

Hitting a Home Run!

Jeanene “Chili” Cilch, AVS, District 11 Value Analysis Coordinator, Caltrans

Ronald J. Tanenbaum, PhD, CVS, PE, GE, F.ASCE, Sr. Value Engineer, Value Management Strategies, Inc.

Musings from Chili:

Often I find it’s a struggle to get myself to the gym or even make time for pleasant excursions like taking in a museum or using my Silver Passport to Sea World. Once I get there I’m always happy except for the momentary self berating. The recurring self talk goes something like this: “I feel so much better after working out, why don’t I do this more often?” Or, another favorite: “I live in one of the most beautiful cities in the world, I take it for granted every time I plop down in front of the T.V.” The point is, I don’t always do what’s best for me and I’m pretty sure I’m in good company. Admittedly, this might be a zany leap, but I think it’s also why reliable value methodologies such as Value Engineering are sadly neglected. During my 15 years of managing the Value Analysis (VA) Program for Caltrans District 11 (serving San Diego and Imperial counties) a favorite lament is: I can lead them to the water, but I can’t make them drink. Finding ways to effectively motivate managers to sponsor VA studies is an on-going challenge. In this business age of instant gratification, multi-tasking and 11th hour fire drills (not to mention the global epidemic of enormous deficits) how do you catch and keep anyone’s attention? If you’re reading this paper, I’m likely “preaching to the choir” but it’s healthy to vent some frustration. Please humor me when I ask; how come my phone isn’t ringing off the hook with requests for VA studies? During this economic blight, wouldn’t it be career boosting for managers to identify cost savings without unseemly sacrifices? How could I do a better job to market the program? Then I hit upon (pardon the pun) an answer: Baseball.

Hardly original, baseball metaphors are apple pie. Popular sayings such as: “hit a home run, “stealing home,” “curve ball” and of course the teenage courtship progression measured by bases are deeply embedded in the American psyche, even for non-aficionados like me. I googled baseball business metaphors and the first entry was blog titled “Nine overused baseball metaphors on the Apprentice.”¹ This blogger complained about the annoying business speak on Donald Trumps’ T.V. show peppered with baseball clichés. His nine irritants are:

- 1. Step up to the plate**
- 2. touch base**
- 3. cover (all) the bases**

¹ <http://senselist.com/2007/02/12/nine-overused-baseball-metaphors-on-the-apprentice/>

4. **off the bat**
5. **home run**
6. **hit/knocked it out of the (ball) park**
7. **strike (struck) out**
8. **out in left field**
9. **major league(s)**

The “problem statement” this paper addresses is how to yield more VA results (improved performance, expedite project deliver, and cost savings). My co-author and I understand that there are many factors why managers are not “seeing the light.” One obstacle could be organizational constraints that limit funding flexibility. Another fear is schedule delay. In Caltrans’ culture delivery is king. Some managers think a VA study will derail their projects by sending them back to the drawing board. They lack support and/or the skill to strategically schedule a VA study to reduce development time. Frankly, I’m afraid another impediment is ego. I like this quote by General Colin Powell: “Avoid having your ego so close to your position that when your position falls, your ego goes with it.” Improving mobility is no easy task. There are no perfect solutions and the best solution is a carefully considered compromise to appease many stakeholders with competing objectives. I’ve yet to meet a super-human manager that navigated the complex maze of project development without ever making a mistake. Finding mistakes is good. That’s the only way you can correct them. However, the obstacle likely to be the most prevalent is that most people are comfortably snuggled into a rut. VA is not part of the routine. It is extra-credit work or that hoop that needs to be jumped through to be compliant with legislation. It’s off the radar, or in keeping with the baseball theme, VA is the pinch hitter waiting in the dugout.

Getting VA off the bench is going to take a sales pitch. The remainder of this paper will present Caltrans District 11 VA case studies with varying degrees of achievement defined by tried and true baseball similes. Results are categorized as:

Single Hits: Studies that reveal important information and assess risks.

Double Hits: Studies that either increase performance for a slight cost increase or decrease cost with a tolerable performance degradation.

Triples: Studies that increase performance for the same costs or decrease cost without jeopardizing performance.

Home Run: Studies that do both – increase performance and decrease costs

These studies were all conducted by consultant team leaders from Value Management Strategies Inc.

The Single Hit: *State Route 67 and Bradley Street Interchange VA Study*

The earlier, the better – that’s what Caltrans has learned over the years for when to schedule a VA study. However, “better” is often difficult if not impossible to quantify. Savvy, experienced

managers recognize that VA can be an effective scoping tool for developing a new project. One that can save significant time, and time *is* money (how many clichés can I throw into this paper?). There's no baseline design for the team to improve upon, no impacts or costs to compare. The VA objectives for project initiation are consensus on a project's need and purpose, identifying measurable performance requirements that support the purpose, and determining the best alternatives to select for further study.

It's been almost a decade, but the four-day November 2000 VA Study that examined the SR-67 and Bradley Avenue Interchange still stands out as a champion example. The team was comprised of representatives from Caltrans, the county of San Diego, the city of El Cajon and community advocates that volunteered their time to serve on the team. Terry Hays served as the team leader. The study objective was to improve a two-lane, 37-foot wide and 194-foot bridge built in 1966. It is in close proximity to multi-unit residential development, industrial use, local bus routes, and Gillespie Air Field. Traffic volumes have exceeded the design capacity of the 25 year old facility. Traffic is controlled at the on and off ramps with traffic signals on Bradley Avenue. In very close proximity on the east and west sides of the interchange are signalized intersections (see photo exhibit A). Bradley Avenue is classified as a four-lane major road with bike lanes on the County's circulation element.

The VA Team developed ten alternatives that were evaluated based on the following criteria: impact to local and freeway operations, community support, fundability, constructability, economic development, and schedule.

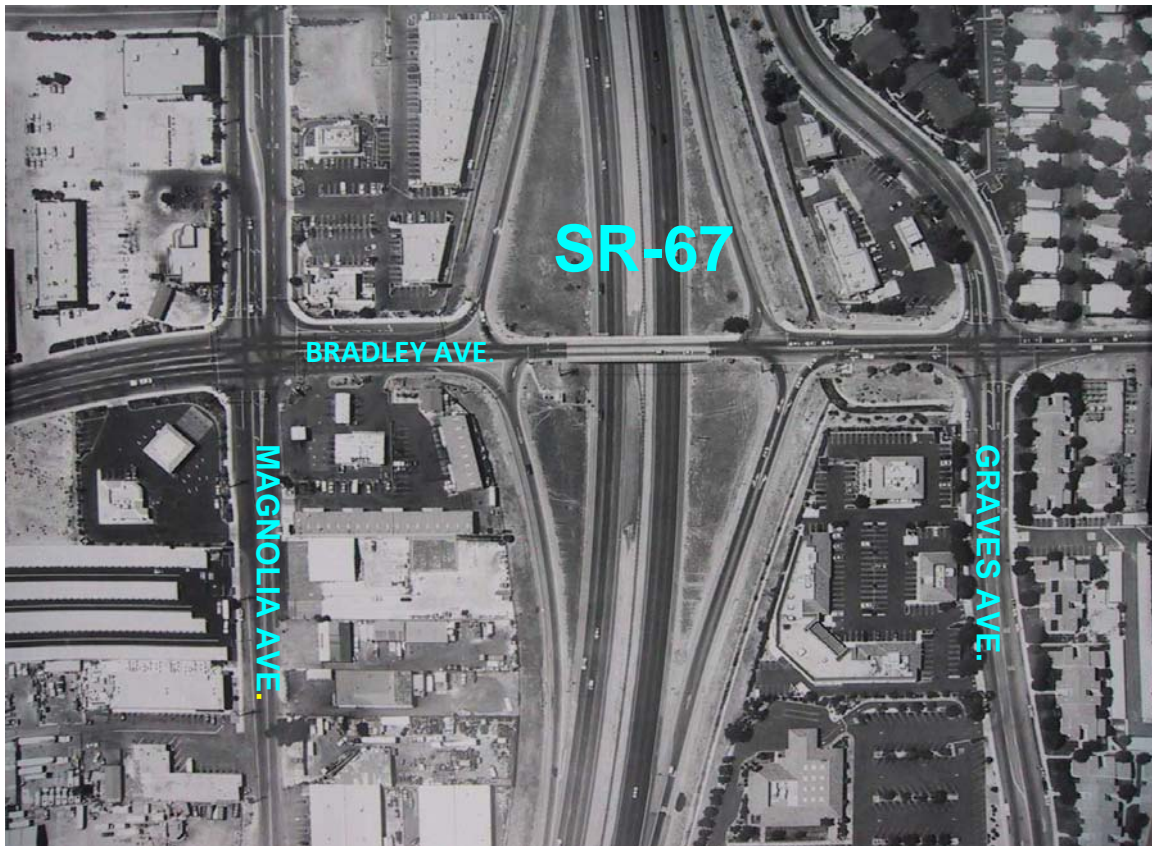


Exhibit A – SR 67 @ Bradley Avenue

Four of the VA alternatives were variations of roundabout configurations. At the time, the roundabout concept was very controversial and met with a great deal of skepticism by VA participants. However, the advantage of significant cost reductions (\$3.4 to \$8 million) for two of roundabouts opened the minds of the VA team. If one of the roundabout options proved viable, the project could be on the fast track to construction due to increased fundability and the potential for obtaining environmental clearance with a Negative Declaration. The roundabout concept was included in the scope of the Project Study Report, but was dropped when additional traffic analysis assessed them to be deficient. But, the point of the study was getting the project on base.

The Double Hit: State Route 905 - Phase 1b

It is 2008, a year still in the economic boom bubble that has many project estimates exceeding their programmed amount due to unexpected increases in right-of-way, labor, and material costs. The 905 Phase 1b VA Study analyzed the mature design plans for a new 4-lane highway segment in the Otay Mesa border region of San Diego County. The study objective was to develop alternatives that reduced the cost of construction with a minimum loss of performance.

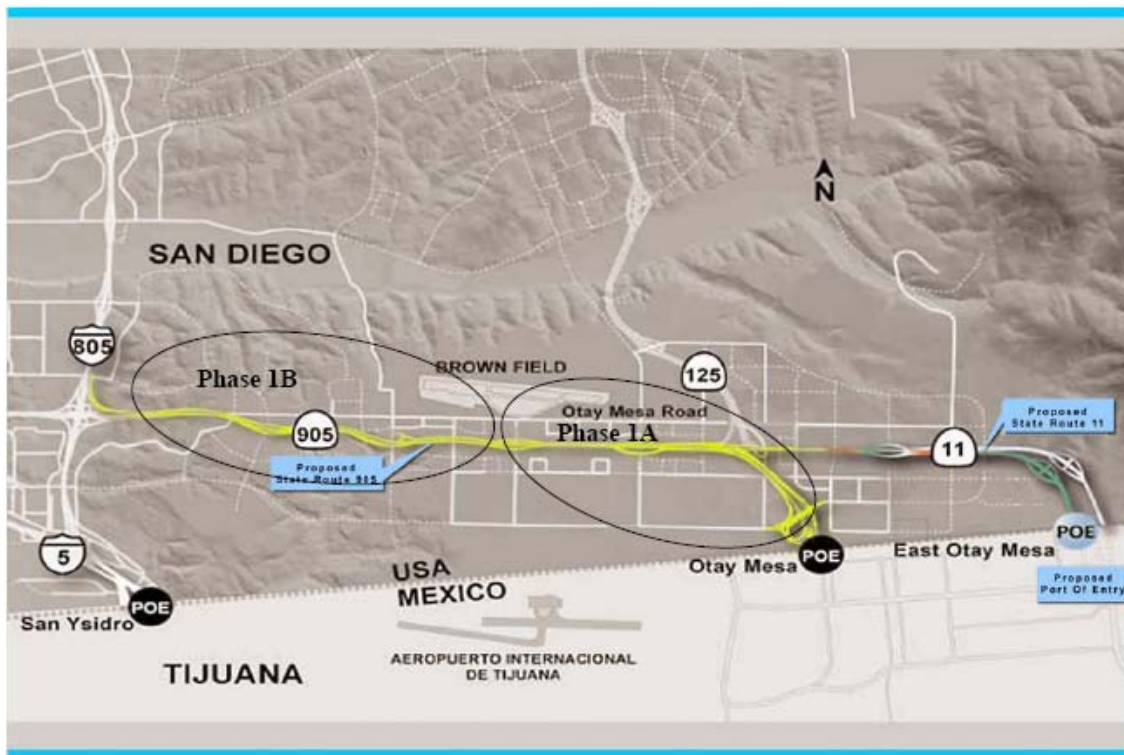


Exhibit B - SR-905

The VA team's recommendations included changing only the shoulder material from PCC to AC. Driving lanes would still be constructed in PCC, and as a result the maintenance issues were minimized. Due to concern over the ability to award SR-905 Phase 1a, the construction of the Phase 1a inside shoulder was moved to the Phase 1b contract. Another cost reduction proposal removed the inside shoulder construction from Phase 1b and moved it back into the Phase 1a project. This also significantly reduced the risk of change orders on both projects while controlling cost. Two alternatives were recommended to defer the construction of less critical items until

additional funds become available. These items included the construction of the Park & Ride lot and ramp metering. One alternative developed by the VA team was a cost estimate adjustment for the cost of the earthwork. The District also accepted the VA team's revised earthwork estimate reduction and, in doing so, accepted its risk exposure. However, the risk was felt to be tolerable based on additional review and increased analysis of the changing economic environment in Southern California. The resulting cost reduction of the accepted alternatives was \$14,115,000. This amount, coupled with District review and subsequent reduction of escalation rates and support cost, has sufficiently reduced the project cost to allow a needed and important project to go forward. The VA team, led by Jill Nelson, launched the project to second base and all that was needed was a few design changes to bring the project home.

The Triple Play: Safety Roadside Rest Areas VA Study

The safety roadside rest area (SRRA) program provides a stopping place and facilities for highway's long distance travelers. They are generally to be found right off the highway in remote locations. The focus of this VA study was three SRRA projects initiated for regulatory compliance. The upgrades are needed to comply with the Americans with Disabilities Act (ADA), and the California Occupational Safety and Health Administration (CAL/OSHA) requirements. Additionally, the projects help to replace and/or renovate buildings originally constructed in the 1960s and early 1970s.

Beginning in late September 2006, District 11 sponsored a six-day VA study to identify cost savings without incurring adverse impacts to project objectives. VA Studies were also conducted in many other Districts to address the significant statewide escalations of SRRA projects.



Exhibit C – D-11's Three SRRA Projects

The VA team was comprised of the Landscape Project Manager, Lead Architects, Environmental Engineer, Maintenance Division of Engineering Services (DES) Lead Architect, and a consultant architect, estimator, structural engineer, and Jill Nelson as the Team Leader. The team was also joined by Landscape Architecture Program (LAP) representatives at the kick-off, implementation and cost risk analysis meetings. They developed eleven VA alternatives applicable to all three projects and eleven additional alternatives specific to each project. Many VA alternatives were rejected because of the adverse schedule impacts of redesign (particularly at Sunbeam), impacts to key project objectives (e.g., eliminating CHP accommodations), and design strategies that are untested by Caltrans (e.g., converting comfort stations to unisex facilities). Although closing Aliso

during construction would reduce costs by approximately \$1 million, it is the most visited SRRA in the State. Therefore, D-11 executive managers agreed to keep both NB and SB comfort stations open during the 1.5-year construction duration.

Implementation Results

Location	Alternative	Approx. Savings
Aliso Creek (SB & NB)	Square off building layout and reduce vending storage and crew area	\$1,102,000.
Buckman	Eliminate vending area (provide utilities only)	\$219,000.
	Reduce crew area	\$252,000.
	Re-stripe for added CHP parking space	\$15,000.
	Close during construction	\$691,000.
Sunbeam	Close during construction	\$466,000.
TOTAL		\$2,745,000.

The three SRRA projects were programmed for \$11.3 million dollars and 2006 escalation factors put the projects at risk of being \$3 million short for construction. While the team discovered far more than \$3 million in potential cost savings, management accepted project changes that nearly equaled the amount of the funding shortfall. There was a 24% cost reduction without a significant degradation of performance. Three SRRA’s and the bases are loaded.

Home Run: State Route 76 at Olive Hill VA Study

This next project doesn’t quite fit the definition stated above for a “Home Run,” but it did win an award and the results were a definite crowd pleaser.

In February 2002, D-11 sponsored a study and invited community participation to identify interim improvements to SR-76, a conventional highway at the intersection of Olive Hill Road in the rural community of Bonsall in San Diego County. This segment of the SR-76 corridor was in the early phase of the project development process and the project was expected to take 7-11 years to complete. The San Diego Association of Governments (SANDAG), Caltrans, and the local community were interested in examining possible intermediate solutions to address current traffic issues. The purpose of the VA study was to identify near-term improvements that would improve local operations and safety without prejudicing the eventual solution for the entire route.

The team focused on the SR-76 intersection with Olive Hill Road/Camino Del Rey and with East Vista Way/Old River Road. At both of these locations, split-phase traffic signals were used, which resulted in long cycle times, as there were no dedicated left-turn lanes from the local streets to SR-76 at these sites. The congestion at the Olive Hill Road/Camino Del Rey intersection was complicated by a mix of regional traffic on SR-78 with local traffic accessing the adjacent Bonsall Center and Post Office. Also a factor was a high volume of vehicles turning from westbound SR-76 to southbound Camino Del Rey to access the school located just south of the intersection.



Exhibit D – SR-76 @ Olive Hill (Post VA Study)

The study's final VA report was published in October 2002 and the interim project was completed and opened to traffic in January 2006. In just over 3 years travelers were benefiting from the results of this VA study. The \$4.2 million dollar project resulted in the following improvements:

- Reduced trip time from 25 to 7 minutes (South Mission Road to local schools)
- Reduced signal cycle time from 240 to 80 seconds
- Raised median that addressed conflicts resulting from left turn movements into and out of the retail mall
- Wider rural bus pullouts, upgraded Westbound bus stop with sidewalks with ADA ramps

This project lit up the score-board, it received Caltrans' 2008 Excellence in Transportation Award for System Operations.

The Home Run (*with bases loaded*): Interstates 5 & 8 Northbound Connectors VA Study

This VA Study was conducted in August 2007 and facilitated by Ron Tanenbaum (co-author of this paper).

Background, Purpose & Need

The proposed project widens the I-8 West to I-5 North Connector to two lanes and adds an auxiliary lane on northbound I-5 from the Connector to Balboa Avenue (see figure below), a distance of over 3 miles. This portion of I-8 has experienced an increase in and severity of accidents. Congestion on northbound I-5 at the interchange area is causing the I-8 West to I-5 North Connector to back up onto I-8. The backup on I-8 occurs on Lane 3 of the five lanes, which is the lane used to transition to northbound I-5 and is not what is normally anticipated by drivers who expect this transition to be from the outside Lane 5. As can be imagined, there is a lot of last minute weaving and a number of accidents due to this oddly arranged interchange. This has also created a situation where slow moving vehicles in Lane 3 have vehicles on both sides at normal freeway speed. The queue on I-8 extends east of the Taylor Street on-ramp to westbound I-8. This inhibits westbound on-ramp traffic from Taylor Street to weave over to the I-8 West lanes past the I-5/I-8 Interchange. The sudden weaving issue is compounded by a large number of confused tourists using this area where numerous hotels are located.



Exhibit E – I-5 & I-8 Interchange

The project is needed to reduce the number and severity of accidents on I-8. On this section of I-8, the fatal plus Injury rate is 2.25 times greater the state wide average for similar facilities. These improvements are expected to reduce the accident rate by 50% on I-8 and also reduce congestion during commute hours on I-5.

Another significant consideration is the project locale. The interchange provides motorists a scenic view of Mission Bay and is a “gateway” to San Diego’s Downtown and International Airport. The median landscaping in this segment of I-5 contains attractive oleander shrubbery planted over thirty years ago that is an aesthetic asset valued by the community.

Baseline Project Design

The baseline project design proposed to restripe the I-8 West to I-5 North Connector from one to two lanes and upgrade the barrier railing on both sides of the structure. The restriping of I-8 would allow the second lane to offer options for traffic continuing onto I-8 or to the I-5 connectors. An added auxiliary lane would be placed on northbound I-5 from the connector to the Balboa Avenue/Garnet Avenue Interchange. Restriping the connector would eliminate the need to modify the Rosecrans/I-5 Southbound on-ramp structure. Also, shoulders would need to be reduced by 2 meters at the Pacific Highway Overcrossing and the Sea World Drive Overcrossing. The Tecolote Creek Bridge would be widened to accommodate the added lane. To minimize environmental impacts, no work was to be done in the San Diego River; all work was planned to be done from the deck. There are two locations where right-of-way takes were anticipated. The first location is between Sea World Drive and Clairemont Drive, and the second is at the Clairemont northbound on-ramp. Interactions with a major railroad right-of-way and a high pressure gas line requiring relocation were anticipated. The capital cost for this baseline design was \$35,823,000 (2007 construction and right-of-way acquisition) and \$4,859,000 in engineering support costs, for a total cost of \$40,682,000. These costs represent those developed by the VA team through adjustments to the estimate provided by Caltrans.

Accepted VA Design Changes

Three of the proposed VA alternatives were accepted resulting in the project terminating at Sea World Drive. This decision was supported by traffic modeling performed during the VA workshop and later substantiated by outside consultant traffic modeling. The total cost for the project was reduced from ~\$40.7 million to ~\$18.7 million, a resulting savings of ~\$22.0 million (54%). Most of the savings were realized by eliminating the need to widen the Tecolote Bridge along with impacts to a high pressure gas line and the adjacent railroad right-of-way and, most significantly, by shortening the proposed auxiliary lane from the proposed ~3.25 miles to a mere 0.25 mile. From a Value Metrics viewpoint, the implementation of these alternatives resulted in a 35% improvement in project performance that culminated in a 188% improvement in project value. An added benefit to the accepted proposals was the retention of the highly prized, aesthetic median oleander shrubs.

Final Musings:

In closing, VA is a team sport. Good coaches focus the team's attention on the immediate strategic objective. Fans cheer each single hit as it advances the team closer to home plate. Every now and then a study team hits it out of the ball park. One final thought, don't forget the peanuts and crackerjacks. All that brainstorming makes a team hungry.

Ronald J. Tanenbaum, PhD, PE, GE, CVS, F.ASCE is a Senior Value Engineer with Value Management Strategies, Inc. With over 40 years of experience in civil/geotechnical engineering, Ron is actively involved in VE/VA having participated in and/or facilitated over 100 VE workshops, with over 30 for transportation projects. As a member of SAVE International, he is the San Diego Chapter Vice President - Membership, and a *Certified Value Specialist*. He has conducted VE/VA workshops for numerous agencies including CALTRANS.

JEANENE “CHILI” CILCH, A.V.S. A Senior Transportation Planner for the California Department of Transportation (Caltrans), her Value Analysis (VA) vocation began in 1994 as the state’s first full-time district VA coordinator. She has facilitated numerous studies and has championed the use of VA as a Caltrans process improvement tool. In 2004, she managed Caltrans’ statewide VA Program where she led efforts that streamlined business practices and expanded VA awareness within Caltrans and partnering agencies.