demonstrated. In 2005, 17 of the 43 Corps of Engineers districts have committed to use DQLL[sm]. The other five federal agencies have not adopted DQLL[sm] at this time. Lesson entry has begun and is expected to continue to increase as the early DQLL[sm] adopters become fully operational in 2005. Figure 6 displays the observed LL approval rate within the Corps of Engineers.

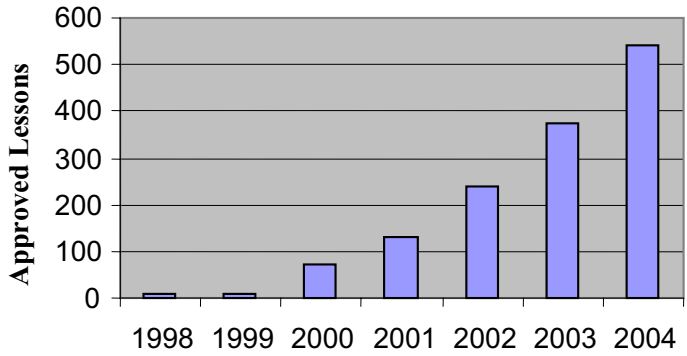

Figure 6. Growth in lessons learned approved in DQLL[sm]

Future Lessons Learned Development Efforts

The authors fully expect that DQLL[sm] implementation within the Corps of Engineers will continue to grow during the next few years. It is also expected that other agencies using DrChecks[sm] will see the merit of expanded use and will require DQLL[sm] to be more fully integrated into other related legacy systems.

We have recently linked the DQLL[sm] approval process to several other tools within the www.projnet.org design quality suite that manage the criteria for the Corps of Engineers as well as the Navy, NASA, and the Air Force. Now, if during an evaluation of a proposed LL the SME determines that the solution to this issue is a change to an existing criterion, the SME can automatically route the proposed LL to the appropriate criteria manager as a Criteria Change Request (CCR). The CCR is a web process that replaces a paper form that is used to take an extended time period to reach the party responsible for managing their criteria. The CCR program notifies the individual responsible for the criteria that a change request has been posted and also informs the submitter (in the DQLL[sm] submittal process this is the DQLL[sm] SME) that the change request has been emailed to the responsible party. CCRs can also be directly submitted on www.projnet.org by any party (even one without a login). A secondary program, the Criteria Management System (CMS), maintains detailed information about all of the criteria (age of document, responsible party, agency proponent, and number of CCRs submitted against the criteria). Specialized CMS reports help criteria managers decide which and when criteria will be updated. A

third linked program, Standards and Criteria Program (SCP), assist with the management of the funding of criteria update activities. Thus, the process of updating criteria based upon lesson learned submittals is now seamless from proposed lessons learned entry through resolution via a criteria change. Once the criteria has been updated, the SME can sunset the DQLL[sm] issue as it now has been resolved via an updated criteria. The above process is shown in Figure 7.

The authors also feel the next local extension to DQLL[sm] is the addition of a push technology that would prompt the user that an approved LL existed for the topic the individual was addressing. The approach will to have a DQLL[sm] search or data mining routine run in the background while a DrChecks[sm] user is entering a design review comment. The user will be able to specify how wide or narrow the scope of lessons he or she desired to be presented for review. The authors believe this would be "killer (desirable) application" that would drive a quick DQLL[sm] adoption rate.

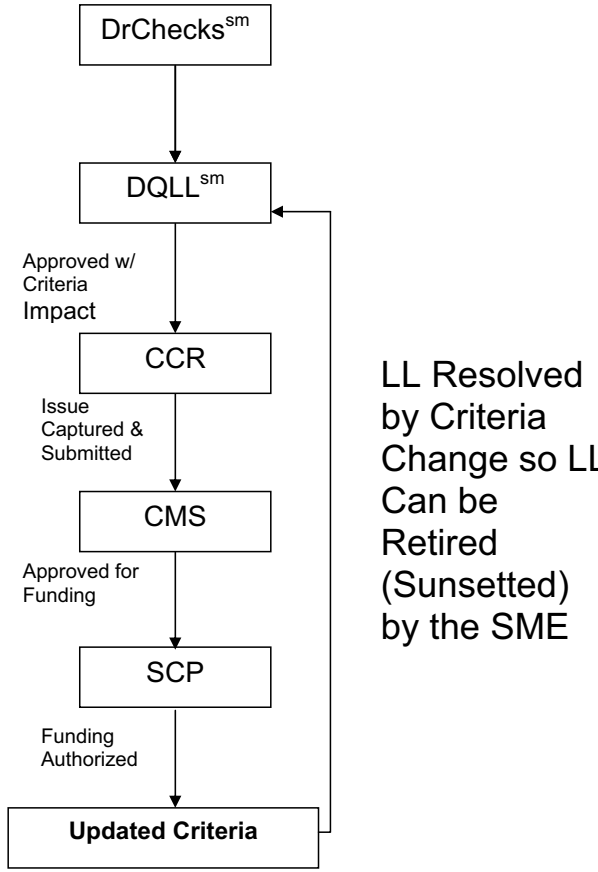

Figure 7. DQLL[sm] issue resolved by criteria change in ProjNet[sm]

Conclusions

There is a definite positive economic consequence from the capture and reuse of lessons learned across a wide range of business processes. Successful lessons learned system can be completely implemented if the application is fully integrated within the legacy system it supports, it contains information that is vetted by subject matter experts, and the lessons are retired when they are no longer appropriate.

Searchable lesson learned repositories offer professionals the ability to gain and reuse knowledge of other geographically remote experts. While the above has been show to save the Corps of Engineers an average of $23,000 per reuse of a design lesson, lesson learned repositories can also allow the programmatic review of problem areas. Analysis of the number of lessons per indices (i.e. design discipline, reviewer, designer, location, or customer) may point to a systemic issue that may require exploration and resolution.

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Using Transportation Construction Contracts to Create Social Equity

Sarah Picker[11]

Abstract

As owners, designers, and constructors, how do we implement and succeed with non-project goals as social equity – as requirements to include disadvantaged business enterprises goals in construction contract bids – in our projects? This question applies to the discussion of constructability.

One social equity pubic policy is to include historically excluded businesses in construction work to benefit them and to redress past inequities. These objectives for social equity are achieved in various mechanisms throughout the design-bid-build project development process. This paper concentrates on the construction contract as a specific mechanism to achieve policy. Inevitably this must involve owners, designers, and contractors/constructors. Also, marketing and community planning efforts that the owner and constructor can implement are discussed, the outcome of the efforts ultimately being reflected in more bidders meeting contract DBE goals.

Introduction

According to the definition adopted by the Constructability Committee within the Construction Institute of the American Society for Civil Engineering (ASCE), "constructability is the integration of construction knowledge and experience in the planning, design, procurement and construction, operation, maintenance and decommissioning phases of projects consistent with overall project objectives." This definition was presented by James Pocock et al. and included in their paper entitled "Constructability State of Practice Report" (2004).

Since most projects are built to accomplish civic, economic, safety, and social goals through construction related jobs, the definition considerations for constructability must include such objectives as sharing employment and targeting jobs to communities that have historically been excluded. When discussing constructability, one must pay attention the procurement of the construction contract as a practical method for achieving public policy goal of valuing social equity. The bidding process can help achieve the objective of social equity because the contract is

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the legal mechanism that require project to include disadvantaged business enterprises (DBE's) during construction project.

This paper uses transportation projects as examples; however, the marketing concepts discussed herein could apply to any type of infrastructure project where the owner and constructor must consider requirements for job stimulation in a DBE community.

Construction Contract

Public agencies (owners) function such that the project is designed by the owner and advertised for competitive bidding in the construction market, the lowest bidder being the company that builds the project for the owner. Public contract law was drafted to protect taxpayer funds from fraud and abuse and to provide for fair and efficient administration of public works contracts. In California, the set of rules used to govern how the process is implemented is called the Public Contract Act.

This Act and subsequent sets of regulation place responsibility on the public agency for proper preparation of the construction contract or bid documents. The ASCE Constructability State of Practice Report indicates that constructability should consider whether the construction contract documents are biddable.

Projects that are biddable are fully designed with 100% complete engineering plans and specifications and the engineering estimate. The estimate is an accurate representation of current anticipated costs for all items of work that are included in the plans and specifications. The bidding process is a competitive bidding process and contracts are awarded to the lowest bidder, pending an assessment that they met the contract requirements. They include insurance, bond, financial requirements and meeting DBE goals.

The United States Department of Transportation seeks to solve social equity issues through the implementation of Federal Regulations 49 CFR Part 26, amended June 16, 2003. This regulation requires that construction contracts for transportation capital projects must contain provisions that a percentage of the contract dollars are to be subcontractors (or suppliers, or manufacturers or trucking operations) designated as DBE firms. This rule was promulgated in 1999. The federal register discussion preceding the regulations states: "The DBE program is intended to remedy past and current discrimination against disadvantaged business enterprises, ensure a level 'playing field' and foster equal opportunity in DOT-assisted contracts" (Federal Register 1999).

A high percentage of transportation contracts being implemented at state, local or a special district levels use federal monies and are thus obligated to comply with federal regulations. The public transportation agency/owner must enforce these provisions. Therefore the contractors who build transportation projects must consider the federal contracting requirements for DBE firms when bidding on contracts. The owner must also be involved and knowledgeable and active in the contracting market to ensure that DBE companies know of potential projects and can meet federal requirements as specified in the construction contracts.

The low bidder has competed to be the constructor. In the competition process, public agencies are not given unfettered discretion to award bids, meaning

they must award to the winning low bidder. During the performance of contract, contractors are held to exacting standards of performance once the job is underway. At bid these are also exacting standards. The lowest bidder is the winning bidder only if they meet all the requirements of the contract, including contract special provisions that related to social equity.

These criteria are applied by the owner when considering whether the bidder has met the contract, which indicates responsiveness or responsibility; that is whether the constructor has met the DBE goal. Can the low bidder show that the percent specified in the contract will go to DBE companies? Table 1 shows several Caltrans projects where the DBE goals have been met.

Table 1. Caltrans projects containing DBE goals

Owner	Project	Contract set DBE goal (%)	% DBE achieved in bid	Contract type	Total contract amount at award ($)	Commitment towards DBE goal at award ($)
Caltrans	Hwy. 99	12.00%	12.30%	6 miles highway widening including two overcrossings	$15,439,966	$1,899,000
Caltrans	SFOBB	16.00%	36.30%	YBI USCG Road Relocation	$1,512,300	$548,965
Caltrans	SFOBB	8.00%	9.46%	W2 Foundations	$24,083,285	$2,278,279
Port of Oakland	OIA	8.00%	8.00%	Aircraft Sound Insulation Program	$10,929,481	$8,743,000
Port of Oakland	OIA	9.80%	16.00%	Reconstruction of Taxiway D and Apron Improvements Adjacent to Building L-812 North Field	$5,069,783	$811,000
Port of Oakland	OAI	11.00%	16.64%	Construction of Asphalt Concrete Overlay of taxiway A East of Taxiway B, North Field	$454,310	$76,000
Port of Oakland	OIA	7.70%	36.24%	Reconstruction of East Apron-Phase 1 South Field	$12,566,465	$452,000
Port of Oakland	OIA	8.10%	9%	Runway Safety Areas (RSAs) Studies at Oakland International Airport	Not reported	Not reported

Considerations for Constructors and Owners

The transportation agency, designer, and bidders should implement marketing and community planning efforts to contracts meet DBE goals, i.e. encouraging contractors to commit to using DBE's in the construction contract. Owners should strive to ensure active DBE participation by community planning efforts and marketing like networking, gathering lists, knowing local availability, knowing how to contact groups and interact regarding bidding. Such activities should occur continuously as a standard business practice. Then, when a contract is ready to be bid, owners and constructors will have the necessary knowledge of DBE availability and capacity.

The definition of a Disadvantage Business Enterprise is from federal regulation 49 CFR Part 26. A Disadvantaged Business Enterprise (DBE) company must meet three basic eligibility standards:

1. They must be a small business;
2. The firm must have at least 51% ownership by a disadvantaged owner; and
3. Disadvantaged owners must exercise 51% control over daily management and operations.

A DBE company's average gross receipts for the past three years must not exceed $17,420,000 for General contractors, $7,000,000 for Specialty contractors, and $4,000,000 for Engineering, Architectural, and Surveying firms. For other specialty areas the standards of Small Business Administration apply.

The following types of firms are examples of DBE companies with abilities to bid on transportation projects: electrical contractor, field office setup contractor, suppliers, rebar, environmental and vibration monitoring, temporary construction works, engineering consultant, inspection services, fuel supplier, computer graphics engineers, reproduction services. Depending on the contract estimate, certain DBE construction firms could also qualify to be a prime bidder.

The timeline for implementing specific activities is based on advertisement and bid due dates and is intended to develop tangible subcontracting opportunities. Each construction contract is unique, and efforts to bring DBE's into the bidding process should occur several months before bid within this timeframe the constructors will have the opportunity the plans and specifications and consider which work they can sub-contract out.

The community planning and marketing programs should assist firms in the process of being able to compete successfully in the market place, remove barriers to the participation of DBE's in projects, and create a level playing field on which DBE's can compete fairly for contracts. Such programs can also encourage partnerships between the prime contractor and smaller local sub-tier contractors. An example would be to attend and participate in conferences such as the U.S. Department of Transportation's Minority Resource Center Regional Conference for Disadvantaged Business Firms which took place in June 2005 in Oakland, California.

At the first National DBE conference held in Washington in November 2004, Secretary of Transportation Norman Y. Mineta stated that the U.S. Department of Transportation (DOT) will strengthen its commitment to the owners of Small, Minority, and Women-owned, Disadvantaged Businesses by helping them obtain capital, training, and other assistance in order to promote their participation in the U.S. transportation industry. This led Secretary Mineta to authorize the Western Region Minority Resource Center (MRC) to host its DBE Economic Summit/Conference. Kaye Stevens, President and CEO of Anue Management Group which operates the Western Region MRC, has established a planning committee with participants from public transportation agencies including BART, Port of Oakland, and Alameda County Transit Improvement Authority, as well as Alameda County General Services (GSA), community organizations, and representatives and small businesses.

This western region conference benefits Disadvantaged Business Enterprises, prime contractors (constructors), and DOT agencies/grantees from Arizona, Nevada, and the entire state of California. There were workshops, a plenary session, a luncheon, and a class by the eminent Dr. Dennis Kimbro. The mission of the summit was to bring IT software, finance opportunities and access, business training, and procurement opportunities to DBE's. The workshops covered estimating and bidding, project management, job costing, and construction accounting. Participants learned about the U.S. Department of Transportation's Short Term Lending Program (STLP) and networked with bankers, buyers, prime contractors, corporate businesses, and agencies on the federal, state, and local level. Dr. Kimbro's class was about business practices, management, entrepreneurship, and economics.

Attending these meetings allows construction firms to become familiar with DBE firms. Constructors can better track the DBE market for capacity and services; the can also gather information such as lists of plan holders, certification lists, and advocacy group memberships and meeting sign-in sheets. Also, the constructor can learn about short-term lending programs sponsored by the U.S. Department of Transportation which help solve cash flow problems for small companies. The federal government has created bond and loan guarantee programs to support loans and bonds for small businesses which could not otherwise obtain financial instruments and guarantees. When a project is completed and loans repaid, the guarantees are released and the trust fund becomes available for future guarantees.

Owners should inform the construction market about projects. They can organize meetings specific to each construction contract or set of contracts to market DBE opportunities and provide a networking forum. At the meetings, owners can inform designers, constructors, and DBE's of the contracting opportunities for specific construction contracts. Invitees should include local minority business organizations.

During the networking portions of meetings, the owners should make an effort to see that DBE's can obtain information about the process of participating in the contract bidding. Information tables manned by owners and other transportation related programs can show how DBE's can participate in the bidding process.

To meet DBE goals, Mr. Ed Dillard suggests that constructors make an effort to involve and inform DBE's about construction contracts and provide information on

how to submit bids for their firm's consideration (Dillard 2004). He also says it may also be necessary to provide DBE's access to information relevant to the project and bidding process such as plans and specifications or historic cost information.

Dillard suggests that the owner and constructor should match work items from the contract that could be subcontracted to a DBE firm. Also, any work known to be subcontracted to a first or second level subcontractor could be subsequently contracted to DBE's. Based on subcontractable work items, owner, constructors, and lower tiered subcontractors should research local firms' availability and explore all tangible opportunities.

Another suggestion by Dillard is that the constructor should look for DBE companies listed in directories by cities, transportation agencies, chambers of commerce, and trade associations. Transportation programs subject to the federal requirements have listings of DBE's. Often this information can be accessed on line. One logical place to start is at the Federal Highway Administration website (www.fhwa.gov). Also, a local minority chamber of commerce or professional association will have information on its members' capabilities.

Dillard also produces a television program, "Bay Area Business Today", that is shown on a cable local access station in Oakland, California. One segment highlighted an outreach effort by the Port of Oakland, one of the successful owners shown in Table 1.

Once identified, these DBE companies should receive written solicitation of bid opportunities. This solicitation should be sent well ahead of the bid opening date to ensure that the DBE can bid on the project in a timely fashion. Below is a list of the essential information that the constructor should provide to DBE in these solicitations:

- the name of the project,
- location of project,
- bid date,
- items of work available for the DBE to bid and construction contract scope of work,
- a location where they can review the plans and specifications, and
- the contact name and phone number for bonding, insurance, line of credit, technical assistance, and other resources.

Constructors should follow up initial solicitation with DBE firms by documenting all telephone calls and keeping a fax log. Ultimately, this documentation could be needed if the DBE goal is not met and the owner needs to assess whether the constructor has taken steps to ensure that a good faith effort has bee achieved.

Another way that owners and constructors can inform DBE's of contracting opportunities is to advertise requests for DBE participation in trade association publications and newspapers and papers with ethnic focus.

What if the goal cannot be met? The constructors must document that they have made a good faith effort to meet the goal. This is a requirement of the contract