Value Study workshop offers considerable benefits to the final alternatives and outcome.

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