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Letter from the Director

For several years, I had the honor of working for then-Vice President Al Gore on the National Performance Review — the task force to reinvent the federal government. Fundamentally, our job was innovation. While there, I saw that organizations, if given the freedom and encouragement to pursue more productive ideas, could not only free tremendous amounts of money annually, they could be more responsive to the people who paid their salaries: the taxpayers.

I have a tremendous challenge to meet our mission of improving mobility across California. Given the size of our task, it is critical that we continually seek out new ways to get the job done. Since joining the department, I have urged everyone to include an element of innovation in all we do.

This issue of the Journal features a few of the innovations currently in motion in the department. Aplus B contracting was first tried out in District 4. District 11 has come up with new ways of making constructability reviews integral to project development, not just an add-on. District 3 is trying out an exciting new form of environmental mitigation, and District 10 is working with local officials on a new planning process. That’s just for starters.

To me, the most exciting of the initiatives featured at the very front of this magazine — connect sensitive solutions. For Caltrans, this is the year of context sensitivity. It is a feature of the new departmental calendar and several other communications efforts. And you can expect to see at least one article in each upcoming issue that demonstrates how to solve problems while being sensitive to our surroundings.

And what is it?

It is a philosophy that prescribes that community needs be considered in solving transportation problems. Since the department began its effort to incorporate sensitivity to connect into its project development process, the same for the effort has changed from context sensitive “design” to context sensitive “solutions.” That is because the goal is to find ways to make our projects work within the environment, natural or man-made. Context-sensitive solutions incorporate the features and character of the surroundings through which our projects pass. They recognize that we are making long-term investments that should reflect and even enhance communities and the environment. Our transportation developer must consider:

The conducted and natural environment of the area.

Environmental, scenic, aesthetic, community and preservation impacts.

Access to and incorporation of various modes of transportation.

Governor Gray Davis has provided us with unprecedented resources to address California’s transportation needs and has challenged us to deliver results faster and more efficiently. That means innovation. And, with innovation, we will build on the types of initiatives described in this journal, turning problems into solutions.

Jeff Morales

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Innovation:
Context Sensitive Solutions

Marsha Minor
Senior Landscape Architect, Livable Communities

“Context Sensitive Solutions,” a new policy championed by Director Jeff Morales, outlines an approach that will make it possible for Caltrans to maintain its responsibilities for safe interregional mobility while being responsive to natural, cultural, and built environments. The policy takes the best of the department’s creative and collaborative problem-solving approaches and mainstreams them, with the purpose of making projects fit their surroundings more gracefully.

The policy is key to the department’s ability to thrive as a creative, innovative partner in the post-freeway building era. Today, using this approach may be the only way large and complex projects can be delivered successfully, implemented continuously, and, at an earlier planning stage, it is expected to prevent delays from re-designs and cost overruns and to strengthen relationships within and beyond the department.

You know society is changing when everyone from the Federal Highway Administration to local agencies uses words such as “flexible,” “context sensitive” and “dual-purpose projects” to describe highway facility design and activities. In fact, now that the interstate highway system is nearly complete, the transportation world is turning its sights on local communities and the linkage between transportation systems and surrounding land uses.

Across the nation, “context sensitive” highways that function as main streets have been widened so they no longer function as comfortable, walkable shopping streets; sidewalks are narrowed; on-street parking removed and street lights replaced with asphalt. The communities through which these highways pass now are speaking up for what they want: attractive gateways and streetscapes, pedestrian safety features, and slower car traffic in downtown areas.

Where freeways have disconnected neighborhoods, communities are asking for crossings to be made convenient and roses pleasant and for new crossings for pedestrians and bicyclists. Communities want the public space of transportation corridors to reflect the unique identities of the places they go through. They are asking Caltrans to partner with them so that our planning, design, construction, maintenance and operations reflect both transportation and community goals.

In 1991, the Intermodal Surface Transportation Efficiency Act gave design flexibility to states for highways not part of the National Highway System. And that act was followed, in 1993, by the National Highway System Act, which provided that even National Highway System highways other than interstate highways could take the environmental, scenic, historic, aesthetic, community and preservation impacts of any proposed activity into account. Two years later, the Federal Highway Administration published “flexibility in Highway Design,” which advocated flexible design, particularly for highways running through communities.

California has the advantage of being in the second wave of states to implement context sensitivity. Five years ago, the Federal Highway Administration chose Connecticut, Kentucky, Maryland, Minnesota and Utah to be pilot states. Through peer-to-peer exchanges and targeted participation in conferences, California is learning what has worked for these states in implementing this approach and, just
Communities want the public space of transportation corridors to reflect the unique identities of the places they go through.

Balancing the mobility of transportation system users with other community values is central to the manual’s philosophy. Finding a safe solution that respects the community and transportation goals of a particular place, in a way that is reasonable, is what it’s all about. Context sensitive solutions and good design standards are entirely compatible. Design exceptions will remain the exception, not the rule. Good design is good design.

Caltrans will also consider, connect and balance all modes of transportation. Funding for non-motorized transportation facilities explored in 1991 with enactment of the Intermodal Surface Transportation Efficiency Act. In the past decade, departments of transportation have redefined the relative importance of driving, walking, bicycling, and transit. The Oregon Department of Transportation, in its “Main Street... When a Highway Runs Through It: A Handbook for Oregon Communities,” goes so far as to say, “Urban streets need to serve all users as well as possible, but pedestrians are the priority (their emphasis) when safety and space allocation must be balanced between modes.”

In California, recently-issued Deputy Directive 64 commits the department to consider the needs of non-motorized travelers fully in all planning, maintenance, operations, and project development activities and products. This includes incorporating into transportation infrastructure the best available standards and adopting the best practice concepts of the U.S. Department of Transportation’s policy on integrating bicycling and walking.

The directive requires that attention be given to the following issues:

- Safe and efficient transportation for all users of the highway system.
- Support for the Americans with Disabilities Act.
- Attainment of community goals and objectives.
- Transportation needs of low-income, disadvantaged groups.
- Support of the state’s economic development.
- Eliminating or minimizing adverse effects on the environment, natural resources, public services, aesthetic features and the community.
- Reasonable financial estimates.
- Cost-effectiveness.

As a good partner, Caltrans is providing interim guidance to local agencies on the parameters under which certain features can be considered. And when local requests for improvements are well beyond what might normally be done, Caltrans, as a good steward of state resources, will help identify funding opportunities and incorporate those improvements where feasible.

No one size fits all. Mirroring its case-by-case approach to projects, Caltrans will approach public involvement project-by-project. The type of public involvement will match the objective at any given point in time. For example, while a public workshop may be ideal for informing a community of a non-controversial activity, it would be less effective for learning about a community’s values when a proposal is firmly contested.

The biggest changes will be in how we think about transportation and how we go about our business. Success requires even more conditions, earlier and wider interdisciplinary collaboration. It also requires meaningful early knowledge of community values. Ideally, before projects are funded, much of the context and much of the acceptance of the purpose and need for projects would be worked out in consider studies that tie in to local General and Specific Plans.

Too, the stakeholders must receive enough information so they can be true partners in reaching collaborative, interdisciplinary solutions when defining, developing and evaluating options.

How can we tell if a project or activity is successful? Ask the stakeholders. This isn’t about making everyone happy; that could mean acknowledging our responsibility to provide a safe transportation system. It is about balancing and meeting a broader universe of goals to provide a lasting public works legacy.
Caltrans currently employs about 70 archaeologists. And what these people do, day to day, is first to study records of where historic and prehistoric activities are known to have taken place, then to hoof it along the path of a proposed project, looking for evidence of that activity.

And when they find it, they dig. They’ve gotten pretty good at digging, but that activity remains something of a hit-or-miss proposition. It’s hard to know what lies under the soil. But now, Caltrans archaeologists are using one particular piece of equipment, the magnetometer, that shows promise of reducing the guesswork in excavations.

The Geoscan Cesium Vapor Magnetometer, in some ways similar to a metal detector, was developed to help locate geological features such as faults by measuring soils’ magnetic susceptibility. But if all the device did was detect the presence or absence of metal, it would have very limited applicability, since archaeologists study much that is not metallic. The magnetometer sees not only metal, but minute changes in the magnetic susceptibility of the soil that can indicate the passage of such features as stone walls, foundations, hearthstones, hearths, buildings and many others.

For the Caltrans archaeologists, this means subsurface features can be located by remote sensing and targeted for excavation with an accuracy of 70 to 95 percent. Compare that with random sampling, which may yield one-to-four percent accuracy and it’s easy to see why Caltrans has begun to employ this technology.

When soils are laid down, iron particles align to the magnetic orientation of the earth. Human actions alter that orientation by compacting soils in house pits or hearths or by digging postholes, storage pits and burials. The magnetometer reads these tiny fluctuations by introducing an electric current into a rod ensnared within a cylinder filled with cesium gas, which creates a magnetic field around the rod.

When an archaeologist carries the magnetometer perpendicular to the magnetic field of the earth, it reads these fluctuations as subsurface anomalies. The magnetometer detects these changes and registers them in a data logger where they are stored until processed.

The common practice in archaeology is to grid a site, using a combination of ropes and stakes so that data can be collected in an orderly fashion. In order to keep control of the context and stratigraphy unique to it. Because of cost or time constraints, only a sample of the gridted area generally is collected or excavated.

For remote sensing grids are used, but in a slightly different manner. A typical 30 x 30 meter remote sensing
The samples shown here illustrate the potential of the magnetometer. The first is from a historic site that was to be impacted by a road construction project that was part of a local assistance project in the Northern Region. Figure 1 shows a 20 x 23-meter grid with a large anomaly (shown in red) that dominates the right third of the image. At least two test excavation units were to be placed randomly within the area and another unit or two in the blue and green sections.

Thousands of dollars and months would have been wasted testing this area, which is a sheet of granite, most of it being 200 to 300 millimeters beneath the surface. After random sampling would have missed the small anomaly in the bottom portion of the unit (indicated), in fact, there was only a chance in 400 of hitting it. The anomaly indicated a ceramic sewage pipe in a 1.8-meter horizontal plane. Identification of this sewage system was instrumental in helping to determine the site's eligibility for the National Register.

In the second example, random soil samples screened for artifacts during grading for a safety project in the Central Region had revealed few or no artifacts. Standard archaeological practice is that if 250 millimeters of soil are removed and no artifacts are found, the test unit is terminated. But in this case, the darker blue to purple area in the upper-left was a shell lens at a depth of 1.5 meters, later removed by a test trench using a backhoe. Shell lenses may show the presence of cultural activity relating to food procurement/processing. It is important, not only for determining eligibility, but for larger research questions.

Occasionally, remote sensing benefits the public in other ways. Recently, a local group wanted to construct a 465 m² structure at a busy road stop. But remote sensing was done for archaeological purposes turned up a large site and field that ground crews then located were located 20 to 30 m to the west. Constructing in this locale without the remote sensing would have resulted in many times the cost of lost time and potential damage to the back field.

The purpose of the survey was to locate possible cultural features, the other information that was revealed because crucial for the project. Ground truthing was not necessary because of the potential for damage to the back field and because the image was clear.

Figure 3 shows a grid from the back yard of a historic house whose front driveway was being taken for a realignment project east of the Sierra in the Central Region. The owner of the house wanted Caltrans to relocate their driveway into the back yard but, because of the age of the house, there was a high likelihood that a proxy exist within and the basements therefor were dug in one another. The importance of this information to archaeologists is that it implies that one of the structures was built at an earlier date, was subsequently buried by erosion and then another group came along and built its dwellings on the same landform.

The magnetometer reads these tiny fluctuations by introducing an electric current into a rod encased within a cylinder filled with cesium gas, which creates a magnetic field around the rod.
Giant Beam Static Pile Load Test

To say this idea is big would not do it justice. It's gigantic!

IU NOVATION:

Bridges over troubled water may be built cheaper and faster in the future thanks to the Foundation Testing and Instrumentation Branch at Caltrans' Transportation Laboratory. Foundation Testing engineers and technicians, along with their counterparts in Structures Design, have developed a new testing system for high capacity piles that will save the state's taxpayers millions of dollars and months of construction on bridges over streams that are subject to severe scouring.

To say this idea is big would not do it justice. It's gigantic!

The test employs a steel beam 19.5 m long, 2.6 m high and 1.5 m wide that is subjected to loads as heavy as 3.6 million kilograms, the largest testing corruption of its kind in the world.

The beam is so big it must be stored at the former home of McCollum Air Force Base in Sacramento because it would not fit in the back lot at the Translab. It was so heavy that when temporarily parked at the Elton Mainesville Station before coming to California's capital city, it nearly punched through the pavement.

"We are always looking for new and better ways to do things," Brian Liebich, senior engineer for Foundation Testing, says matter-of-factly. "Design came to us with a challenge and, working together, we were able to take an idea and bring it to fruition in about 18 months."

Caltrans' new testing system for high capacity piles can apply 3.6 million kilograms of pressure.

Historically, Caltrans has used groups of piles with capacities of about 250 kips each to support most structures. (A kip is equal to 1,000 pounds.) Each pile is about 900 mm wide and composed of reinforced concrete or a steel closed-end pipe or "H-beam". A group of piles is driven into the ground and, using a pile cap, tied into the column that supports the bridge superstructure.

In streams where aggregate mining is common, scouring can erode the soil and dig down close to the pile tip, weakening the bridge and requiring expensive and timely repairs. To compensate, pile and pile caps must be driven to below the maximum scour level, which can make for pile caps that are so much as 10 m below the ground surface, and difficult to erect.

That was the dilemma facing Jim Foster, who was senior bridge designer on the I-5 Santa Clara River Bridge in Ventura County.

Because of the severe scour condition at the Santa Clara River, designers working on the new bridge faced the prospect of installing the footing caps 12 m below the existing ground elevation. "It was possible to build it using the traditional method but it would be very expensive, difficult..."
Foster adds, “This system allows for optimal structural pre-planning, which results in the most efficient placement and use of the materials to construct the bridges. Typically, it could take a month to install one support. With this system, one support could be installed in a week. In the case of Santa Clara River Bridge, it reclad the anticipated three construction seasons to two.”

With the benefits clearly spelled out, the next challenge for the Caltrans team was to validate the strength of the high capacity pile to withstand the loads it would be required to carry.

Foundation Testing became an imprinting Caltrans’ highly successful existing pile test system, which is capable of applying 907,000 kg of pressure. This type of load test verification has been standard practice on large bridge projects.

“Since the load capacity varies from bridge to bridge, it is important that we set the limits high enough to consider all possibilities,” Liebich says.

At Stoy Creek, engineers are looking for strength of three million kg. “We’ll know right away whether our expectations of the capacity of this design are valid,” says Liebich.

“We’re confident, but you always want to make sure especially where public safety is the issue.”

With completion of the test, the hollow steel pile columns are filled with reinforced concrete and the remainder of the bridge erected.

“We have the best of both worlds. We can conduct an actual field test to determine the capacity and then use the work for the bridge,” Liebich says.

Successful completion of the test using high-capacity piles will give Caltrans designers another proven alternative for use when building bridges over water. One possibility is the new eastern span of the San Francisco-Oakland Bay Bridge whose designers are considering using 3.0 m diameter, high-capacity piles measuring more than 100 m long for the supporting columns.

This new pile load test system was developed from conception to testing in 18 months. It demonstrated that the Caltrans Quality and Continuing Improvement Program is working well and saving the state’s taxpayers time and money.

And when they say they have big news at the Transbay, they aren’t kidding.

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Above: The nuts and bolts on this project are a handful for Brian Liebich. Right: The two hydraulic jacks with engineer Hernan Perez each can apply more than 500,000 kilograms of pressure.
Nothing illustrates this better than the attempt to develop a new campus of the University of California to the east of the city of Merced. The effort started in the early 1990s, when the Virginia Smith Trust offered several thousands acres of land on which to locate a new university campus. In the foothills of the Sierra, the largely ungraded grasslands seemed ideal. The Smith Trust was offering scholarships to Merced area high school seniors so they could stay near their home towns for higher education. The property was some distance to the east of Merced, its surrounding area offered a new focus for development that would not result in converting more valuable farmland for houses and streets. There was enormous local support for the university campus.

Eagerly, the local agencies got together to plan for a valuable new institution in Merced County. But in the mid-1990s, the campus proposal stumbled. The U.S. Fish and Wildlife Agency declared several species of fairy shrimp, which were abundant in several pools, an endangered species. And on the Smith property was an array of vernal pools that biologists judged to be among the richest in California. The Environmental Protection Agency and the U.S. Fish and Wildlife Agency could not provide approvals to allow the campus to go forward. Ultimately, the campus had to be moved to an already-developed golf course near valuable farmland, engendering inevitable pressures for additional development and a reduction in California’s stock of farmland.

And because the access highway to the university crossed several jurisdictions, three separate agencies began preparing three separate environmental documents to get it approved. Caltrans began work on a Negative Declaration to clear the Merced interchange with Route 99; the county is doing an Environmental Impact Statement on the portion in Merced County, and the University of California is writing an environmental document for the portion on its campus.

Jess Brown, of the Merced County Association of Governments, and Bill Nicholson, Director of the Merced County Planning and Community Development Department, in later discussions, felt that there had to be a better solution. Local and regional planning had been extensive. But they had not had an adequate understanding of the requirements of the state and federal permitting agencies.

Elsewhere, Caltrans and the permitting agencies were running into similar problems. They were arriving at project development stages only to find that they had not identified potential problems in the permitting process. Caltrans needed to understand the intentions and needs of the permitting agencies as well as potential future changes that could bring projects to a halt.

The Merced County Alliance, an agreement between Caltrans and the permitting agencies that was signed in 1999, contained several provisions to improve communication, quality and timeliness, and to address environmental issues early in transportation planning through frequent communications, cross training and rotational assignments between the agencies.

And Caltrans, under Brown and Bill Nicholson decided to move quickly to try to make the process work better for Merced County. They developed the Partnership for Integrated Planning, a pilot project. Directed by representatives of the founding agencies, it has assembled representatives of federal, state and local agencies and other interested parties to bring differing perspectives to bear on problems early.

The two-year project will assemble and integrate data within the context of the Merced Council of Governments’ 20-year Regional Transportation Plan. The data may also be used in the Merced County General Plan framework. Data will be modeled and displayed in several scenarios for participants to evaluate and develop point-of-view recommendations on optimal locations for development and transportation infrastructure.

Participants will evaluate the effort and recommend ways to identify environmental issues before the project development process starts. The intent is for the lessons learned and the methodologies developed to be used as a model throughout California and showcased nationwide.

Participants and environmental resource agencies will address environmental impacts and mitigation for land development and transportation projects. An outcome of this effort should be strengthened cumulative impact analysis, at the project stage and improved identification of sensitive environmental resources early in the planning process. This information can then be used to guide planning decisions on the most appropriate locations for land use development and transportation infrastructure.

Merced County is located in the San Joaquin Valley east of the San Francisco Bay area. Primarily a rural county with the city of Merced its only urbanized area, it contains rich agricultural lands and environmental areas that are being crowded by changing land uses. The county is also a gateway to recreational opportunities at Yosemite and other Sierra destinations.

Inter-regional travel and resulting problems derive from sources outside the county. Air quality is a major issue in the one-eighty county San Joaquin Valley air basin, which does not meet federal quality standards.
The Merced County Association of Governments, the federally recognized metropolitan planning organization for transportation planning, was selected as a partner for several reasons, including its understanding of the pitfalls of a lack of communication. The agency was known for innovative planning efforts and possessed a working geographic information system that contained parcel-level base maps, streets and road configurations, soils information, wetland and cultural limits and hazardous materials sites, all the stuff of avoidance.

In addition, development of the agency’s new regional transportation plan was just starting, and large development projects had been proposed that would impact environmentally sensitive areas. The EPA, Caltrans and BAWA, all actively involved in the region, were able to channel resources to the partnership.

Merced County needed the partnership for a number of reasons. State Route 99, its main north-south route, and State Route 152, its main east-west route, were being overwhelmed by new commuters who were escaping higher real estate prices outside the county. Both routes carried high levels of interregional travel from outside the county, particularly truck travel. And both routes were in need of substantial upgrades.

Elsewhere, new towns were being proposed at Santa Nella, Village of Laguna San Luis, Fox Hill and Yosemite Lakes Estates. Castle Air Force Base had been retired by the U.S. Air Force and new uses for the base were being examined. And, as with most of the rest of the San Joaquin Valley, population pressures were threatening both the sensitive wetlands of the south and western portions of the county and valuable farmland elsewhere. If the county were to develop the infrastructure necessary to serve the growth while minimizing impacts to these valuable resources, it would have to have a strong working relationship with all the agencies whose missions involved their protection. The local agencies signed on.

The partnership has been in place since mid-2003. Among its first tasks was an effort to create among the members of the partnership an understanding of their various missions. This would be necessary as a basis for principled negotiation later on. Over the life of the project, the participants will gather planning and environmental information for inclusion in the GIS, identity and rank strategic issues, integrate transportation, environmental and land use strategies and model them and, ultimately, develop and distribute project recommendations.

“Nobody is assuming this is going to be easy,” Brown says. “These agencies have missions that are often at cross purposes. But we must get them involved in the planning process. We will have to struggle with major issues, but ultimately, the better we know each other, the better our chances of a successful future for Merced County.”

— Gene Bonfanti

Governor Davis Spearheads Transportation Renaissance

By Marie Contreras Sweet
Secretary, Business, Transportation and Housing Agency

As we begin a new year, I want to thank the employees of Caltrans for their dedicated service in 2001. With your help, we made a record investment in improving California’s transportation infrastructure. Nearly $1 billion worth of transportation improvements projects are currently under way—many of them at an accelerated rate.

Over the next year, California will have over $1 billion in transportation projects alone under construction, the largest in state history. California’s transportation budget is now twice the size of that of any other state.

The goal of the Davis administration is to ensure the safe, efficient and reliable movement of people and goods. We have set out to do something about gridlock, so that people can travel to and from work more quickly and spend more time with their families or doing whatever activity they enjoy in this great state.

The state has identified $200 million in transportation projects that will be delivered at accelerated speed, providing a quick kick-start to the economy. Many projects are being brought on line a year or more in advance of their original construction dates.

We’ve formed a unique and effective partnership with Caltrans, the Resources Agency and Cal-ERA to expedite the approval process for transportation construction. Governor Davis, Director Morales and I will be looking for additional ways to speed these projects. Foremost, we will reach out to our partners in local and regional governments to support that goal, and we will do it in an environmentally friendly way.

So, on behalf of Governor Davis, thanks again for all that you do. Here’s wishing each of you a happy New Year.
Electronic Bridge Site Data Submittals

By Paul Knox, Caltrans Student Assistant, Division of Engineering Services

Big bridges are mammoth engineering projects that require extensive materials, construction equipment and personnel to complete; even small ones require a complex set of data in order to be designed correctly. To tailor a bridge design to its physical location involves reviewing and producing dozens of separate pieces of data, including survey reports, right of way and vertical and horizontal clearance requirements, flood plain levels and others.

The method for submitting a Bridge Site Data Application, which had been in place for decades at Caltrans, often resulted in applications that were incomplete or that contained inaccuracies. But today, an innovation by the Preliminary Investigations unit in the Division of Engineering Services, known as the Electronic Bridge Site Data Submission Application, is streamlining the process and improving its accuracy. And it stands as a model leader in technology application.

District design teams, until recently, submitted printed Bridge Site Data Submittal applications to the Preliminary Investigations unit through the mail, a process that often allowed errors in the application to get through. Before 1999, Preliminary Investigations did not have a consistent, reliable and efficient procedure to ensure that the applications were complete and accurate before delivery to Structural Design. Occasionally, the Preliminary Investigations Unit would have to return to square one and resubmit the construction site, increasing the overall cost of the project, sometimes significantly.

When Chuck Pazzi took over as Branch Chief for Preliminary Investigations in December 1999, he became aware of the problems with site data submissions and began investigating ways to improve them. He saw three problems. The existing system allowed inaccuracies of the data; the process for correcting inaccuracies was cumbersome, and processing of the data for Bridge design was time-consuming. To address these problems, he convened a quality team tasked with designing a more efficient process. His supervisor, Roberto LaCalle, was the team’s sponsor.

The team consisted of specialists not only from Preliminary Investigations but also from various districts, as well as technology support. As it began to examine the submission process, it collected verbal and written complaints, suggestions and recommendations made by clients through telephone inquiries as well as in onsite meetings. It also contacted the Division to identify areas of confusion. Of particular interest were spaces on the Bridge Application form that in use that were often left blank or were filled in incorrectly.

After gathering and analyzing information on problems with the existing system, the team concluded that an electronic submission process would be the best solution and began to investigate the logistics of implementing such a process. Pazzi’s team discovered that although it was possible to implement such an application process, to do so would require a significant amount of work. The team spent the next few months designing an electronic version of the paper application.

The team had originally planned to attach Electronic Bridge Site Application to emails. However, once it began testing, it discovered that the electronic applications were too large to send as an email attachment. After discussions with technical support specialists at headquarters, the team decided that compressing the Electronic Bridge Site Application would be the most elegant solution. Preliminary Investigation’s web site now contains links to Electronic Bridge Site Application forms, a link to a popular file compression utility and a full set of instructions for how to use the file compression software to “zip” the applications.
The team recognized that the electronic application would have to appear as similar as possible to the print version while being capable of direct electronic submission to the investigations unit. Using this feature, clients could easily compile and submit their applications, eliminating the wait or more required for the application to arrive by mail. It questions arise, Preliminary Investigation’s request for clarification and the district’s response could be almost simultaneous, using a couple weeks on a typical project and as much as several months on a large, complex project.

How it works — When a district design team is ready with its site data submittal, a designer sits down at a computer and, using software recommended by Pazz’s Intranet and SSC team members, keys site data— including floodplain, hydrology, traffic, and other data—into the report. To make the electronic form easy to use as possible, the team divided it into separate information-specific sections.

The software contains a number of internal controls that assure that the data is consistent and requires correction of inaccuracies before submission, including an electronic review that will give hints and suggestions automatically when the cursor touches the highlighted portion. The designer then transmits it to the Preliminary Investigations unit, which checks the application to ensure that it is complete, that it was taken at the correct location and that specific forms are completed. When the branch finds that the information is reasonably complete and accurate, it initiates data collection and processing to produce a Preliminary Site Report for use by Structure Design.

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<th>Site Data Submitted</th>
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Accurate floodplain and water volume data are essential for bridge structure placement.

The electronic form not only offered nearly instantaneous communication between structures and client districts but also the opportunity to build quality control directly into the system. Quality controls include innovative scroll-down menus, pop-up boxes and an electronic help file. The team supported this quality control feature in a new electronic instruction manual specifically designed for the Electronic Site Data Submission Application.

Under the old system, the district engineering staff would send the Preliminary Investigation report to Structures Design through interoffice mail, taking as long as two days. Should the engineers have substantial questions, the inquiries and responses would travel through departmental mail again. Overall, an individual inquiry could spend several days to a week in interoffice mail or even be lost. The Electronic Site Data Submission Application process shortens this exchange, providing a significant time savings.

Preliminary investigations now can track each application more easily and accurately with a specialized spreadsheet. Moreover, customers can access an online version of the spreadsheet to investigate their project’s progress. They can review the dates the survey crew will be on site, the status of their application and the projected date of delivery to design.

Designing a bridge will never be quick and easy, but Pazz and his team have made it a deal deal quicker and easier. The new process shines as much as a third of the time required to deliver a complete and accurate Preliminary Investigation Report to Structure Design.

Pazz praises the team. "This project was just too large for one person to complete. It took the team's combined effort to bring us to where we are today. They were willing to do whatever it took to complete the project."
The westbound Interstate 80 to eastbound I–580 and southbound I–880 freeway-to-freeway connector at the San Francisco-Oakland Bay Bridge Distribution Structure, commonly called the “maze” by Bay Area travelers, is a heavily traveled artery that for many years had been one of the San Francisco Bay Area’s worst traffic bottlenecks. A crucial passageway, it was a common subject of complaints in newspapers and a platform for public figures to criticize the transportation network.

At the maze, motorists from all over the heavily populated north and east regions of the San Francisco-Oakland Bay Bridge and to a major artery to Silicon Valley. And after the 1989 Loma Prieta earthquake, which took out its Interstate 880 component, what had been merely a headache for drivers became a royal pain in the neck.

The new connector between westbound 80 to eastbound 580 and southbound 880 was completed in about a third of the original time estimate.

The conditions under which Caltrans designers had to work could not have been more challenging. The roadway portion of the connector where it diverged from westbound I-80 was a three-lane facility that merged into two 3.66 m lanes with shoulders varying from 0.91 to 3.05 m. The roadway was about 306 m long. The portion of the connector that split into southbound I-880 had been built in 1993. Eastbound I-580 was constructed in 1993. The southbound I-880 branch of the structure was 9.75 m wide, while eastbound I-580 branch was 8.51 m.

Based on these conditions, an original design was prepared that incorporated a silver lining to the existing structure. However, this hindered plans for a future eastbound HOV lane project that was intended to pass under the connector, because the existing columns encroached into the HOV lane’s alignment. With these factors in mind, designers came up with a design that replaced, rather than widened, the connector. This design brought the roadway up to current standards of safety and design and allowed replacement of the existing support columns.

Replacing such an important connector proved to be a real challenge, for several reasons. The design had to be such that traffic would suffer minimal impact; it had to accommodate the new HOV lane, and it had to conform to the existing connector at the project limits without compromising Caltrans standards. The final design included double columns strategically placed to allow enough room for the future HOV lane. To improve safety, the roadway portion of the new connector had three lanes, standard 3.0 m shoulders, and improved sight distances. In addition, the design incorporated new staged-in place cast columns that met safety standards and were cost-effective from a maintenance point of view.

But the supreme challenge of the connector project was its design, although that was in itself a significant
challenge. The biggest challenge was in executing the design on an existing roadway that carried about 75,000 vehicles daily. A daily peak-hour delay of up to 30 minutes had existed for years at the merge point on the connector on westbound I-80 destined for eastbound 1-580 and southbound I-80. To minimize the impact on travelers, District 4, using every measure it knew of to speed construction, scheduled completion of the job in 420 calendar days.

And to achieve this accelerated schedule, the district initiated an unconventional method of construction contracting: A-BI contracting. Under this method, prospective contractors competed on the number of working days, as well as the total project cost. The engineer’s estimate on the project was $16.5 million. Bidders were asked to estimate the number of days it would take to complete the project, and to include $20,000 for each constructive day in their bid amount. The $20,000 figure, based on the cost of each day’s traffic user delay, was calculated by the district’s highway operations branch.

Under A-BI contracting, a firm that bid, say, $10 million on the project and planned to complete it in 400 days would include an additional $2 million in its bid amount. If the firm planned to complete the project in 300 days, it would add an additional $6 million. In this way, the firm that planned to complete the project in the shortest amount of time, other things being equal, would be the low bidder. If the contractor were unable to complete the project in the time specified in the bid, a deduction of $20,000 for each day over would be assessed.

A-BI contracting proved effective, since it brought positive responses from six potential contractors. The awarded contractor, R.B. Brosamer, estimated that it could complete the project in about a third of Caltrans’ estimated completion time: 130 days. (The second bidder estimated that it could complete the project in 260 days.)

And, in fact, Brosamer did make the 130 days. Said Shahmirzad, the Resident Engineer on the project, attributes the contractor’s ability to complete the project in such a short time to several factors. One of these was Shahmirzad’s own suggestion for a staging change that reduced the number of stages from five to two. “Right away,” he knew we had a problem because the footings

Construction contractors competed on both time and cost bases for award of the ramp contract.

R.B. Brosamer built the new connector a half width at a time, rerouting traffic, demolishing the existing connector, then building the other half. Traffic continued, not only on the connector itself, but also on busy eastbound I-80 beneath it.

For the new bridge were at the same location of those for the existing bridge. To put the footings in, we had to demolish the old ones.”

Shahmirzad partnered with Brosamer to make a change to demolish the old structure. “We were lucky that Brosamer was also the contractor for the adjacent contract (doing seismic work on the nearby Route 880),” Shahmirzad says. “They expected the work on Route 880 and opened the additional lane necessary for the increased volume of traffic as a result of the stage change for this contract.” The stage change called for the closure of the 880 connector ramp for two months and a detour was set up for the traffic to take 880 to 980 and back to 880. This was the same detour route used for 10 years after the Loma Prieta earthquake, when the Cypress freeways collapsed.

The stage change eliminated several traffic switches, thereby reducing the congestion and delay for travelers. And it also allowed Brosamer to work two daily shifts, seven days a week.”

This change had a direct cost saving of $603,000 and accounted for most of the time savings.

The district also expected all submittals of work, and anything else that needed submittal approval, and made other efforts to reduce the contract time.

The stage construction involved building the new connector half width at a time, rerouting traffic, demolishing the existing connector, and building the other half. “We were done under traffic, not only on the connector itself, but also on busy eastbound I-80 traffic beneath it. Brosamer succeeded in meeting the ambitious goal of completing the project in 130 calendar days, nine months ahead of schedule. The new connector opened to traffic on July 21, 2000, exceeding all expectations. The Connector Replacement Project is a tribute to engineering ingenuity and construction know-how. It represents all the innovative engineering in design and construction that a team is capable of putting together. A-BI contracting is a process that puts a contractor’s focus specifically on “how we can complete the job in the shortest amount of time,” especially with an imposed user delay cost of $20,000 for each day over. It is a process that should be considered for any project where there is great public pressure to get the job done quickly.”
innovation:

rural transportation management

by Jim Linga
photos by Don Taouchi

The Sacramento River Canyon seems an unlikely place to be at the forefront of a revolution.

Yet, this scenic treasure north of Redding along the shores of Shasta Lake has become the northernmost outpost in Caltrans’ high tech battle against traffic congestion.

Deployed along a 9-mile segment of I-5 is a virtual highway of advanced technology sensor to collect up-to-the-minute traffic data. That information, coupled with a network of cameras, gives Caltrans District 2 Manager a carpool’s seat from which to watch the flow of traffic at the narrowest stretch of I-5 between Mexico and Canada.

In a place as rustic and beautiful as the Sacramento River Canyon, it is hard to imagine the Source of Traffic Congestion anywhere near. But it happens, particularly over holiday weekends and during the summer when thousands of people head for Northern California’s pristine lakes and mountain campgrounds and little communities like Weed, Boney Falls and Weaverville, comfortably nestled in the surrounding landscape.

We start our journey at Redding, the county seat of Shasta County. Once a town dependent on the railroad and the surrounding lumber industry, Redding has transformed itself into a diverse, thriving business center of 80,000 people.

Rooding was named in 1872 for Benjamin R. Redding, the first land agent for the California and Oregon Railroad. Two years later, the local state assemblyman sponsored an effort to change the city’s name to honor Mayor P.C. Redding on whose land grant the community was located for six years, it was known as Redding but ultimately reverted back to Redding because the railroad refused to recognize the change.

For the poor mayor, Herman Johnson’s campaign to break Big Falls grip on the Golden State in the early 1900s wasn’t soon enough.

“While transportation decisions focus on traffic congestion, the tendency is to think immediately of urban areas like Los Angeles and the Bay Area,” says District 2 Director Thomas Miners. “But mobility is every bit as important in areas like Shasta County and the north state. Northern California is an important element of the state’s economy. How successful we are at keeping traffic moving here not only affects those of us who live and work here but has a direct impact on the jobs and economic well being of people living hundreds and in some cases thousands of kilometers from here.”

California’s high tech battle against traffic congestion is being waged in the shadow of Spectacular Mount Shasta.

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Longtime traffic watchers in District 2 recall a Turkey Day weekend backup about 70 years ago that stretched 40 km from the Gibson Maintenance Station to Danville. That episode served as the catalyst for the high-tech transportation revolution in the canyon.

"There's very little elbow room in the canyon," says Brian Johnston, manager of District 2's Transportation Management Center. "There are no easy alternate routes. If I-5 is closed because of an accident, detours and two or three even six hours to a trip. Every minute we can save in clearing an accident is crucial in getting traffic flowing again.

Given the physical and environmental constraints of the canyon, District 2 engineers developed a strategy to improve the department's ability to react when an incident occurs. The solution involved installation of a network of sensors to collect traffic information and cameras strategically placed at key locations along the roadway, that tie directly into the District 2 Traffic Management Center in Redding.

"From the center, we know the traffic volume and can see the actual conditions on the freeway. If an incident occurs, we take action immediately," Johnston says.

These actions include dispatching maintenance and other emergency personnel, activating a series of changeable message signs to alert traffic north and south of any delays and broadcasting the latest information on highway advisory radio.

The Sacramento River Canyon section was the last segment of I-5 in California to be brought up to full freeway standards. The final 20 miles, which included six bridges and four interchanges at a cost of $110 million, was completed in 1992.

"I-5 in the canyon is a magnificent piece of transportation engineering given the spectacular terrain and the traffic demand. Department engineers in the district and structures produced a roadway that moves traffic efficiently while offering travelers a front row seat at nature's handiwork," says Nielsen. "Our maintenance crews take very good care of it. I-5 in the canyon is something we are proud of."

The combination of a modern freeway designed for high speeds and magnificent scenery can cause a driver's attention to drift. To help drivers stay focused on their speed and enhance safety, Caltrans District 2 installed a $100,000 advanced curve warning and traffic monitoring system along Interstate 5.

While the numbers of accidents are low, the ones that do occur can be very severe due to the high speed at which motorists travel. The warning system is intended to slow drivers as they approach curves.

The system links radar detectors with changeable message signs. As drivers approach, the message displays the advisory speed and the current speed of the motorist. It is higher than the posted speed.

Even on a mild autumn afternoon, we get a glimpse of the potential problem that can occur. Just above the O'Brien interchange, midway in the canyon, a partially jackknifed big rig is blocking two of the three southbound lanes.

"You don't expect it to be a nice day with dry pavement but if you're going too fast, you can lose control. We're fortunate in this instance that the rig could be easily redirected and that traffic volumes are light so there's no backup."

"I-5 in the canyon is a magnificent piece of transportation engineering given the spectacular terrain and the traffic demand. Department engineers in the district and structures produced a roadway that moves traffic efficiently while offering travelers a front row seat at nature's handiwork," says Nielsen.
Shikra County towns of Dunsmuir and Mount Shasta seem mostly untouched by California’s century-long land rush.

Johnson says, “If this happens on the day before Thanksgiving, look out.”

Based on its positive experiences in the canyon, District 2 is planning to install cameras on all its major routes including Highway 36 from Red Bluff to Lassen Park, Highway 44 in Redding, Highway 295 in Modoc County and Highway 79 through the Feather River Canyon. In all, more than 57 cameras will be installed to help the district keep a handle on traffic.

The district also pioneered the use of barrier gates on the stretch of Interstate 5 in the canyon. After locations, the district installed gates in the median barrier that can be opened to assist emergency crews responding to accidents as well as to divert traffic around the closure when circumstances warrant.

The 40 or so kilometers along I-5 from Redding to Dunsmuir offer the traveler an opportunity to see nature at its finest. Even with a modern freeway leading its way through the mountains, much of what you see hasn’t changed since early man first laid eyes on these hills.

We pass Lakehead and arrive in Dunsmuir, a town of just over 2,000 that could be the definition for old railroad towns. Dunsmuir was once the transportation hub in the north state, the home of a major repair facility for steam locomotives.

Dunsmuir’s romance with the railroad goes back to its founding. Located at the southern end of a very steep grade, Dunsmuir became the place where additional engines or “puffins” were placed at the end of the train to provide extra oomph to get over the hill.

These “puffins” also gave the town its original name.

A fellow by the name of Dunsmuir ambled into town and asked the city fathers to rename it in return for the gift of an ornamental fountain. Both kept the bargain and the fountain, originally placed outside the train station, now sits in the city park. Dunsmuir was burned into the national consciousness 10 years ago when a freight train carrying a toxic chemical derailed, pouring thousands of gallons of poison into the Upper Sacramento River. The devastation was total with the fish kill stretching well downstream and forcing evacuation of countless campers and residents.

The spill also underscored the remarkable recuperative powers of Mother Nature. Today, the waters of the river are once again crystal clear, teeming with fish and the Upper Sacramento River remains a favorite place for anglers.

Between Dunsmuir and Weed at the base of Mount Shasta lies the town of Mount Shasta. Like other communities in this area, the railroad and timber were the reasons for its founding.

Now, tourism powers the economic engine in these parts. Nearby skiing, and the natural beauty of the surrounding area have turned Mount Shasta into a destination point for tourists. Blessed! The yogis have found it.

Continuing north, I-5 opens up into the Shasta Valley as we come upon Weed.

Weed took its name from Abner Weed, a lumberman who was looking for a windy place to speed the drying of lumber. The lumber industry dried up, but the wind has kept blowing.

Cattlers high tech apparatuses have found their way here. The department expects to have a warning system in place next summer to alert motorists to real time wind conditions along the highway.
The Lincoln Bypass Mitigation Plan

Long-term mitigation of the environmental effects of a major transportation project poses a thorny problem for project developers. All projects of any magnitude have major impacts upon the environment through which they pass. Caltrans project staffs fully understand this and are conscientious about pursuing their responsibility to mitigate for the effects of their projects.

The cost estimates are prepared early in the life of a project when it is very difficult to estimate the environmental effects and, particularly, the cost of mitigating. What often slips through the cracks is a reservation of the resources to oversee the long-term establishment of plant and animal colonies to replace those impacted by the project. Oftentimes, the work ends up “coming out of the budget” at an already overcrowded environmental program and staff.

But what if a “bailout” environmental mitigation program were available when the project’s effects were determined and negotiations with permitting agencies completed? And what if that program included all of the establishment and monitoring costs for a period of up to 10 years?

That is what is happening on the Aiken Ranch, just south of the burgeoning town of Lincoln in fast-growing Placer County. On a spectacular November day, an ecological stew of bugs, swallow’s hawks, great blue herons and great egrets soar, scrub jays and flickers sing, deer graze and wild turkeys gobble. Blue oaks, Oregon ash, cottonwoods and grasslands rustle in the breeze. Currant deer pick up their ears, then amble into the valley below a cluster of Oregon grape. Pintle flowers from the Antelope Valley ripple through this spairst faeryland.

It is through here that the Lincoln Bypass, a $190 million, 20-km, four-lane expressway proposed to replace the congested State Route 65, would run, impacting farmland, rural pools and streams, marsh wetlands, mossy oaks, trees and grasslands.

Blue oaks, Oregon ash, cottonwoods and grasslands rustle in the breeze.
A snowy egret keeps an eye out for a snack on the Aitken Ranch.

Currently, Wildlands Inc. operates 10 mitigation banks—locations where agencies or developers can buy "credits" against their projects' impacts—totaling more than 200 ha. And when the Lincoln By-pass project began to round toward final shape, he returned to Caltrans, this time with an even more interesting proposal.

Pacer Legacy, an independent foundation dedicated to preserving open lands in Placer County, had purchased an agricultural easement on the Aitken Ranch, which Wildlands owned. That easement was intended to keep the ranch in agricultural use in perpetuity.

Wildlands surveyed its property and determined that virtually all of the mitigation requirements for the Lincoln By-pass could be met through habitat restoration on the Aitken Ranch. Morgan approached Caltrans with a proposal. He and his 37-person staff would remove the existing turkey barriers, design the mitigation, grade and develop new vernal pools and wetlands to replace those taken by the project, plant 500 oak trees and several Valley oak saplings, and restore 20 hectares of riparian forest. Non-native sedge grasses would be controlled by grazing Wildlands' 230 head of Texas Longhorn cattle. The company would also produce an environmental impact report for the mitigation project, to satisfy the requirements of the California Environmental Quality Act.

Morgan proposed reaching an agreement with the permitting agencies—the U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game—in a conceptual plan for the mitigation. When a final alternative was chosen for the project, he would then develop the mitigation, manage it through establishment, and establish a permanent conservation easement that would protect the property in perpetuity. Morgan has since received correspondence from the agencies, including the Environmental Protection Agency, agreeing to the concept.

The proposed agreement with Wildlands required a big step from Caltrans. The Environmental Impact Statement for the proposed project still lay in the AIRMAN review basket and had not been dated for public comment yet. The department did not have a biological opinion from U.S. Fish and Wildlife Service, required to produce a final agreement on the mitigation. A final decision had not been made on the best environmentally damaging proposed alternative.

The agreement thus required the department to take the risk of securing the property before approval of the Environmental Impact Statement by the Federal Highway Administration.

District 3, on a risk basis, has set aside state-only funds to do that. If the project goes ahead as planned, Caltrans will seek reimbursement from the federal government for the right-of-way funds. The department is currently negotiating with Wildlands regarding whether to purchase the Aitken Ranch outright or develop some other agreement with the company to assure that it remains at the mitigation site.

"I hope our staff did a good job on this deal," Aitken says. "We did the fieldwork to assess the potential impacts of the various alternatives to create the basis of the Wildlands proposal. Environmental Senior Ken Van Velzer worked tirelessly to keep the proposal solid on its relevance to the project and gave Wildlands guidance throughout the process on our needs, making it easy for them to deal with resource agencies.

Wildlands Inc. will graze its Texas Longhorn cattle at the Aitken Ranch to reduce the encroachment of non-native grasses on vernal pool uplands.

Aerial view of the State Route 65 alignment as it crosses the outflow from Auburn Ravine near Lincoln.
“In fact, Koa and staff facilitated meetings to get the idea fleshed out and at one of those meetings got verbal support for the approach from Fish and Game. Clay Nystrom and his right-of-way staff were told ‘No’ to begin with on advance purchase, but they found ways to make it work. Without the funding of those funds, the Wildlands proposal was DOA.”

The benefits of the arrangement are many:

- The site has already been determined to have the habitat necessary for mitigation.
- The mitigation will be installed at a large site rather than at several small ones, an approach preferred by permitting agencies.
- The mitigation would occur prior to construction, demonstrating an early Colton commitment to protect the environment.
- Environmental document approval will be advanced with mitigation already under way.
- The project addresses recent cost increases to ensure that mitigation is under way by the start of construction.
- Cost savings are expected as a result of having a turnkey mitigation arrangement.

The Wildlands, Inc. staff develops mitigation banks, does feasibility analyses, works with Global Positioning and Geographic Information Systems and CAD/CAM designs ecologically based restorations, performs long-term stewardship and monitoring, supervises grading and earthwork and plant installation.

Wildlands Inc. has obtained letters from resource agencies that provide conditional advance approval to the turnkey project.

Perhaps the most elegant outcome of the Lincoln Bypass mitigation project is one that will delight economists forever. That is that a private interest has, once again, seen a need and filled it. Adam Smith’s “invisible hand” has been at work, producing what may be well be the first of a whole new mitigation industry, one that has every promise of easing project approvals, establishing high-quality mitigations of project effects, and doing it at a lower cost than could be done by government.

Colton and other government agencies will be the winners when private entrepreneurs see the potential profit and join Wildlands, Inc. in competing for environmental mitigation projects.

— Gene Bestehorn

A deer hides in the bushes in the riparian habitat along Auburn Ravine Creek.

On a spectacular November day, an ecological stew of bugs, Swainson’s hawks, great blue herons and great egrets soar, scrub jays and flickers sing, deer graze and wild turkeys gobble.
Social scientists are fond of citing the law of unintended consequences when situations change for the worse as a result of some human-produced action. One of those has been occurring over the past few years as efforts to reduce pollutants running into the San Francisco Bay have reduced levels of impurities in the water.

One of the unintended outcomes is that Tendrils (marine worms) are multiplying and they’re getting healthier as the bay water is cleaned up. And they like nothing better than wood. They establish relay trains that bore into treated wood bridge fenders, reducing them to ashes in a few years. Dealing with the worms has meant finding a new material from which to manufacture the fenders.

Now, the soda bottles, broken toys and superannuated TV dinner packages that you’ve been tossing into the recycling bin are finding their way into bridge fenders.

Fenders are the first line of defenses for a bridge pier. Part of an overall system that may include “dolphins” – poles driven into locations where ships are likely to clip into the pier – and concrete skirts, they are designed to take the hit from a major watercraft and to deflect it away from the pier. They are “sacrificial” in that they are designed to absorb the energy of a ship, often taking damage and having to be replaced. Better to replace a fender than to raise a sunken cargo vessel or replace a bridge pier.

Marine borers make quick work of bridge fenders, even those treated with now-banned creosote.

Ken Brown is chief of Structures Maintenance Investigations in Caltrans District 4 and Mark Woods, the Structures Resident Engineer on a $2.5 million project to sheath the San Francisco-Oakland Bay Bridge piers that lie in navigational lanes with recycled plastic fenders. The project began in May of 2001 and was completed in November. Eventually all piers in navigational lanes of the San Francisco Bay Bridges will be fitted with plastic fenders.

“At least one of the toll bridge fenders will fail at a hit each year,” says Brown. “They often come from barges that have gone ashore, but occasionally we do get ships. The last major one, from a 32,000-tonne ship traveling at 11 knots, resulted in more than $200,000 in damage, which was limited to the fender system with some to the main pier. The ship ended up with part of the fender system sticking out of its side.”

Bridge bums are a headache. Pilots of vessels that hit the systems, unless they are seriously damaged, are not judged. They are simply charged for the cost of repairing the damage. “Often we end up with debris from the fender in the water, and that becomes a hazard to smaller vessels. We have to go out and try to pick up everything that has gone into the water,” says Brown.

Mark Woods is Structures Resident Engineer on a $2.5 million project to sheathe Bay Bridge piers.

INNOVATION:
Bridge Fenders of Recycled Plastic

By Gene Berthelsen
Caltrans began experimenting with recycled plastic fenders in the early 1990s after environmental agencies started looking at recycled wood being used in the fenders at that time. But the idea's massive scale program took every available resource to make bridges safer. With that program now in its final stages, the department has turned back to replacing the wood fenders with recycled plastics.

The extended period of time has allowed the department to evaluate different materials and methods of placing them and render them in order to save and better materials.

The plastic works were carried out on the Dumbarton Bridge and the west span of the San Francisco-Oakland Bay Bridge. Over the years, the department has evaluated plastic-only fenders, which cracked, their plastic-coated two-inch pipe, which required to stay in place. Later materials have included reinforced, recycled plastic with fiberglass mesh at the corners, which has proven to have both strength and durability.

Also tested were a composite that included a fiberglass shell encasing polymer concrete, filament-reinforced plastic and fiberglass mesh with plastic resin around it through a synthetic process. "The filament reinforced system is being used on the east span of the Bay Bridge as a pilot. Since that bridge is scheduled for replacement and the material will not have to be in place for an extended time. We are unlikely to use it on other upcoming fender jobs," Brown says. "While it is cheaper in price, we do not believe it to be an equal product to the reinforcer.

Recycled plastic with fiberglass reinforcing at the corners is the current standard. It costs about twice as expensive as treated wood. However, it is expected to have a useful life about three times that of wood, providing a life cycle savings. It is also more forgiving, bending and returning to its original shape rather than shattering if a hit is not catastrophic. But it is its relatively benign effect on the marine environment that is important. The recycled plastic, which has been manufactured to provide the same structural value as wood, is inert.

The recycled plastic is slightly heavier than wood, which has caused some but not unmanageable problems for the contractor. Power Engineering, in which Power Engineering that suggested using the reinforced, recycled plastic on this Bay Bridge project, through a Cost Reduction Initiative Program. Power was to shop at the former Alameda Naval Air Station to assemble the fender segments and float them on long barges to the work site.

In most cases, the members are attached to the pier by bolts, but at Piers 14 and 15, they are attached to the pier on "wales," horizontal members either of wood or galvanized steel, with galvanized bolts recessed into the plastic in order to eliminate the danger of sparks from any impact. Such a spark could produce a fire if the fender were struck by a vessel carrying highly flammable materials. "Chocks" or spacers, provide lateral stability.

Concrete slabs lie behind the fender system as a second line of defense against a hit.

"Power Engineering has been a real resource for us on this project," says Mark Wood. "With this first full-scale use of recycled plastic for fender systems, we believe that we are producing a system that will ultimately provide much greater value for California's taxpayers and a much more favorable aquatic environment in the San Francisco Bay. Everyone wins."
Constructability is the term that Caltrans engineers apply to the delicate nexus between the end of design and when the bulldozers start pushing soil.

But in this handbook, where the world of design theory encounters the world of dirt, traffic, environment and machinery, the usual change orders and construction claims are born. And each year, change orders amount to about $250 million; the total of construction claims against Caltrans by its contractors currently stands at about $1.54 billion.

Constructability reviews -- interdisciplinary reviews to make plans more buildable -- were instituted by then-Design Chief Bob Buckley in 1991. Those reviews have been a work in progress ever since, implemented in differing fashion in differing districts. And today, District 11 in San Diego is reducing claims and change orders through an expanded concept of constructability reviews.

"The manufacturing world discovered the concept of team development of products with the writing and lectures of W. Edwards Deming in the 1960s," says Jim Leithead, District 11 Construction Chief. "We are now applying those principles to transportation design."

Pushed by Mohammed Chau, representing Construction, and Bob Hopkins, the district deputy for design, District 11 has developed a two-pronged approach to constructability. One of these is to establish, as many districts have done, a constructability review unit, now under the supervision of Hamed Balch.Nav. This unit tracks all projects in the district that are at PS&E, development stages and orders constructability reviews at 39, 60 and 95 percent completion stages. If necessary, the reviewers will be supplemented by reviewers from outside consulting firms, on contract.

"At 30 percent, we are looking at broad design issues pertaining to geotechnics (layout, profile, cross section), construction staging and detours, hydraulics, materials and geotechnical, right of way, soil, utility, and environmental and permitting requirements or restrictions," says Balch.Nav. "Those issues include drainage, earthwork, environmentally sensitive areas, systemic planning that may involve nearby projects, potential difficulties in maintenance areas, and so on. We are looking to reduce conflicts and avoid scope creep. This is "change control."

"At 60 percent, we should have a complete set of draft plans in addition to the information provided at 30 percent. We should be getting structure plans, traffic control and a critical path for the number of working days and quantities. It is substantial at 1.00 percent of uncharted plans."

Traffic handling is a big issue at this stage. "There are lots of detail issues at this stage," says Balch.Nav. "We are interested in design issues, staging, quantities for balancing, proximity to potentially interfering features, disposal areas and considerations for upcoming weather during construction."

At the 95 percent stage, a complete set of draft plans, including all revisions of the 60 percent stage, special provisions and best engineering estimates should be available, along with plans, special provisions, and standard special provisions. At this stage, the plans, specifications and estimates should be ready for submission to the Office Engineer.

Expanded constructability reviews include examinations by all Caltrans disciplines, including maintenance.
Involvement by construction contractors in constructability issues is expected to provide more biddable and buildable plans.

“Projects estimated at $25 million or more are required to go through all the reviews, as are those under $25 million that are very complex. For smaller, less complex projects, reviews are performed only at project initiation and at 30 and 95 percent stages. Projects estimated at less than $2 million are reviewed only at Project Initiation and 95 percent.”

“Projects estimated at $25 million or more are required to go through all the reviews, as are those under $25 million that are very complex. For smaller, less complex projects, reviews are performed only at project initiation and at 30 and 95 percent stages. Projects estimated at less than $2 million are reviewed only at Project Initiation and 95 percent.”

“We want to see work wherever traffic control is maintained, and we want to look at anything we haven’t reviewed at earlier stages,” Bobbeood says. “We are especially interested in copies of relevant permits and a suggested workday schedule.”

At each of these reviews, all reviewers receive plans two weeks before a scheduled interdisciplinary review meeting. Each reviewer has a set of check lists with which to do his or her project review. “The check lists are constantly evolving,” says Dave Stabbins, Senior Transportation Engineer in charge of constructability reviews.

Each review includes a field review and meeting with all disciplines involved. “This has forced project teams to have Project Development Team meetings that had kind of dropped by the wayside,” Stabbins says.

But we’re thinking that this is a process that could get us better projects at all levels of expenditure,” says Jim Litchinicum. The second prong of the district’s constructability effort goes far beyond the notion of review. When it needs to do is to involve construction throughout design by assigning a construction “buddy” to each project. And it also involves the construction industry in getting more biddable and buildable projects. “This is the team concept,” says Litchinicum.

Buddy System: Under the buddy system, a resident engineer with broad construction background is teamed with the design engineer at the beginning of the PS&E stage to provide guidance and analysis of constructability issues until the project is ready to list. After project report approval and preparation of skeleton layout plans, the project engineer teams up with the resident engineer assigned for review and consultation. The project engineer meets with the resident engineer once a month at the project site, with a maintenance chief.

During this meeting, the two go over contract items, construction staging, method of payment, quantity, safety aspects, equipment usage, materials, traffic control, night or day work, production rates and contract working days. Suggestions made by the resident engineer are discussed with the design manager and other functional areas, then incorporated into the PS&E. Issues with time constraints and scope changes are reviewed and the resident engineer’s comments are noted on the PS&E.

In the next phase, issues requiring resolution by the division chief are handled in a quarterly meeting attended by the resident engineer, project engineer, design manager and the district claims engineer.

Along the way, the participants divide constructability issues into ones that are potentially fatal flaws and those that can be handled by change order.

Contractor Review: District 11 is also making draft project plans, specifications and estimates available to prospective contractors for review and comment when they are 90 percent complete.

“The contractors have been very supportive of this concept,” Litchinicum says. “They love to make suggestions. We believe the prospective bidders will recommend better stage construction, innovative construction techniques, enhanced specifications and material use and allow us to evaluate the constructability issues and make appropriate changes before the bid. With the contractor review, we will also divide the constructability issues into those that are potential fatal flaws and those that can be handled during construction.

Contractors can access draft project plans through the Caltrans Office Engineer website at http://www.dot.ca.gov/hr/esc/iesd/ . Draft project plans will be posted for review for a two-week period, during which contractors can submit comments via the website. Caltrans will direct the comments to the appropriate district and design engineer for consideration in the final design. Comments submitted, whether incorporated into the final design or not, may be posted on the Office Engineer website.

A $15 million project with a list date in November and a $62 million project slated for late December underwent this process.

“Overall, the enhanced constructability review process will reduce the complexity of the constructability issues, allow us to assess the merits of revised contract plans and specifications, produce more biddable and buildable contract plans and specifications and give us a better basis for estimating resources, costs and schedules,” Litchinicum says.

Enhanced constructability reviews should produce more biddable and buildable contract plans.
Innovation:

Fast-Setting Concrete

By Jim Drago

Watching concrete harden is said to be about as exciting as watching grass grow. Not any more.

The Office of Rigid Pavement at the Translab, in cooperation with the concrete industry, has developed a revolutionary process that may mark the most significant advance in concrete road building since the Appian Way carried its first caravan of Roman Legions.

If one were to compare grass growing to concrete hardening, Caltrans' new fast-setting concrete is like planting grass seed, going out for a long lunch and coming back to a fully grown, lush green lawn needing to be mowed.

This is critical for the army of contractors and inspectors who work at night to remove and replace entire lanes of concrete pavement before the morning light brings the first wave of traffic.

"Caltrans' experience is that this new concrete is different from the specialty concretes that have been used recently," says Tom Pyle, Chief of the Caltrans Office of Rigid Pavement. "The specialty concretes are being slowed down so that we can work with them. But this is the same fast-setting cement that has been around for ages—on speed. Earlier specialty concretes can be expensive and sometimes have been difficult to use.

With the new process, construction crews can pour a slab with Portland cement concrete and run traffic over it in four hours, about one-third of the time required by a regular concrete mix.

"It's remarkable," Pyle says. "We've been looking for a fast-strength Portland cement concrete mix for years. This concrete is fast and versatile enough to be used in the worst of situations. It can be produced by most any batch plant and used on bridges, pavements, in adverse weather and for considerably less than what we've been paying."

California has about 24,000 km of concrete pavement lanes, mostly constructed in the 1960s and 70s, with a 20-year design life. Many of these now need repair that, because of the crush of traffic, must be done at night during very short work windows.

Putting concrete to sleep at the plant and waking it up at the jobsite provides adequate time to produce a smoothly finished roadway.
With more than $300 million worth of concrete pavement rehabilitation and repairs scheduled over the next fourteen years, Susan Massey, chief of Caltrans’ Office of State Roadway Rehabilitation, says that improving construction efficiency is critical to easing the impact of that work on traffic.

“Our construction windows are very tight. Deviations can severely impact traffic,” says Massey. “We need a dependable, fast-setting concrete to get the new slabs ready to carry traffic when it is time to open.”

“It’s exciting,” says Tom Pyle, chief of the Office of Rigid Pavement. “Think of it, the strength needed in a third of the time.”

In construction, the clock starts ticking when the demolition team starts removing the old pavement, Pyle says. “One of the problems Caltrans has experienced is the limited time, an hour or so, to get fast-setting concrete poured and in place. Some of the first mixes we used did not give the workers time to get the work done and it spilled over onto the concrete. Some of the cabs gave a rough ride because there wasn’t time to get a smooth finish. The public is vocal about getting a smooth ride on the freeways.”

To meet these challenges, Transbay’s Office of Rigid Pavement, together with Tom Kalata of the Western States Chapter of the American Concrete Paving Association, put out a call to the concrete industry to develop a fast-setting mix that would provide the required strength in a shorter time.

The industry responded with various products, and Transbay technicians even tried a few mixes of their own. All failed to provide the required strength.

Then the lab switched course.

“We told industry to be creative, look outside the box and try materials that had not been used before,” Pyle says.

That did it.

Master Builders Inc., a Cleveland, Ohio-based manufacturer, developed a system of additives that produced high early strength in just four hours. Master Builders solved the time problem by applying Clinchum, a product that made a liter of water behave like two, at the plant. Less water was needed, and less water made for stronger concrete. The company then added DuraChem, a chemical that puts the cement to sleep. The result was concrete in three hours.

At the job site, when the work area was ready, the company added an accelerator to make it go.

“At first we couldn’t believe we had attained such strength in four hours,” Pyle says. “We knew the specialty cements could get this strength, but ordinary cements simply had not achieved it outside our laboratory.”

We told industry to look outside the box and try materials that had not been used before.

That did it.

Chuma Construction has poured 170 smooth slabs using the new fast-setting process. None have experienced cracking.

“The concrete has performed just as we expected. It is setting up within four hours, giving the crew the time and flexibility to get it poured, finished and opened to traffic,” says Peter Chan, District 7 Deputy Director for Construction. “The ride is smooth and we have no cracking.”

Chan says that for urban areas like Los Angeles, the material will help reduce the risk that night or weekend concrete replacement jobs will open late and adversely affect traffic. “Our next challenge is to develop a fast-setting concrete that can be placed by a paving machine,” says Chan, a longtime Caltrans construction veteran. “I am confident the industry will do it.”

“We’re very encouraged,” says Susan Massey. “The material so far has performed very well. It allows us to get it in, get the work done and get out of the way.”

“Because the accelerator is non-chloride, it can be used on structures without producing corrosive effects that could damage the steel,” Pyle says. “The material has a projected life span of 20 years, comparable to a regular concrete mix. It is cost competitive, and the price will continue to come down as other suppliers get into the market and contractors become familiar with it.”

Who says watching concrete harden isn’t exciting?
Aerial photography has been an essential tool in the project development process for the past 40 years. Aerial photographs are used to identify environmental resources, spot potential right-of-way issues, analyze legal situations, plot rough alignments, illustrate potential effects for public displays and in numerous other ways.

For the past 40 years, Caltrans has acquired its highway inventory aerial photography in the same way: contractually about a fifth of the state highway system each year, covering the entire 24,000 km every five years, recording black-and-white images on film negatives. The most current photography for any given location is usually at most five years old. Older photography; a vital tool in documenting changes to the state highway system over time, is stored as film negatives and available on order.

But today, that system is being revolutionized. By end of this fiscal year, seamless digital color imagery of the entire California highway system will be available to anyone with access to the Caltrans Internet. The geo-referenced images will cover a swath 900 meters wide centered on each route at a ground resolution of 0.3 m per pixel and be compatible with Caltrans CAD and GIS software. The two images below compare DHIPP color digital imagery with the conventional black-and-white film photography:

The new Digital Highway Inventory Photography system provides color images and allows users to calculate the area of pictured features.

Users will have viewer tools at their disposal that will allow them to measure horizontal distances and calculate the area of any feature depicted in the imagery, in user-defined units, or to select an area of imagery and paste it into other software applications, such as Microsoft Word documents. They will be able to select areas of imagery by county, route and kilometer. The color imagery will allow users to identify vegetation, wetlands and cultural resources much more accurately than with the existing black-and-white photos. Moreover, the full 24,000 km system will be flown in a single year. The reduced costs of acquiring digital imagery will allow a revisit cycle of just two or three years.
"We expect that once people begin to use DHIPP, its applications will multiply exponentially," says Jim Appleton, Chief of the Office of Photogrammetry in Sacramento. "Each time I give a presentation to Caltrans staff, someone will suggest a new application. Recently a planner developing parkland alongside 101 told me that when the tool becomes available, it would reduce his need to perform site inspections by up to 50 percent. Talking to the more than 1100 Caltrans staff statewide who have attended our forums, I have seen firsthand how intuitive they can be. These forums are always started by encouraging positive feedback on what is being demonstrated, but I have rarely received any. The most frequent feedback is that they love what they have seen and want it yesterday!"

By the mid-1990s, the Caltrans Office of Photogrammetry began to find it difficult to engage aerial photography contractors to perform the conventional highway inventory photography. The 24-inch focal length, 9" x 14" image format was expensive, and there were no existing digital cameras that could perform the job. The lack of available parts and service was beginning to result in inventory photography delivery problems. In 1997, the Photogrammetry Branch began evaluating a variety of replacement systems that included high-resolution commercial satellites, digital aerial cameras and several conventional aerial mapping camera configurations. Caltrans wanted reliable operational availability, a reasonable number of potential contractors and the ability to deliver photography that met many client requirements as possible.

Digital imaging was not a practical solution at the time, so an interim format change was made to use current generation film-based mapping cameras with a 5" x 9" image format. According to Appleton, "We learned a great deal about how to manage change from this experience. We had failed previously to communicate clearly to our customers why we had to make an unpopular change to a product they were familiar with and that met their needs. This is why we have made such an extensive customer outreach effort with the digital inventory."

By 1999, the commercial aerial imaging industry and Caltrans were ready to go digital. Caltrans staff desired a product that had working characteristics (scale, image quality, ground resolution, limited relief displacement, ground coverage, etc.) that would closely match the old film-based format. Digital availability on demand was also of high priority with clients.

The digital inventory, on an accelerated schedule, is the result. "It will have gone from concept approval to an operational system in just over a year," Appleton says. "This is all the more impressive when you realize that it is not only compressing five years of photography into a single year, it also encompasses a complete informational technology project."

"We have had great support from the Caltrans Information Technology Program," Appleton says. "They have helped us to accelerate development of the feasibility study report and will be full partners in the implementation of the Digital Viewer and Storage System for imagery."

The digital inventory is a great example of internal and external partnering. "Photogrammetry could not implement a project like this on our own," Appleton says. "We have a number of internal partners: the Information Technology Division, Capital Program and District Photogrammetry Coordinators, not to mention the 1100 Caltrans imagery users who participated in statewide forums. Our external partners are just as important: HHC Aerial Photographers, a California-based, certified small business with a 30 year history of working with Caltrans, and Infinia (LAFM) Inc. It takes a team approach to make a project like this succeed."

Caltrans will own the exclusive rights to the digital imagery and the Digital Viewer and Storage System, making it possible for them to be shared with external agencies and the public. Availability of this information via the Internet is the ultimate goal," Appleton says. "However, we need to ensure that mechanisms are in place to protect the department's interests first. We have had some preliminary discussions with Caltrans Legal on this issue and continue to move forward."

With the DHIPP cut and paste tool, users can select a feature from the inventory and paste it into a Word document.

"We're seeing a continuing resolution in these technologies," Appleton says. "In 1998, the best we could have imagined would have been one-meter resolution digital imagery. Today's systems are better than that. It would have been black and white, images rather than color, and the imagery would have cost about four times what it costs today. There are exciting possibilities in the future, including infrared, multi-spectral, images, continuing reduction in cost and increasing resolution."

Current information regarding specifications and availability can be found on the Division of Engineering Services, Office of Photogrammetry webpage on the Caltrans intranet.

— Gene Borthakur

The DHIPP calculation tool could reduce the need for field inspections by 50 percent.
Grace, Joy and Hope

One of the hallmarks of Caltrans people is their desire to work in their larger communities to make them better places. For Caltrans District 10 employee and harp therapist Betty Kibble, sharing a precious gift of music is a natural.

Betty, an office technician in the district’s travel forecasting unit by day, heard a harp therapy program years ago at a medical conference. She was drawn to it.

Shortly after that, she bought her first harp, began to study and since has graduated from the International Harp Therapy Program in San Diego.

Betty’s harp, “Grace,” is a Dirty Strings Celtic Harp. She also owns a smaller Windstar Therapy Harp, or folk harp, that she calls “Joy,” which has specially designed strings to suit the tone for therapy purposes.

On September 13, at DISTRICT 10’s Volunteer Stewardship Awards Banquet, Betty played “Therapeutic Moments,” her own composition, honoring the hard work and devotion of the harp and harp therapy’s abilities to provide comfort and encouragement. The music’s soothing tones of strings that are strong across a soundboard and plucked manually, each string has a level that the harpist moves to produce sharper or softer sounds.

Since ancient times, the harp has been a symbol of relief and comfort, and harp therapy is an ancient art that has been newly refined in today’s world. For those in physical, mental or spiritual pain, the resonant music of the harp helps bring release into a state of peace.

Betty had to learn hand and bowing positions and took it one note at a time. She experienced a sense of immediate gratification while learning to play. After six months, she could play “Joy,” which is much easier to play than “Grace.”

Betty plays at least every other weekend at church services, weddings, skilled nursing facilities, community events and hospital visits. She also participates in a variety of community events and musical groups.

Betty, who is looking forward to “Joy,” a new addition to her family of harps, has found a gift within herself that has empowered her life. Her harp therapy continues to be a source of joy for herself and others.

— Tanya Boulware, District 10

Man of the Year

The Project Management Institute Government Specific Interest Group has named Caltrans Supervising Transportation Engineer Nigel Blampied its Member of the Year for 2007.

Nigel Blampied, Project Management Institute’s Member of the Year.

Nigel Blampied has been in the American Heart Association for more than 10 years. He was first elected to the Board of Directors in 2006, then served as President for the past two years.

Nigel Blampied is an accomplished musician and has performed with several orchestras throughout the United States. He is also an expert in project management and has been a frequent speaker at industry conferences. His passion for both music and project management has earned him the respect and admiration of his peers.

Nigel Blampied is currently a Project Manager for the Caltrans District 10 office, where he is responsible for overseeing the construction and maintenance of the state’s highway system. He is dedicated to ensuring that projects are completed on time and within budget, while maintaining the highest standards of quality and safety.

Nigel Blampied’s expertise in project management is not limited to his work at Caltrans. He has also served as a consultant for several companies, including a major construction firm in the region. His experience in project management has earned him numerous awards and recognitions, including the Project Management Institute’s Member of the Year award.

Nigel Blampied’s interest in project management was actually kindled in his first work experience as a construction contractor in his native South Africa. He was familiar with the challenges of managing projects in a developing country and brought that expertise to his work at Caltrans.

Nigel Blampied joined Caltrans in 1992 as a transportation engineer in District 7, then moved to District 10 in 1995 to oversee construction projects.

The Caltrans Division of Project Management has responsibility for providing funds, personnel, equipment, and support to all project management efforts throughout the state. Blampied currently oversees a team of more than 100 project managers who work on a variety of projects, including road construction, bridge replacement, and traffic control systems.

Nigel Blampied recently led the highly-successful Capital Improvement Program, which resulted in the completion of 1,200 projects for the state’s transportation system.

Nigel Blampied’s dedication to project management, coupled with his passion for music, has made him a valuable asset to Caltrans and the American Heart Association. His achievements are a testament to the fact that excellence in both project management and music can be achieved simultaneously.

— Carol Bellah
National Award for Caltrans Bridge Engineers

Caltrans engineers Lian Duan and Jason Lynch received the prestigious 2003 Arthur M. Wellington Prize at the recent American Society of Civil Engineers (ASCE) National Convention in Houston, Texas. The award citation reads: "For the paper, "Reaction Properties of Laidley Members of San Francisco-Oakland Bay Bridge, Journal of Bridge Engineering, May 2001." It is the first time that any Caltrans engineer or ASCESacramento local member has received the Arthur M. Wellington Prize - national recognition for Caltrans’ pioneering work and innovative approach to repairing long span steel truss and suspension bridges.

Dr. Lian Duan is a Senior Bridge Engineer and Structural Steel Committee Chairman with the Division of Engineering Services. He has worked with Caltrans since 1999 and has more than 20 years of bridge and building design experience. He was lead engineer for the development of seismic retrofit design criteria for San Francisco-Oakland Bay Bridge West Spans. He co-authored the Bridge Engineering Handbook, winner of a Choice magazine’s Outstanding Academic Title award for 2000, and Structural Engineering Handbook CRC Press 2000.

A registered Professional Engineer in California, he is the former editor of Engineering News and author of a well-known and widely respected textbook on railway engineering. The prize is awarded annually for papers in transportation-related areas. Dr. Duan and Jason Lynch shared the award with Mark Reno, a Senior Engineer with Quincy Engineering, Inc. of Sacramento.

Learning the Ropes

Public employees get lots of experience with red tape, operating on a shoestring and hanging by a thread. But, the management team of the Division of Business, Facilities, Asset Management and Security recently tried their skills for a change. For three days at the state training center in Modesto, 25 new employees participated in a change management program.

A leap of faith: From 23 meters in the sky, one of the appropriately named high elements of the Training for New Skills of the Department of Management and Planning, was the climax of a two-day training program that taught the managers that their individual comfort zones and the beauty of their respective parks forest in Modesto.

It may seem like a stretch to see how dependent on a team to help navigate an obstacle course with cardio work and physical challenge can apply to working together on budget allocations or shifting workload priorities. But the training gives participants a safe place to talk and learn with each other and to work together on problems, guided by experienced coaches. As a bonus, it’s fun.

Diane Martin, Chief of the Office of Oversight, Facilities Operations and Planning, found that the change in scene helped inspire relaxation and start to know each other as people, not just co-workers. The first exercise, the low-kielth, trust walk, created independence among the participants. It’s a simple exercise in which one person with eyes open leads the other co-worker with eyes shut on a walk. Each new exercise created new relationships and brought different people into leadership roles at different times depending upon their skills required. Everyone had something valuable to contribute.

The high elements were more of a personal challenge. They included an 8 m walk back and forth between two times on a rope 12 meters above the ground while holding onto a single overhead rope. Another was walking on a log between trees that were 8 m apart with no overhead support. Still another included jumping off of a log to grab a flag about two meters away, dropping about a meter and a half, then regaining the ground.

While the rest of the team was supportive, Diane says, "It was your choice to do the exercise or not. It was an opportunity to push yourself in a safe environment." Although not initially comfortable on the high elements, Diane found that it wasn’t as bad as she had anticipated. "This experience has helped me to try things I would never have considered before."

Attending the training were Steve Astin, Owen Amsler, Steve Longhauer, Diane Marcia, Ron McCann, Louis Santulli and Glenn Yee. The results were so positive that the division plans to include all new hires in a workshop in the spring.

Any division with the necessary training allocations and management approval can make use of a program of this type.

– Steve Astin, Division of Business, Facilities, Asset Management and Security
Dave Oldenberg

At the onset of what had the look of a blistering day near Clarksburg on the eastern side of the Sierra 30 years ago, Dave Oldenberg, then an inspector with Lahontan Irrigation District, noticed a hitchhiker in a business suit at the side of the highway in front of the Ranch House Cafe. "I'd been instructed not to pick up hitchhikers in an official car but I just couldn't pass this guy up," he says.

The suit-clad hitchhiker turned out to be Rob Watkins, then the Caltrans District 9 director. After two hours in the car, Watkins suggested that Dave consider working for Caltrans.

Oldenberg was persuasive, and shortly afterward, he began his 30-year career with the Department, from which he recently retired.

Oldenberg had graduated from Washington State University with a major in Agricultural Engineering before being drafted into the Marines. While stationed in the Mojave Desert, he fell in love, married, became an environmental inspector for San Bernardino County, then moved to a job with Lahontan, living and working in Bishop.

After his ride with Watkins, Oldenberg's career with Caltrans started in District 9's materials lab, testing the air quality in Mammoth Lakes. With State Highway 203 to be widened, Caltrans needed to test whether or not the increased traffic would affect the air quality. It turned out that the widening not only didn't affect the air quality, but improved it, because it reduced congestion.

From 1991 to 1993, Dave prepared a Project Study Report for the Mojave bypass. "That meant two years, wandering through the desert in Mojave," But 10 years later, the project was being built according to his recommendations.

Oldenberg then moved from design to maintenance engineering. "Shot and sweet, I like seeing immediate results." The last part of his career was spent in construction where he worked on his favorite job: that job took him to the top of Mt. Dana on his 60th birthday to supervise the installation of G2E Ex explosives to control avalanches on State Highway 158.

Dave's hobbies are hiking and poetry. His love is his family and the country he loves. He has spent 28 years exploring the eastern Sierra and says, "You could never hike all of it in a lifetime." The best part of his career was that I was able to combine my love of the outdoors with my career. I guess I have Watkins to thank for that." After his retirement, Oldenberg returned to work as a retired consultant, inspecting the G2E Ex explosives, a project he dearly loves because it takes him back into the mountains.

He has four children, all of whom he and his wife are very proud. His son, a Marine Corps major, complicated one of the two CH32s that rescued a downed American pilot in Bosnia a couple years back.

— Susan Long, District 9

DPAC Teams with KVIE

Back by popular request, members of the Headquarters Division of Procurement and Contracts (DPAC) showed their community support recently by raising the funds necessary for a local radio station, KVIE-Channel 6, to support the annual cemetery clean-up in support of KVIE's 57th annual Popular Piano-supported television station.

Recently, 17 DPAC members, family, and friends spent an energetic afternoon in support of the KVIE Arts Auction 2003. This year's auction netted a total of $114,000, which exceeded the previous year's total by $23,000. It is good to know that DPAC's contributions of time and effort helped the station achieve this success. KVIE also noted that DPAC's group effort during last June's Great Escapes raised $15,500 for the station in the three-hour period that they managed the phone line.

Volunteers had a great time at all events and reaped the reward of experiencing a fun activity that contributes positively to good local television programming. At the same time, all enjoyed the camaraderie that came from being one of the people who enjoy themselves while doing it.

Thanks to Martha Martinez for organizing this event for the second year in a row.

— Arne Backr, Division of Procurement and Contracts

Procurement and Contracts comes to the rescue of public television.
Bill Silva

Bill Silva entered the Air Force in 1971, hoping to become a pilot. Almost, it assigned him to be a military meat cutter.

The Air Force granted his wish. Almost. It assigned him to be a military meat cutter.

And thereby hangs a tale that led to 25 years coaching women’s and men’s volleyball, including three years at the college level, one national championship and three top five finishes at the NCAA National Championships and national Coach of the Year. Not bad for an anthropologist in the Headquarters Environmental Division.

“After the Air Force had decided to make me a military meat cutter, it assigned me to Langley Air Force Base in Virginia, where I quickly found out that it had stopped using military meat cutters 10 years before. I was then offered a choice: to become a military police officer, a cook, or an administrative specialist. I took administrative specialist.”

Silva then worked for six excruciatingly dull months at the company clerk at Dodds Hall, which served the foreign and political dignitaries who stayed at Langley AFB. Looking for something more interesting, he hanged a tryout on the Air Force’s volleyball team, a USO operation that had the job of entertaining troops in Southeast Asia.

“I’d never played volleyball, but I could jump 46 inches in the air, so the coach took me under his wing.” Silva says.

And in the hopes of never again working as a company clerk, Silva doubled for himself the four-hour workouts and discovered not only a way out of the purgatory of company clerking, but a love of volleyball.

After the Air Force, Silva coached volleyball at high schools, junior national league and, eventually, at Pacific Christian College (now Hope University) in Fullerton, where he achieved his national distinction. It was through his desire to coach college volleyball that he came to his present career in anthropology. “I had to have something on your resume besides volleyball,” Silva says. “I got a course or two in anthropology and found the second love of my life.”

Silva now has a Master’s Degree in Anthropology from CSU Long Beach and, after a stint with the U.S. Forest Service, a new position with Caltrans, where he is busy putting magnetometers and gravimeters to work in search of subsurface archaeological features.

With regards to his work as a Caltrans anthropologist, Silva says, “I can’t quite believe they’re paying me to play live dice.”

These are his career and family, Silva has not been on a volleyball court for awhile, but intends to get back into it this year. He’ll get into a city league, and has been asked to play on a team to compete in the “Golden Masters National.”

And Caltrans’ junior national volleyball club has asked him to coach a team for eighteen-and-under volleyball.

“there is much in sport to apply to daily life.” Silva says. “As a coach, I learned that the skills transfer, while certainly important, is not what wins national championships. It’s character. And if you can really instill honesty, courage and integrity in your athletes, you have an excellent chance at competing at the very top. And the bonus is helping people achieve their potential as human beings.”

—Gene Berneisen

Bill Silva and his national championship volleyball team.

T
he journal, hoping to establish a national tradition, is dedicating its first edition of the new year to the innovators that keep Caltrans at the forefront of public agencies throughout the world. Intending to write about new stuff all over the department, not just engineering, we recently put out a call for stories ideas on topics in which we were breaking new ground. The Journal wanted to know about administrative practices, planning, maintenance, computer systems, and right of way—the whole range of what we do.

We thought we’d receive eight to 10 suggestions—maybe a dozen at most.

Imagine how surprised and delighted when, instead, a dozen of story ideas rained down on us. Around 200, in fact.

Since the Journal usually contains about 40 pages, and our manage story runs to four or five pages, we would have put out a thousand-page issue to get you all of them. We now have 285 ideas on our story list for future issues. Their depth and breadth is inspiring. Alphabetically, they range from the Advanced Highway Maintenance and Construction Technology Research Center, to statewide use of the XMAP project scheduling tool to keep projects on time and on budget.

Anheuser-Busch angeles advanced guidance systems that keep stoplights from eating up quarantines at the top of the Santa Ana to 2500 meters, to dimming the sound of people living at 120 meters under the San Francisco Bay for protection of marine life. Speeds’ from 300 mph trains to movable guardrail systems to protect maintenance workers (less than 1 km/h). The Journal is concerned about how things are done, not just about what is done.

There are thousands of story ideas, an entire field of study. The Journal wants to know about a completely new field. Bill Silva, (page 6) who is helping bring a whole new technology to bear on finding subsea archaeological features so our project don’t unknowingly destroy the past, is excited about the technology and the dialogue that can arise from it. He is excited about the dialogue that can arise from it. He is excited about the dialogue that can arise from it.

But beyond that, Bill is a full-time miner who believes in using a volleyball court (page 6) to teach young people the values of honesty and integrity and courage and hard work.

There are thousands like Bill Silva at Caltrans. The Journal collects the old hands not to money.