

ACEC INSIGHTS

American Council of Engineering Companies of Massachusetts

March 2009

Would a Special Water Infrastructure Finance Commission Allow Diverse Stakeholders to Work Together?

By John L. Daniels, Vice President, Woodard & Curran, Inc.



Most, if not all, of our membership should be keenly aware by now that the Senate bill to “Establish a Special Water Infrastructure Finance Commission” (to be beholden to The General Court), was unable to independently gain full support during the 2008 legislative session. The Bill, introduced by former Senator Pamela Resor and co-sponsored in the House by Representative Jeffrey Sanchez, did gain full legislative support as an amendment to the 2008 Environmental Bond Bill in the waning days of the 2008 legislative session. However, it was unceremoniously vetoed by Governor Deval Patrick when he approved the Bond Bill on August 14, 2008.

Senator Resor crafted the Bill utilizing the resources of the Joint Committee on Agriculture and Natural Resources, along with the thoughtful and creative thinking of the diverse stakeholders, including the parties listed in the accompanying sidebar. The Bill was born out of the frustration of various constituencies’ inability to quantify, prioritize and coordinate the Commonwealth’s existing short and long-range water infrastructure and associated financing needs.

The Bill, as written, would officially sanction, empower and drive the Special Commission through the following tasks:

- To examine the water infrastructure needs of the Commonwealth for the next 25 years;
- To examine the public health and public safety threats associated with current and future unmet needs;
- To examine the political structure, management and delivery systems that are currently employed by the Commonwealth’s agencies and regional and municipal utilities, and;
- To carefully evaluate current Federal, state and local financing mechanisms that support the current infrastructure with an eye toward recommending future financing and funding techniques that could be employed to close the ever-widening gap and adequately pay for future capital and operation and maintenance costs of the to-be-created infrastructure.

Unfortunately, since the 2008 legislative session had already adjourned, the Governor’s veto became a pocket veto.

Many state and constituent commissioned efforts have attempted over the years to quantify both water infrastructure needs with financing and funding resources. These efforts have led to the conclusion that

The Bill was born out of the frustration of various constituencies’ inability to quantify, prioritize and coordinate the Commonwealth’s existing short and long-range water infrastructure and associated financing needs.

regularly scheduled needs surveys, usually delegated to the states, that are then used by Congress to determine the budgets for both Clean Water and Drinking Water State Revolving Fund appropriations proposals.

Through the Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection (Mass DEP) has diligently, if only on a very cursory level, responded to this regular Congressional mandate. Recently, the Massachusetts Water Pollution Abatement Trust, the Commonwealth’s State Revolving Fund Bond Bank, awarded two grants totaling \$400,000 to the Mass DEP to assist it in contracting technical expertise at the local level to acquire more reliable, detailed data. This activity and resulting product have allowed for better

the needs and funding gap continue to widen with each succeeding year. Both the Federal Safe Drinking Water Act and the Federal Water Pollution Control Act require the US Environmental Protection Agency (US EPA) to conduct

➔ [continued p. 8](#)

John Daniels is a Senior Consultant/Vice President specializing in municipal infrastructure financing at Woodard & Curran, Dedham, MA. He has over 38 years of experience assisting New England municipalities with the development of long-term capital improvement and project financing plans and working to maximize the capture of offsetting agency financing. John can be reached at jdaniels@woodardcurran.com or 781/251-0200.

ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES
OF MASSACHUSETTS

The Engineering Center

One Walnut Street
Boston, MA 02108
T: 617/227-5551
F: 617/227-6783
www.acecma.org

TABLE OF CONTENTS

**Training in Tough
Economic Times**
[PAGE 2](#)

**Who Can Be Titled
As “Engineer”?**
[PAGE 3](#)

**ACEC/MA Pushes Critical
Bill Over the Top at End
of Legislative Session**
[PAGE 4](#)

**The Business Necessity to
Promote STEM Careers**
[PAGE 4](#)

**Practical Strategies For
Reductions In Force**
[PAGE 5](#)

**Engineers Need To
Get Dirty!**
[PAGE 7](#)

Upcoming Events
[PAGE 9](#)

New Members
[PAGE 10](#)

*Select a title for a
QuickLink to your
favorite article.*

Insights Board of Editors

Robert J. Dunn, Jr., Co-Chair
Associate
Stantec Consulting Services, Inc.
T: 978/692-1913, E: bob.dunn@stantec.com

Joy L. Kelley, Co-Chair
Director of Human Resources
Tetra Tech Rizzo
T: 508/903-2489, E: joy.kelley@tetrattech.com

David A. Chappell
President
Chappell Engineering Associates, LLC
T: 508/481-7400
E: dchappell@chappellengineering.com

Mary B. Hall, PE
Principal
GZA GeoEnvironmental, Inc.
T: 617/482-1000, E: mhall@gza.com

David J. Hatem, Esq.
Attorney
Donovan Hatem LLP
T: 617/406-4800
E: dhatem@donovanhatem.com

Paul J. Murphy, PE
Senior Project Manager
GZA GeoEnvironmental, Inc.
T: 781/278-3700, E: pmurphy@gza.com

Cheryl A. Waterhouse, Esq.
Managing Partner
Donovan Hatem LLP
T: 617/406-4520
E: cwaterhouse@donovanhatem.com

Susan Hartman D'Olimpio, IOM
Association Manager
The Engineering Center
T: 617/305-4111, E: sdolimpio@engineers.org

If you would like to contribute an article to *Insights* or have ideas for new topics, please contact Joy Kelley at 508/903-2489 or joy.kelley@tetrattech.com

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Training in Tough Economic Times

By Olin R. Jennings and Laura N. Jennings, *The Jennings Group*

During difficult economic periods, we often hear presidents of engineering and other technical service firms say, *"I am in a dilemma. When times are tough we really need to be more effective in everything we do, especially in managing clients and projects, and in winning work. We should invest in training for improvement now but some of my senior managers are opposed to training, claiming it's a waste of scarce resources—time and money. How can we both be right?"* The answer may surprise you.

Requirements for Better Performance

Some of the key priorities during tough economic times are (1) more effective project management to ensure maximum profitability,

...the importance of interpersonal skills is surprisingly high when fully considering the skills needed for success in down markets.

happy clients and more effective conversion of project changes into profitable revenue; (2) more effective selling to capture more of the limited number of projects; (3) more effective relationship-building

skills to develop trust and strengthen rapport with current clients, and building better relationships with prospects; and (4) more effective motivation of professional staff to keep them energized and highly productive.

Responding to these requirements means offering both on-the-job training or more formal training by in-house managers or outside trainers. Three sets of skills need to be improved:

- technical skills—how to do the work;
- management skills—how to manage processes;
- leadership/interpersonal skills—how to build trust, communicate, motivate and lead both internal and outside people.

Technical managers tend to focus on the technical and process management skills. But the importance of interpersonal skills is surprisingly high when fully considering the skills needed for success in down markets.

The Problem

The president quoted above is correct. It is absolutely true that better performance is essential for weathering tough times. Effective training can improve the immediate effectiveness of your organization to help you gain market position in

the down economy *and*, at the same time, equip your people and your firm to be in a stronger competitive position as the market recovers.

The senior managers are also correct. Training that does not result in behavior change and more effective performance *is* a waste of time and money. In our experience too many companies do not structure their training to achieve lasting behavior change. In these firms, money and lost billable time are spent on training, but there is no significant improvement in performance because the mindset change in the classroom is not transformed into effective behavior change. Training, then, is just something that managers perceive must be done to satisfy employee expectations for training and with hope that there will be some benefit to the company.

Thus, training is an easy target for cost reduction during tough times because it often does not produce the desired results. Lasting behavior change becomes difficult as technical professionals and managers move through the process from technical training to management skills training and on to leadership/interpersonal skills training. Often the leadership/interpersonal skills training is cut the quickest from budgets even though leadership and interpersonal skills are most important to success in tough times.

The Solution

Effective training transforms mindset change in the classroom into permanent and natural behavior change in the workplace. Positive behavior change improves performance. How is this achieved?

First, rethink your company's approach to training. It's very important to ensure that:

- Training is focused on improving key skills that will make a difference in your financial performance—technical, process and interpersonal;
- Ensure that your training investment truly results in changed behavior;
- Never start a training program until you have thought through how you will transform mindset change into behavior change and, if an outside trainer is used, look for a track record of behavior change;

Who Can Be Titled As “Engineer”?

By Mary B. Hall, PE, Principal, GZA GeoEnvironmental, Inc.



While the answer to this question might seem obvious to some, it is not as straight forward as it may seem. In September 2006, and in an attempt to answer this question, ACEC/MA asked the Massachusetts Board of Registration of Professional Engineers and Professional Land Surveyors to provide guidance on the use of ‘Engineer’ as a title. This issue was brought to the ACEC/MA Board after it was rumored among engineering consultants that an engineering firm may have been fined by the Commonwealth for alleged improper usage of the words ‘Engineer’ or ‘Land Surveyor’ on business cards for staff who were not licensed as Professional Engineer or Professional Land Surveyor.

ACEC/MA asked the Board of Registration for a written policy with respect to 1) individuals who were licensed in another state, but not in Massachusetts and 2) individuals who are not licensed in any jurisdiction but had obtained a degree in engineering. This request was made in response to a 2005 revision of State regulations that broadened the Board of Registration’s authority by allowing them to discipline both registered and unregistered persons who they deemed were unlawfully practicing engineering.

The Board of Registration did not take the matter lightly. They prepared two draft guidance policies and solicited public comments. ACEC/MA, along with BSCES and MALSCE, provided comments to both draft policies. The comments to the second draft were a joint effort between the three organizations to provide the Board of Registration with one opinion on the subject rather than three somewhat different approaches to resolving the question. The Board’s Advisory Ruling on the Use of the Title ‘Engineer’ was approved on December 11, 2008, is posted on the Board’s website and is noted below.

In many ways this recent ruling is just a re-statement of the existing law. The ruling does not clarify the issue of individuals who are graduate engineers but not registered in any state to the extent originally suggested by the joint response of ACEC/MA, BSCES

and MALSCE. However, the ruling does re-state the Board of Registration’s authority to discipline individuals using the title ‘Engineer’ in a manner inconsistent with Massachusetts General Laws. ACEC/MA encourages its member firms to review their internal policies regarding the use of the title ‘Engineer’ in light of this recent Board of Registration ruling.

Chapter 112, Section 81D of the Massachusetts General Laws states that “a person shall be construed to practice or to offer to practice engineering (1) who practices any branch of the profession of engineering; or who, by verbal claim, sign, advertisement, letterhead, card, or in any other way represents himself to be a professional engineer (2), or through the use of some other title implies that he is a professional engineer; or who holds himself out as able to perform, or who does perform any engineering service or work or any other professional service designated by the practitioner or recognized by educational authorities as engineering.” (*emphasis added*)

The Board interprets branch to mean any one of the fundamental branches of engineering enumerated under M.G.L. c. 112, § 81E together with those additional fundamental branches currently licensed by the Board and any of their sub-branches.

The fundamental branches include: aeronautical, chemical, civil, electrical, heating-ventilating-air conditioning, industrial, mechanical, metallurgical, mining, safety, fire protection, sanitary and structural as well as agricultural, control systems, environmental, manufacturing, marine, nuclear and petroleum engineering.

Therefore, the use of the title “Engineer” in a manner that the Board determines is inconsistent with the aforementioned provisions shall be subject to disciplinary action per M.G.L. c. 112, §65A.

The provisions of this opinion, however, shall not apply to:

- Persons licensed as engineers under M.G.L. c. 146, who are not qualified to engage in the practice of engineering as defined in M.G.L. c. 112, § 81D.

- The work ordinarily performed by persons who operate, maintain or install machinery and/or equipment per M.G.L. c. 112, § 81D.
- Persons who are exempt from the provisions of the registration law by virtue of M.G.L. c.112, § 81R.
- Persons who are not registered/licensed in Massachusetts but who hold a current license to practice in another state or jurisdiction and who declare or otherwise qualify their title in a manner that does not imply they are qualified to practice in Massachusetts (*e.g. Professional Engineer, Kansas*).

This Advisory Ruling is issued pursuant to a determination made by a majority of members present at the duly called meeting of the Board of Registration of Professional Engineers and Professional Land Surveyors on December 11, 2008.

(1) M.G.L. c. 112, s. 81D defines the practice of engineering as “any professional service or creative work requiring engineering education, training and experience and the application of special knowledge of the mathematical, physical and engineering sciences to such professional services or creative work as consultation, investigation, evaluation, planning, design and supervision of construction for the purpose of assuring compliance with specifications and design, in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects ...”

(2) M.G.L. c. 112, s. 81D defines a Professional Engineer as “a person who, by reason of his special knowledge of the mathematical and physical sciences and the principles and methods of engineering analysis and design acquired by professional education and practical experience, is qualified to practice engineering, as attested by his registration as a professional engineer...”

Mary Hall is a Principal with GZA GeoEnvironmental, Inc. and a member of ACEC/MA’s Board of Directors. She can be reached at mary.hall@gza.com or 617/963-1001.

ACEC/MA Pushes Critical Bill Over the Top at End of Legislative Session

By Dennis P. Coffey, Business Development Manager, HNTB Corporation



On December 30, 2008 Massachusetts Governor Deval Patrick signed into law Chapter 439 of the Acts of 2008. A legislative priority for ACEC/MA, this bill makes important changes in the Massachusetts General Laws that provide the Massachusetts Board of Registration of Professional Engineers and Land Surveyors with the same authority as other Boards within the Commonwealth's Division of Professional Licensure.

Representative Harold Naughton (D-Clinton) filed House Bill 278 (later identified as HB 4339) at the beginning of the legislative session after Representative Naughton spoke with a constituent and with ACEC/MA. The bill moved through the Legislature following a public hearing and after review and consideration by several legislative committees. Key members of the Legislature were better able to understand

the importance of this bill to the general public because of ongoing educational efforts by the ACEC/MA Government Affairs Committee and with support from our legislative team at Rasky Baerlein Strategic Communications.

This legislation amends MGL Ch. 13: Section 45 by providing the Board with the same level of rulemaking authority recently given to the Board of Registration for Architects. This authority will allow the Board to adopt rules to provide important clarifications pertaining to the standards for professional engineers and land surveyors. For instance, this new law would allow the Board of Registration to require continuing education for engineers—something many other boards currently have the power to do. The new law also makes it clear that the two additional land surveyor positions added to the Board as part of the FY 2005 budget will be permanent positions. With nearly 50 percent of all matters received by the Board stem from

land survey issues it is essential that the full compliment of its members be available to review complex and difficult issues.

In addition to the hard work of Representative Naughton and the Chairs of the Joint Committee on Consumer Protection and Professional Licensure, Representative Michael Rodrigues (D-Westport) and Senator Michael Morrissey (D-Quincy), special thanks go to Senator Steve Panagiotakos who helped to shepherd the bill through the waning hours of the legislative session and also to the persistence and advocacy of our Government Affairs Committee.

Dennis Coffey is a member of the ACEC/MA Board of Directors and serves on the Government Affairs Committee. He is Business Development Manager for HNTB Corporation and is engaged in several transportation projects in the region. Dennis can be reached at 978/905-4005 or at dpcoffey@hntb.com.

The Business Necessity to Promote STEM Careers

By William S. Howard, PE, Executive Vice President, CDM



On February 27, 2009 I spoke at a breakfast meeting of the North Shore Workforce Investment Board (WIB) focusing on a number of elements related to connecting 'work with school,' including the LIFT² Science Technology Engineering Math (STEM) initiative. Additional speakers included Congressman John F. Tierney, Mayor Kim Driscoll of Salem, Dr. Patricia Meservey, President of Salem State College, and Mary Sarris, Executive Director of WIB. Brad Cranston, a teacher at the Carlisle Middle School and former LIFT² Teacher Extern, also spoke about his 2008 summer experience at CDM.

My talk began with a discussion on the shortage of STEM graduates and some of the strategies CDM has implemented to help positively impact this issue including our active participation in the Metro South/West Regional Employment Board (Metro S/WREB) "Leadership Initiative for Teaching and Technology" (LIFT²). Mr. Cranston then gave an enthusiastic presentation describing the various work and project related activities he performed at CDM. He further described

how he communicated his CDM experience to his students, to other LIFT² participants, and to his teacher colleagues in the Carlyle school system. As we know, this is the true magic of LIFT².

I went on to describe the business case for why it is important to develop a greater knowledge of math and science based career opportunities among elementary to high school age students. The reasons include:

- The annual growth in US science and engineering degrees continues to be far below the annual growth rate of science and engineering jobs. While there are signs that the situation is improving, the shortage continues;
- It is estimated that 25 percent of the current science and engineering workforce is over 50 years old;
- More foreign students who earn STEM related degrees at US universities are returning to their homelands or emigrating to other countries to practice;
- The current gap of STEM workers in Massachusetts is estimated to be 24,000 below what is needed;

- There is evidence that US high school students are less prepared for STEM classes than students from countries with whom they will be competing.

Challenging, rewarding and exciting opportunities for scientists and engineers are developing everywhere while fewer of our best and brightest students choose to learn the necessary skills to take advantage of these opportunities. It will take a dedicated commitment from all levels of government, proactive involvement of the private sector and enthusiastic participation of schools at all levels with government and industry to turn this situation around. The North Shore WIB and the Metro S/WREB are shining examples of organizations committed to making these connections occur.

CDM has some activities underway to help encourage young students to consider careers in science and math. We have partnered with the Boston Private Industry Council, as well as with Metro S/WREB to offer summer internships to high school students. Over the past few years CDM has hired 14 of these students within

➔ [continued p. 6](#)

Practical Strategies For Reductions In Force

By Mary L. Marshall, Esq., Marshall Law Group



Due to the current economic situation, many organizations have been faced with the need to reduce their work force. Such reductions range from the elimination of one or a few positions to large-scale layoffs. Those actions may lead to legal challenges by laid-off employees and may also trigger statutory requirements or restrictions.

To avoid costly mistakes, employers must be aware of the various laws which may require that they provide notice, insurance continuation, severance pay and/or other benefits to laid-off employees. In addition, some employees who are laid off for legitimate economic reasons may nevertheless sue their employers alleging that the layoff decision was unlawful. Consequently, an employer faced with the need for a layoff must review its actions to ensure that it has not violated any individual rights and has complied with applicable legal requirements.

Selecting Employees for Layoff

Both federal and state laws prohibit discrimination against employees on the basis of age, disability, gender, national origin, religion, race or color, pregnancy, sexual orientation, military status or service, genetic information, ancestry and union activity. One or more employees may challenge a layoff decision alleging that it was based on one or more protected characteristics. Therefore, employers must ensure that employees are not selected for lay-off due to any of the protected characteristics listed above. Employers must also ensure that layoff criteria which appear to be neutral do not have an adverse impact on employees with a protected characteristic. For example, if employees in a specific position are selected for layoff based solely on their compensation, employees may allege that the decision has a disproportionate impact on older employees, who had received wage increases due to their longevity.

Although the need to cut costs or reorganize will initially provide an employer with a non-discriminatory business justification for a layoff, the determination of who to layoff may still be challenged as discriminatory. For example, if 20 percent of an employer's workforce is African-American, but 40 percent of the employees who are laid off are African-American, employees may claim that the employer was biased in selecting employees for lay-off.

An employer's best defense to any claim of discrimination is to prove that it based layoff

decisions on objective, performance and/or business-related criteria. In short, an employer must be able to demonstrate that it had a legitimate business reason for selecting which employees it will lay off. To avoid the likelihood that a laid-off employee will successfully bring a legal action, employers should follow the procedure described below.

First, employers should establish clear, business-related criteria for selecting which employees will be laid off. As long as the criteria are objective, rational, and based on the employer's legitimate business needs, the employer is free to use criteria which meet its needs. Possible criteria are listed below.

- **Job performance.** As evidenced by performance evaluations;
- **Skills.** Including the ability to perform more than one job function;
- **Seniority.** Either with the company or in the position. Seniority is often used to determine which of two or more comparably qualified employees to retain;
- **Conduct.** Including absenteeism, tardiness, and disciplinary history as evidenced by verbal and written warnings. This factor also includes positive or desirable attributes;
- **Future contribution to the department.** Since each department will operate with a reduced staff, it will be important that each remaining employee be a team player who is willing to help co-workers and work long hours.

Second, those responsible for selecting which employees for layoff should be informed about the required criteria and be instructed to select employees for layoff using only those criteria or other approved factors. If supervisors will make the initial recommendation, they should, to the extent possible, base their assessments on the employees' personnel files and other documentation rather than on their subjective opinion. Specifically, opinions about an employee's job performance should be based on the employee's performance evaluations and related documents as well as on objective performance criteria.

Third, after supervisors have identified employees to be laid off, senior management should review the proposed layoff list to ensure that it does not disproportionately target employees in protected categories. For example, if most of the employees on the initial layoff list are over age 40, while a majority of the employees in the company are under age 40, management should examine each recommendation to ensure it was based on the

established criteria and not the employee's age. Management should also challenge recommendations which do not reflect the employee's personnel record. Before announcing any layoff, management should be convinced that every employee was selected for layoff based on valid, non-discriminatory reasons.

Conducting the Reduction in Work Force

It is important to conduct the layoff in an honest, dignified manner. Be prepared to tell employees the reasons for the layoff and be honest about the employees' future status. Employees should be given accurate and complete information about their benefits, pay, insurance, the possibility of recall or transfer and unemployment benefits. Do not make any promises about future actions that you may not be able to keep. For instance, do not promise to contact the employee if a suitable position opens in the future.

Although every employer hopes that it will only lay employees off once, it is possible that you will need to lay employees off again in the future. Employers must be aware that the steps they take during one lay off may be cited by employees in the future. Therefore, avoid any statements that may imply that you are following a "standard" practice in conducting a particular layoff. The employer should warn supervisors to emphasize that the employer is acting in a way it considers appropriate for this layoff.

Separation Agreements and Releases

Most companies who can afford to do so pay severance to laid-off employees. Employees who elect to pay severance should require employees to sign a release as a condition of receiving severance. Such practice will avoid future legal action and help the morale of remaining employees. A release is generally part of a separation agreement that articulates your expectations (i.e. that the employee will not disclose confidential information) and describes the benefits he/she will receive. However, if an employer pays severance, the employer should be careful not to state that it is pursuant to the employer's "policy." Communicate that the severance has been determined for this particular situation and is not to be considered a standard practice.

To be effective, a release of legal claims must comply with a variety of legal requirements. In addition, separation agreements should include language and address issues that many employers may not consider. Before asking employees to sign such agreements, employers should consult legal counsel.

Practical Strategies For Reductions In Force

continued from page 5

Recent legislation requires employers or the entity that accepts COBRA payments to pay 65 percent of the COBRA insurance premiums for employees who are involuntarily terminated between September 1, 2008 and December 31, 2009. Any separation agreement should reflect that requirement and any employees impacted by a lay-off since September 1, 2008 must be notified about this change.

Worker Adjustment and Retraining Notification Act

The federal Worker Adjustment and Retraining Notification Act, ("WARN") requires employers with at least 100 full time employees to provide 60 calendar days written notice of an impending plant closing or mass layoff. The notice must be provided to employees, unions, the state dislocated worker unit (Division of Employment and Training in Massachusetts) and the chief elected local government official where the closing or layoff is to occur. The notices are required for any reduction in force that affects at least 50 full time employees within a 90 day period, provided they constitute at least 33 percent of the work force at that location.

An employer may provide fewer than 60 days notice under the following conditions:

- Notice would affect the employer's ability to raise capital or business;
- The employment loss is caused by unforeseeable business circumstances;
- The closing is caused by a natural disaster;
- The layoff was expected to last fewer than

6 months but was extended due to unforeseen business circumstances.

In addition, the Act does not apply in the following circumstances:

- A temporary facility is closed;
- The affected employees were hired with the clear understanding that employment was limited to the duration of a facility, project, or undertaking and the closing/layoff is a result of completion of the facility, project or undertaking;
- Employees are hired for a specified and obviously limited term and are informed in writing of the exact date of termination, either at the outset or prior to the 60 day notice period;
- The closing/layoff constitutes a strike or lockout not intended to evade the requirements of the Act.

Early Retirement Plans

In lieu of a lay off, employers may elect to offer employees an early retirement plan. Such plans must comply with a variety of technical requirements. In general, early retirement plans offer all employees in a certain group or class a benefit if they chose to resign.

The types of voluntary early retirement incentive plans the law allows include: early retirement incentives that provide a flat dollar amount; service-based benefits (e.g. amount multiplied by years of service); a percentage of salary to

all employees above a certain age; flat dollar increases in pension benefits or percentage increases; or incentives that impute years of service and/or age. The primary disadvantage to Early Retirement Plans is that the employee, not the employer makes the separation decision. Thus, more valuable employees may elect the Plan while less valuable employees may reject it.

Conclusion

This summary has focused on reducing the number of employees performing similar jobs. A decision to eliminate a specific position will raise similar but distinct issues. In addition, employers may be able to avoid layoffs by taking other actions to reduce personnel costs, such as reducing benefits, cutting wages, requiring employees to take time off without pay and similar steps. Employers should seek professional/legal advice about those options.

Mary Marshall received her J.D. degree in 1980 and initially practiced employment law at the former Boston firm of Herrick & Smith and later became a partner in the employment law firm of Stoneman, Chandler & Miller, LLP. In 1998, she founded the Marshall Law Group. Ms. Marshall and the other attorneys at the Marshall Law Group exclusively practice employment law on behalf of management, helping employers comply with federal and state employment laws while meeting their business objectives. Ms. Marshall also litigates employment claims and has successfully defended employers in Massachusetts and throughout the United States. She can be reached at 781/235-4855 or mlm@marshallawgroup.com.

The Business Necessity to Promote STEM Careers

continued from page 4

our Consulting and Engineering Division in Cambridge. We also sponsor "Job Shadow" days with the Boston Private Industry Council where students from the Boston Public Schools are partnered with a CDM professional during a business day.

CDM has partnered with Metro S/WREB to offer paid externship positions to middle and high school math and science teachers. This effort is part of the broader LIFT² initiative that ACEC/MA encourages member firms to participate in. Over the past four years CDM has hired seven teachers to work with us in Cambridge. Following their in-house experience with CDM, these teachers attend work sessions with other LIFT² program participants to discuss what these teachers have learned and how to incorporate their experience in their own classrooms.

CDM has found all of these programs to be very rewarding and certainly successful. During our Job Shadow days, young people have been over-heard to comment positively on engineering as, "a cool thing to do." Our LIFT² teachers have expressed great satisfaction with their experience while many of our engineers and scientists are very proud of CDM's commitment to these programs. During 2009 CDM plans on expanding this opportunity to other offices and beyond.

In summary, the US is challenged to encourage STEM related careers or risk losing its reputation for being in the forefront on scientific, medical and engineering innovation. As professional engineers we must be aggressive in pursuing solutions to this dilemma. We must work together within our engineering community to find ways to encourage more of our students to

pursue STEM-related degrees and professions. Collaborating with groups like WIB and participating in the LIFT² program will help to meet these challenges.

Bill Howard serves as CDM's Executive Vice President for Quality and Client Service, and is the firm's Chief Technical Officer. He has been a member of the CDM Board of Directors since 1992, and sits on the Board's Executive Committee. Mr. Howard received his BSCE from Northeastern University and his MS in Sanitary Engineering from Cornell University in 1971. Mr. Howard serves on the Board of Trustees of Northeastern University, Chairs the Audit Committee, and is a member of Northeastern's Engineering Industrial Advisory Board. He is past Chairman of the American Council of Engineering Companies. He is also currently Chairman of the National Commission for Cooperative Education. Bill can be reached at howardus@cdm.com.

Engineers Need to Get Dirty!

By Keith Lincoln, Senior Civil Engineer, Chappell Engineering Associates



Having spent the majority of my career in an office environment working on design projects, I recently felt it was time for me to acquire a much needed change in direction. I remembered when, working as a construction inspector in Connecticut, the project superintendent suggested that all designers should be required to have worked in the field before starting their design careers. He further recommended that design engineers should be required to work one year in the field for every five years spent in the office. This sounded reasonable enough to me at the time and after years as a design engineer it still does.

The benefits for a design engineer to acquire field experience are invaluable. Working in the field allows design engineers to observe those operations required to turn a set of design documents into a finished construction product. Often the engineers with the most practical suggestions, useful solutions and general insight are those with a solid background in heavy construction. Knowing this, I sought out an opportunity in contracting to broaden my own experience.

As the Contractor's Project Engineer on the Sagamore Rotary Grade Separated Interchange project, I was able to get an inside look at the construction business from an entirely different perspective. My efforts on this project solidified my belief that there is often a disconnect between designers and construction personnel that, when bridged, would benefit all. Seeing this project from the design and site superintendent perspectives both validated and disproved some of my previously held beliefs as to how a contractor operates. My experience has mainly been with public sector work, yet now I can appreciate that some of these same issues extend into private sector projects.

Like design engineers, successful contractors care a great deal about the quality of their work. Rework, arising from poor execution, can lead to significant losses on a project. While the contractor makes money by devising appropriate ways to be more efficient, he is primarily looking to be profitable by performing the work correctly and as efficiently as possible so that s/he can move on to the next project. Change orders can

slow down the contractor's process making the execution of the work less efficient.

Field experienced designers who engage in more frequent interaction with construction personnel may produce design documents that result in fewer change orders during construction. Unfortunately, once a project has been approved for construction the designer's scope of services is usually reduced and there is little interaction between designer and contractor unless a problem is encountered, and by then it may be too late. When this happens it is more a matter of trying to make the best out of the situation. A former co-worker summarized the situation succinctly when he remarked that there is not enough "schmoozing" in the system. Since my own experience I know he's right. "Schmoozing," was his term for positive communications developed to facilitate breaking down the barriers that can occur between the design and construction professionals.

Many design engineers often have a narrow focus that, if broadened, will help the designer to be more aware of constructability issues during the design process. Building in more

Working in the field allows design engineers to observe those operations required to turn a set of design documents into a finished construction product.

communication during early phases of a project can lead to a more cooperative effort between designers, agency construction personnel and contractors. The time to resolve a problem is during design—it is far less expensive to manage design issues and reduce construction costs before a construction phase begins. Communication facilitates a review of the design up front by all parties.

If this makes sense, as it does to me, then why isn't it happening on a more consistent basis? Often, agencies with their own construction inspection staff are not inclined to compensate firms for hours spent in the field, and consulting firms want to minimize unbillable or non-utilized hours. Design budgets are often separate from construction budgets so there is little incentive for agency managers to use resources up front during design, even when they may reduce the chance for major

overruns during construction. Agencies performing 100 percent of construction inspection using in-house personnel further reduces the opportunity for designers within private sector firms to gain valuable field experience.

Personally, I have tried to envision ways to improve interaction between design and construction personnel, ideally before a construction contract has been awarded. While some of my recommendations may at first seem impractical I believe they represent a starting point toward a more integrated design/construction process. These recommendations include:

- Engineering consultants should provide design personnel, particularly younger engineers, with opportunities to observe construction operations. If paid construction inspection positions are not possible then trips to the project site to meet construction staff and observe the execution of key operations would be beneficial;
- Engineering professionals and agencies should utilize construction inspection personnel, and perhaps contractors, where there is no potential conflict of interest in peer reviews and 'constructability' reviews of design documents;
- Agencies performing all Resident Engineering and construction inspection activities in-house should consider some level of consultant inspection. Conversely, agencies should encourage their managers and design review staff to have both design and field experience by rotating personnel between the various departments;
- Design firms should encourage design engineers to undertake construction inspection from time to time, particularly at junior engineering levels, to broaden the experience level of their personnel;
- The structure of many agencies results in separate design and construction budgets. This reduces the incentive for agency design managers to spend resources up front to avoid greater liabilities during construction. More agency personnel and consulting engineers should be allocated for quality control during the design process;
- Providing change order information and issues to the engineering consultant in a timely manner during construction, and

[continued p. 8](#)

Water Infrastructure Finance Commission

continued from page 1

reporting on both Clean Water and Drinking Water needs now being digested by the US EPA. While this is positive progress, there has never been a successful effort to bring together the diverse and sometimes divergent stakeholders commissioned by the Bill to wrestle with the questions Senate Bill No. 2292 poses.

One of the positive aspects the Bill clearly could help resolve is that the diverse environmental constituencies rarely, if ever, join together on a level playing field to wrestle with any issues. There are conferences and other open forums sponsored individually or jointly by various constituents, but none of these organizations has the political or financial where-with-all, or the staff capability, to undertake what this Special Commission might accomplish. Whether one is in agreement with the proposed makeup of the Special Commission or has

alternate thoughts—and that subject is up for grabs during the 2009 legislative session—if passed this Bill would bring together diverse constituencies around one table with an open door. This would allow these constituencies to find a way to craft a meaningful and useful, if not definitive, report containing predictions, recommendations and draft legislation.

The exhaustive mandate of the Bill, as it currently exists, certainly would challenge the Special Commission and its stakeholders. It would require many of us in our industry to expend considerable time, energy and resources to proactively contribute and hold our own at the table.

As the Bill proposes, it would be wonderful to bring together disparate members from across Massachusetts representing the General Court

(House and Senate), the Executive Branch, the municipalities, the public at large, professional associations, the contracting industry, the environmental lobby, planning organizations, environmental consumer organizations, and public interest groups to craft and debate the issues and work toward consensus. Imagine what it would be like to have a jointly endorsed, short, medium, and long-range, sustainable, state-wide water infrastructure strategy.

Will the Council membership support the Bill in the 2009 legislative session, which has been refilled by Senator Resor's successor James Eldridge? What, if any, are your thoughts on strengthening this critical piece of legislation? Senator Resor believes that the Bill's premise is both sound and current. Do you agree?

Training in Tough Economic Times

continued from page 2

- Focus training on your core managers and professional staff;
- Remember the importance of interpersonal skills in motivating better performance and making project and client management systems produce better results. You may have a good technical product but your managers' ability to interact with, motivate and lead staff and clients makes you more effective in delivering that product.

Second, make training and improving your people a strategic priority. This means finding a way to get lasting results and maintaining this priority even in difficult times. You may need to reduce the total dollars invested, but remember to focus on your highest potential managers and professional staff. Properly executed, training as a strategic priority will help transform your firm into a learning organization at all levels in all economic climates. Investing in training that produces meaningful behavior change, and maintaining training priorities, will pay dividends during soft times and will put the company on a springboard for stronger economic times when competitors are only beginning to recover.

Measuring Success

True success is balancing the short term and the longer term needs of the company. Measure your success by asking whether you are just cutting costs or whether you are equipping the company to be in the best position to weather today's tough times and springboard into tomorrow's returning markets. Before you cut the luxuries and cut the lower priority training courses, ask yourself if they are luxuries or just poorly executed essentials.

Olin Jennings and Laura Jennings are co-founders of The Jennings Group, a management consulting and leadership skills training firm that has specialized in working with engineering and other technical services firms for over 20 years. They have trained over 3,000 technical managers and professionals in interpersonal skills. They offer extensive experience in leadership skills training in the US and Europe, and conduct leadership skills training programs for ACEC NY, the American Society of Civil Engineers, and Society of Professional Engineers in NJ. They will be the trainers for ACEC MA's new Odyssey leadership training program which begins in September 2009. Olin and Laura can be reached at ojennings@thejenningsgroup.com.

Get Dirty!

continued from page 7

disseminating the information to design staff, so that similar problems can be avoided on the next job.

There are many potential benefits to be recognized from a more cooperative design/construction approach. Most important, regular interface between the designer, contractor and owners will result in better designs and fewer change orders during construction. By creating more frequent opportunities for communication and greater understanding, the parties involved can perform their separate tasks more easily and effectively. Both field and design personnel need the best professional judgment each offers, and each must enable a more cooperative communication approach that leads to mutual success.

Keith V. Lincoln, PE, Senior Civil Engineer for Chappell Engineering Associates, LLC, has an extensive and diverse background with over eighteen years of experience as a project engineer, project manager, construction inspector and contractor on a wide range of transportation projects including rural and urban roadway reconstructions, highways, interchanges and bridges. Keith can be reached at 978/823-0054 or klincoln@chappellengineering.com.

UPCOMING EVENTS—SAVE THE DATE

ACEC/MA 7th Annual State Markets Conference

Westin Waltham
Waltham, MA
April 15, 2009

ACEC National 2009 Annual Convention

Washington, DC
April 26-29, 2009

The Engineering Center 11th Leadership Dinner

Four Seasons Hotel
Boston, MA
May 6, 2009

ACEC/MA Design Professionals Day at the State House

Details to be announced
May 12, 2009

ACEC/MA May Breakfast Program

Details to be announced

ACEC/MA Annual Evening at the Boston Pops

Dinner at the Colonnade, Boston, MA
Symphony Hall, Boston, MA
Details to be announced
June 5, 2009

ACEC/MA Strategic Planning Conference

Details to be announced
June

ACEC/MA-BSCES-MALSCE Joint 17th Annual Golf Tournament to benefit The Engineering Center Education Trust

Shaker Hills Golf Club
Harvard, MA
June 19, 2009

For a Sponsorship Information and Registration Form go to:

www.engineers.org/downloads/17thAnnualGolfTournamentRegForm.pdf

ACEC/MA Odyssey Program

Begins Fall 2009
Details to be announced

ACEC/MA Everest Program

Fall 2009
Details to be announce

Check out www.engineers.org for more information on events and to register.

PRESIDENT

James A Pappas, PE, Senior Principal
Stantec Consulting Services Inc.
T: 617/226-9227, E: jim.pappas@stantec.com

PRESIDENT-ELECT

David F Young, PE, Vice President
CDM

T: 617/452-6544, E: youngdf@cdm.com

SENIOR VICE PRESIDENT

Lisa A Brothers, PE, Vice President, COO
Nitsch Engineering
T: 617/338-0063, x220, E: lbrosthers@nitscheng.com

VICE PRESIDENT

Mary B Hall, PE, Principal
GZA GeoEnvironmental, Inc.
T: 617/963-1001, E: mhall@gza.com

PAST-PRESIDENT

Robin S Greenleaf, PE, LEED AP, President
Architectural Engineers, Inc.
T: 617/542-0810, x102, E: rgreenleaf@arcengrs.com

TREASURER

William M Kelleher, CFO, Principal
S E A Consultants Inc.
T: 617/498-4610, E: william.kelleher@seacon.com

SECRETARY

Suzanne L. Pisano, PE
E: suz@pisanos.us

DIRECTORS

Bruce E Beverly, PE, President, CEO
Haley & Aldrich, Inc.
T: 617/886-7390, E: bbeverly@haleyaldrich.com

Dennis P. Coffey, Manager of Business Development
HNTB Corporation
T: 781/565-5905, E: dpcoffey@hntb.com

Ko Ishikura, PE, President, Principal

Green International Affiliates, Inc.
T: 978/923-0400, E: ko@greenintl.com

Brian W Lawlor, PE, LEED AP, Senior Vice President

Symmes Maini & McKee Associates
T: 617/520-9224, E: blawlor@smma.com

Richard A Moore, PE, Chairman

Tetra Tech Rizzo
T: 508/903-2318, E: rick.moore@tetrattech.com

Richard F O'Brien, PE, Vice President

Parsons Brinckerhoff
T: 617/960-4919, E: obrien@pbworld.com

Stephen J. O'Neill, PE, Senior Vice President

Meridian Associates Inc.
T: 978/299-0447, x202, E: soneill@meridianassoc.com

William J Reed, PE, Sr. Vice President, Principal

Fay, Spofford & Thorndike
T: 781/221-1118, E: wreed@fstinc.com

Michael J Scipione, PE, President, CEO

Weston & Sampson Engineers, Inc.
T: 978/532-1900, E: scipionm@wseinc.com

NATIONAL DIRECTOR

Robert Vokes

VHB/Vanasse Hangen Brustlin, Inc.
T: 603/644-0888, E: bvokes@vhb.com

LEGAL COUNSEL

David J Hatem, PC
Donovan Hatem LLP
Dir T: 617/406-4800, E: dhatem@donovanhatem.com

ACEC National ExComm Key Contact

Ted C. Williams, PE
Landmark Engineering
E: ted.williams@landmarkengineering.com

TEC STAFF CONTACTS

Abbie R. Goodman, IOM, Executive Director
The Engineering Center
Dir T: 617/305-4112, E: agoodman@engineers.org

Elizabeth Tyminski, COO

The Engineering Center
Dir T: 617/305-4127, E: etyminski@engineers.org

Susan Hartman D'Olimpio, IOM

The Engineering Center
Dir T: 617/305-4111, E: sdolimpio@engineers.org

NEW MEMBERS

AJA Engineering

475 School Street, Suite 12
Marshfield, MA 02050
Phone: 781/319-9812

www.ajaengineering.com

Aboud Al-Zaim, President
aboud.alzaim@ajaengineering.com

FIRM DESCRIPTION:

AJA Engineering provides civil, structural, transportation engineering and construction management for both public and private clients. Our staff of professionals provides a complimentary base of experience that allows for efficient, and economical, civil, and structural design projects, including site development, site plan review, subdivisions, roads and highways, rehabilitation and inspection of buildings, homes, and bridges.

Arup USA, Inc

955 Massachusetts Avenue
Cambridge, MA 02139
Phone: 617/864-2987

www.arup.com

Mark Walsh-Cooke, Principal
mark.walsh-cooke@arup.com

FIRM DESCRIPTION:

Founded in 1946, Arup is an international group of multi-disciplinary practices with over 10,000 employees working in more than 90 offices in 37 countries. Arup's Boston office offers multi-disciplinary design services including structural, civil, mechanical, electrical and plumbing engineering, and transport planning; augmented by specialist consulting in communications, acoustics, security, fire protection, code consulting and facilities management.

Daniel Carson Consulting Engineer

4 Candlestick Lane
Framingham, MA 01702
Phone: 508/875-1748

Daniel Carson, Proprietor
dcarson1945@yahoo.com

FIRM DESCRIPTION:

Consulting engineering in areas of cost estimating, construction management and multi-disciplined engineering.

Mian Adam & Associates, LLC

1462 Cambridge Street
Cambridge, MA 02139
Phone: 617/999-4437

www.mianadam.com

Babur Mian, President & CEO
bmian@mianadam.com

FIRM DESCRIPTION:

Mian Adam and Associates, LLC provides management consulting services including strategic planning, development of business plans, project management, financial systems implementation and developments of strategies for ownership transition and diversification. It provides engineering consulting engineering services to contractors in the infrastructure industry.

Lamson Engineering Corporation

437 Cherry Street, #109
Newton, MA 02465
Phone: 617/558-0101

Kin C. Lam, PE, Principal
lamsoneng@msn.com

FIRM DESCRIPTION:

Provide professional services in areas of civil, geotechnical and structural engineering for projects associated with State transportation agencies and private clients.

Traffic Solutions, LLC

50 Franklin Street, Suite 402
Boston, MA 02110
Phone: 617/722-9900

www.trafsol.com

Lenny Velichansky, PE, Principal
lvelichansky@trafsol.com

FIRM DESCRIPTION:

Traffic Solutions is traffic engineering and transportation planning firm, located in downtown Boston, and provides a full spectrum of engineering and consulting services to public and private sector clients.

Surveying and Mapping Consultants, Inc.

170 Forbes Road, Suite 207
Braintree, MA 02184
Phone: 781/380-7766

www.smcsurvey.com

Kevin Hanley, President
khanley@smcsurvey.com

FIRM DESCRIPTION:

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