

## IPENZ ENGINEERING UPDATE April 2009



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- Fundamentals of good design.
- Implementing risk management on transit mega-projects.
- Teaching graduate business students to write clearly about technical topics.
- Closing the capability gap: Strategic planning for the infrastructure sector.
- Life cycle assessment of the Seagen marine current turbine.

### ► Special Focus on Bridges

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## Management/Leadership/Strategic Planning/Recruitment/Training and Development/Project Management/Corporate Responsibility

### √IPENZ 23/01 Stop overdoing your strengths.

Kaplan, R and Kaiser, R. Harvard Business Review, Volume 87 Issue 2 (February 2009) Pages 100-103.

Although most managers can recognize an off-kilter leader (consider the highly supportive boss who cuts people too much slack), it's quite difficult to see overkill in yourself. Unfortunately, that's where leadership development tools such as 360-degree surveys fail to deliver, say Kaplan and Kaiser. Dividing qualities into "strengths" and "weaknesses" and rating them on a five-point scale will not account for strengths overplayed. The authors suggest several strategies, based on their years of consulting experience and research, for figuring out which attributes you've employed to excess and adjusting your behavior accordingly. Strengths taken too far have two consequences: First, they become weaknesses. For instance, quick-wittedness can turn into impatience with others. Second, you're at risk of becoming extremely lopsided – that is, diminishing your capacity on the opposite pole. A leader who is very good at building consensus, for example, may take too long to move into action. To strike a balance between two key leadership dualities – forceful versus enabling, and strategic versus operational – you need to see your actions and motivations clearly

### √IPENZ 23/02 Do people at work have the reputations they deserve?

Sidle, S. Academy of Management Perspectives, Volume 22 Issue 3 (August 2008) Pages 109-110.

### √IPENZ 23/03 Seven ways to improve management through the art of coaching.

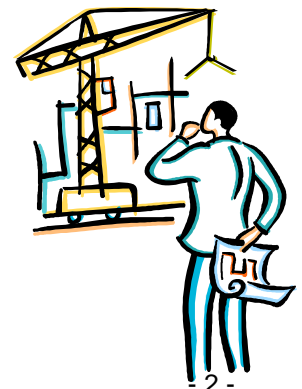
Hallbom, T and Warrenton-Smith, A. Journal of Innovative Management (Fall 2008) Pages 33-42. Coaching can be used effectively to build individual performance and encourage the desired corporate culture.

### √IPENZ 23/04 The attention deficit.

Krohe, J. Conference Board Review, Volume 45 Issue 6 (November/December 2008) Pages 42-48. The author looks at a range of issues that lead to disruptions in the workplace and notes that all new office technology exacts costs in terms of distraction. Knowledge workers are connected by e-mail, instant messaging, XML feeds, blogs, social networking sites, cell phones and pagers at the expense of their work. In the end, staff will stop paying attention as demands on attention exceed capacity to cope.

### √IPENZ 23/05 Fundamentals of good design.

Bahill, A and Botta, R. Engineering Management Journal, Volume 20 Issue 4 (December 2008) Pages 9-17.



**√IPENZ 23/06 Grief and the workplace.**

Hazen, M. Academy of Management Perspectives, Volume 22 Issue 3 (August 2008) Pages 78-36. This paper seeks to improve understanding of grief and how it may impact at work. Approaches taken by psychologists and social scientists to comprehend grief from the perspective of the griever are described. In addition the paper considers how workplaces respond to grieving staff, how co-workers may participate in grief denial or support healing, how actual work may help someone healing from loss and how managers, in organisations with supportive policies and practices, can respond.

**√IPENZ 23/07 Historical construction cost database and its application.**

Assiskumar, S. AACE International Transactions (2008) Pages EST 16.1 –EST 16.5. This article reports on a study that investigates the attributes of a good database and factors that influence how credibly the data produces estimates. Historical cost databases can be useful in working out a budget in the early stages of a project.

**√IPENZ 23/08 Parametric estimating for environmental remediation projects.**

Brunsmann, A., Robson, K and Gransberg, D. AACE International Transactions (2008) Pages EST 06.1-EST 06.5.

This paper deals with the use of parametric estimating to understand variation and enhance the accuracy of estimates for environmental remediation projects. Parametric estimating permits an estimator to devise a model for a fast and precise cost estimate. A base of historical data is required for the effective use of parametric estimating in the environmental field. Types of cost estimating, such as order of magnitude and budget are identified by the Association for the Advancement of Cost Engineering (AACE).

**√IPENZ 23/09 Teaching graduate business students to write clearly about technical topics.**

Jameson, D. Business Communications Quarterly, Volume 69 Issue 1 (March 2006) Pages 76-81.

This article offers guidelines for writing and revising technical topics. They include analysing a text to understand how technical terms are used based on purpose and intended audience, recognising the flow of ideas and creating logical relationships, constructing a line of reasoning using generalisations and examples, utilising a concise writing style, effectively comparing data and providing a readable layout of the text.

**√IPENZ 23/10 How to write it: Business plans and reports.**

Lamb, S. Business & Economic Review, Volume 53 Issue 1 (October-December 2006) Pages 17-24. The author gives guidance on how to write business plans and reports that are effective and persuasive.

**√IPENZ 23/11 Implementing risk management on transit mega-projects.**

Kildare, Shawnv Blank, George P. AACE International Transactions (2006) Pages 3.1-3.5. Use of a risk assessment tool to manage some high profile transit mega projects in the New York city.

√**IPENZ 23/12 Engineering ethics : a systems dynamics approach.**

Geistauts, G., Baker, E and Eschenbach, T. Engineering Management Journal. Volume 20 Issue 3 (September 2008) Pages 21-28.

√**IPENZ 23/13 What will you do when your desire to please and ethics collide?**

Garrett, Michael. Leadership & Management in Engineering. Volume 8 Issue 1 (January 2008) Pages 42-44.

The author investigates the ASCE Code of Ethics in response to his unhappy experience with ethical issues in a project. The assignment deals with reviewing the design of another in a process where the designer is excluded and the available design notes and calculations are ignored. The author gives his opinions on this topic.

√**IPENZ 23/14 Expectation of performance levels pertinent to consultant performance evaluation.**

Chow, L.K., Ng, S.T. International Journal of Project Management, Volume 25 Issue 1 (2007) Pages 90-103.

Increasing numbers of clients seek to measure the performance of Engineering Consultants (ECs) and amass a set of Consultant Performance Evaluation (CPE) records with an intention to monitor the quality of consultancy service and facilitate subsequent decisions.

√**IPENZ 23/15 A practical experience of using competency-related pay.**

Conca, J. Competency and Emotional Intelligence. Volume 13 Issue 4 (Summer 2006) Pages 24-28.

The author argues that Utility company Union Fensoa's experience of using a competency framework to integrate its rewards systems with its other HR practices casts doubt on the perceived wisdom that pay and competencies should not mix.



√**IPENZ 23/16 Why teams don't work.**

Coutu, Diane. Harvard Business Review. Volume 87 Issue 5 (May 2009) Pages 98-105.

The belief that teams make us more creative and productive—and are the best way to get things done—is deeply entrenched. But Hackman, a professor of organizational psychology at Harvard and a leading expert on teams, is having none of it. Research, he says, consistently shows that teams underperform despite all their extra resources. In an interview with senior editor Diane Coutu, Hackman explains where teams go wrong.

√**IPENZ 23/17 The effects of leadership in the high hazard construction sector: Injuries and fatalities an issue of leadership and not hazard.**

Slates, K. Leadership & Management in Engineering. Volume 8 Issue 2 (April 2008) Pages 72-76.

Why do some companies have a greater success in lowering injury rates than other. This paper reviews the literature covering safety in the construction industry and reviews the part that management plays in improving a company's safety performance.

√**IPENZ 23/18 Outsourcing : from cost management to innovation and business value.**

Weeks, M and Feeny, D. California Management Review, Volume 50 Issue 4 (Summer 2008) Pages 127-146.

Discusses the compatibility of IT outsourcing, and innovation.

√**IPENZ 23/19 The definitive guide to recruiting in good times and bad.**

Fernandez-Araoz, F., Groysberg, B and Nohria, N. Harvard Business Review, Volume 87 Issue 5 (May 2009) Pages 74-84.

Few companies are thinking about hiring right now, but that's a mistake. If history is any guide, staffing will become a front-burner issue once the economic upheaval eases. Even now, companies are running into staffing problems in emerging markets, and many will have to find talented replacements for baby-boom retirees. Will they be able to meet their needs? Not likely, say Fernández-Araoz of Egon Zehnder and Harvard Business School professors Groysberg and Nohria. Their research, conducted with scores of CEOs, HR executives, and recruiters, found current hiring practices to be haphazard at best and inept at worst. And no wonder. Ignorant of their staffing needs, most companies treat hiring top-level executives as an emergency. That leaves them little choice. One study found that nearly a quarter of the time, the executive selected was the only candidate considered. Far too few companies conduct reference checks; far too many rely on gut reactions when judging qualifications and cultural fit. Hardly anyone considers whether candidates will be good team players. And, shockingly, only half of the top managers recruited by the companies studied were interviewed by anyone in the C-suite. The result: About a third of promising new hires depart within three years of being recruited. As a remedy, the authors offer their best thinking about state-of-the-art hiring practices for the top levels of the organization.

√**IPENZ 23/20 Ten critical principles for successful design-build projects**

Jergeas, G., Fahmy, S. Cost Engineering. Volume 48 Issue 11 (2006) Pages 29-34.

Results of a survey of 410 respondents who are first time users of the design-build. Identifies common issues and offers some suggestions for making the design-build project a successful experience.

√**IPENZ 23/21 Personal coaching for business persons: A plethora of choices.**

Rabstajnek, C. Leadership & Management in Engineering. Volume 8 Issue 2 (April 2008) Pages 54-56.

The popularity of coaching has meant this function is now more marketable in today's business environment and there has been a rise in the number of people who sell this service. Rabstajnek suggests some selection criteria to consider when choosing a personal coach.

√**IPENZ 23/22 Cost impact factors for utility replacement and repair projects.**

Shehab, T. Cost Engineering, Volume 51 Issue 1 (January 2009) Pages 22-25.

The sewer and water networks in the U.S. are in poor condition and are in need of upgrading. This article suggests a methodology for identifying key parameters to help establish accurate budget for these projects.

**√IPENZ 23/23 Closing the capability gap: Strategic planning for the infrastructure sector.**

Dominguez, D et al. California Management Review. Volume 51 Issue 2 (Winter2009)  
Pages 30-50.

Public infrastructure management is reviewed.

**√IPENZ 23/24 Construction material costs: Recent years and beyond.**

Rowse, B., Cost Engineering. Volume 51 Issue 1 (January 2009) Pages 17-20.

Prices for construction materials, including steel, copper and cement have increased significantly over the last few years. Additionally, fuel prices have impacted as an indirect cost.

## Technical Aspects of Engineering

**√IPENZ 23/25 Life cycle assessment of the Seagen marine current turbine.**

Douglas, C. A., Harrison, G. P., and Chick, J. P. Proceedings of the Institution of Mechanical Engineers: Part M Journal of Engineering for the Maritime Environment. Volume 222 Issue M1 (February 2008)  
Pages 1-12.

**√IPENZ 23/26 Low-Cycle fatigue damage of circular concrete-filled-tube columns.**

Zhang, G.W., Xiao, Y. and Kunnath, S. ACI Structural Journal. Volume 106 Issue 2 (April 2009) Pages 151-159.

**√IPENZ 23/27 Deformation capacity of reinforced concrete columns.**

Mostafaei, Hossein, Vecchio, Frank J. and Kabeyasawa, Toshimi. ACI Structural Journal. Volume 106 Issue 2 (March/April 2009) Pages 187-195.

**√IPENZ 23/28 Determination of cathodic protection potential criteria for thermally insulated pipeline in synthetic groundwater.**

Choi, Y and Kim, J. Corrosion, Volume 65 Issue 2 (February 2009)  
Pages 88-95.

**√IPENZ 23/29 Hybrid corrosion protection of chloride-contaminated concrete.**

Glass, G.K. Roberts, C. Davison, N. Proceedings of the Institution of Civil Engineers: Construction Materials, Volume 161 Issue CM4 (November 2008) Pages 163-172.

**√IPENZ 23/30 A best practice policy for recycling and reuse in building.**

Brewer, G. Mooney, J. Proceedings of the Institution of Civil Engineers: Engineering Sustainability, Volume 161 Issue ES3 (September 2008) Pages 173-180.



√**IPENZ 23/31 Hot v. cold formed hollow sections.**

Whitfield, S. The Structural Engineer, Volume 85 Issue 21 (6 November 2007) Pages 32,34.

√**IPENZ 23/32 Follow the light**

Ivanovich, I and Lynch, P. Consulting Specifying Engineer, Volume 45 Issue 1 (December 2008) Pages 16-22/

Discussion on lighting control technology in the U.S. in 2009.

√**IPENZ 23/33 Environmental assessment of residential buildings with an emphasis on water conservation.**

Ilha, M., Oliveira, L. and. Gonçalves, O. Building Services Engineering Research & Technology. Volume 30 Issue 1 (February 2009) Pages 15-26.

√**IPENZ 23/34 The case for using reclaimed water.**

Smith, E and Zhang, H. Power Engineering. Volume 112 Issue 11 (November 2008) Pages 178,180,182,184.

√**IPENZ 23/35 Water reuse and conservation in the CPI.**

Schultz, T. Chemical Engineering. Volume 115 Issue 9 (September 2008) Pages 44-50.  
Chemical process industry water reuse.

√**IPENZ 23/36 Making water reuse more sustainable.**

Bastian, R O'Connor, G, and Elliott, H. BioCycle. Volume 49 Issue 5 (May 2008) Pages 51-55

√**IPENZ 23/37 Benefits of shifting fire protection to reclaimed water.**

Digiano, F., Weaver, C and Okun, D. American Water Works Association Journal, Volume 101 Issue 2 (February 2009) Pages 65-74.

√**IPENZ 23/38 Total water management strategies for utility master planning**

Jeffcoat, S., Baughman, D and Thomas, P. American Water Works Association Journal, Volume 101 Issue 2 (February 2009) Pages 56-

√**IPENZ 23/39 Does quality of the built environment affect social cohesion?**

Dempsey, N. Proceedings of the Institution of Civil Engineers: Urban Design and Planning, Volume 161 Issue DP3 (September 2008) Pages 105-114.

√**IPENZ 23/40 Assessing 'carbon balance' of intelligent transport schemes.**

Patey, I. Conquest, J. and Holt, A. Proceedings of the Institution of Civil Engineers: Engineering Sustainability, Volume 161 Issue ES3 (September 2008) Pages 181-184.

√IPENZ 23/41 **Paying for parking: improving stated-preference surveys.**

Dell'Olio, L. Ibeas, A. and Moura, L. Proceedings of the Institution of Civil Engineers: Transport, Volume 162 Issue TR1 (February 2009) Pages 39-45.

√IPENZ 23/42 **Heat pumps for cold climates.**

Roth, Kurt, Dieckmann, John, and Brodrick, James. ASHRAE Journal. Volume 51 Issue 2 (February 2009) Pages 69-72.

√IPENZ 23/43 **Air handling unit design for energy conservation.**

Wheeler, Arthur E. ASHRAE Journal. Volume 51 Issue 2 (February 2009) Pages 40,42,44,46,48-50.

√IPENZ 23/44 **Prediction of flow-generated noise produced by an in-duct spoiler in a ventilation system using CIBSE Guide B5 methods.**

Mak, C et al.. Building Services Engineering Research & Technology. Volume 30 Issue 2 (May 2009) Pages 153-167

√IPENZ 23/45 **Evaluation of micro-wind turbine aerodynamics, wind speed sampling interval and its spatial variation.**

Makkawi, A., Celik, A., and Muneer, T. Building Services Engineering Research & Technology. Volume 30 Issue 1 (February 2009) Pages 7-14.

√IPENZ 23/46 **Biofiltration of wastewater lift station emissions: evaluation of VOC removal in the presence of H<sub>2</sub>S.**

Martinez, Alvaro, Rathibandla, Snehasheela, Jones, Kim, and Cabezas, Jose. Clean Technologies and Environmental Policy. Volume 10 Issue 1 (February 2008) Pages 81-87.

√IPENZ 23/47 **Aerobic in-vessel composting versus bioreactor landfilling using life cycle inventory models.**

Cabaraban, Maria Theresa, Khire, Milind, and Alocilja, Evangelyn. Clean Technologies and Environmental Policy. Volume 10 Issue 1 (February 2008) Pages 39-52.



## Special focus topic Bridges

√IPENZ 23/48 **20-year performance of bridge maintenance systems.**

Ault, J and Farschon, C. Journal of Protective Coatings & Linings. (January 2009) Pages 16-18, 21-22, 24, 26, 29, 31-32.

Forty seven coatings were applied to the Mathis Bridge in New Jersey as part of an experiment. Based on a paper presented at the 2008 SSPC-PDCA joint conference, this article describes how the various coatings performed over a 20 year period.

√IPENZ 23/49 **Assessment of epoxy coating on bridge deck reinforcement.**

Weyers, R. et al. Concrete International. (June 2008) Pages 55-60

√IPENZ 23/50 **Corrosion simulation tests bridge cable sensors.**

Materials Performance. Volume 48 Issue 3 (March 2009) Pages 18-21

√IPENZ 23/51 **Cathodic protection of historic bridges.**

Bottenberg, R. Concrete International. (September 2008) Pages 37-41.

√IPENZ 23/52 **Structural assessment of bridges with premature concrete deterioration due to expansive reactions.**

Boenig, A et al. ACI Structural Journal. Volume 106 Issue 2 (March/April 2009) Pages 196-204.

√IPENZ 23/53 **Ship impact protection for Hungerford Bridge, London, UK.**

Parker, J. Proceedings of the Institution of Civil Engineers: Structures and Buildings. Volume 162 Issue SB1 (February 2009) Pages 11-19.

Of major concern in the design of bridges is ship impact. Applying the various methods in use can result in calculated forces that are very large and vary significantly. The method used in designing the Hungerford footbridges over the River Thames in central London are described in this paper and compared with the results of other approaches. Depending on the method used, large variations are shown to be produced by Eurocode I. As well the design and construction of Hungerford Bridge's ship impact protection is outlined

√IPENZ 23/54 **Strategies for the management of bridges for vehicular impacts.**

Ghose, A. Proceedings of the Institution of Civil Engineers: Structures and Buildings. Volume 162 Issue SB1 (February 2009) Pages 3-10.

Road vehicles relatively frequently have impacts on bridges and this can cause delays for road users, injuries or fatalities for occupants of vehicles as well as sometimes leading to major incidents from derailments on railway lines that are carried by highway bridges. The scale of the problem in the UK is outlined in this paper and the main reasons for bridge-deck strikes are given. Industry good practice guides and strategies are reviewed.

√IPENZ 23/55 **Behavior of split timber stringers reinforced with external GFRP sheets.**

Gómez, Sara and Svecova, Dagmar. Journal of Composites for Construction. Volume 12 Issue 2 (March/April 2008) Pages 202-211.

Rehabilitation techniques for timber bridges.

√IPENZ 23/56 **Swaying of pedestrian bridges.**

Blekherman, Alexander N. Journal of Bridge Engineering. Volume 10 Issue 2 (March/April 2009) Pages 142-150.

√IPENZ 23/57 **Kinematics of Movable Bridges.**

Wallner, Markus and Pircher, Martin. Journal of Bridge Engineering. Volume 12 Issue 2 (March/April 2007) Pages 147-153

√IPENZ 23/58 **Lessons learned from the bridge collapse in Palau.**

Burgoyne, C and Scantlebury, R. Proceedings of the Institution of Civil Engineers. Volume 161 Special Issue 2 (November 2008) Pages 28-34.

√IPENZ 23/59 **Lessons learned from historical bridge failures.**

Collings, D. Proceedings of the Institution of Civil Engineers. Volume 161 Special Issue 2 (November 2008) Pages 20-27.

√IPENZ 23/60 **Sustainability leads to durability in the new I-35W bridge.**

Concrete International. (February 2009) Pages 27-32.

√IPENZ 23/61 **Applying "fuzzy concept" to bridge management.**

Al-Wazeer, A et al. Public Roads. Volume 72 Issue 1 (July/August 2008) Pages 28-37.

√IPENZ 23/62 **Modern timber bridges – an international perspective.**

Lawrence, A. The Structural Engineer. Volume 86 Issue 18 (16 September 2008) Pages 26-31.  
Discusses the recent revival of timber bridges in Europe and the United States, along with key design issues.

√IPENZ 23/63 **Reliability-based system-level optimization of bridge maintenance and replacement decisions.**

Robelin, C and Madanat, S. Transportation Science. Volume 42 Issue 4 (November 2008) Pages 508-513.

√IPENZ 23/64 **Using supercomputers to determine bridge loads.**

Kerenyi, K. et al. Public Roads. Volume 72 Issue 2 (September/October 2008) Pages 28-34.

√IPENZ 23/65 **A new design for steel bridge decks using laser fabrication.**

Bright, S. and Smith, J. The Structural Engineer. Volume 85 Issue 21 (6 November 2007) Pages 49-57.

√IPENZ 23/66 **Estimating the future condition of highway bridge components using national bridge inventory data.**

Bolukbasi, M. et al. Practice Periodical on Structural Design & Construction. Volume 9 Issue 1 (February 2004) Pages 16-25.

√**IPENZ 23/67 Natural frequency of railway girder bridges under vehicle loads.**

Li, J. et al. Journal of Bridge Engineering. Volume 8 Issue 4 (July 2003) Pages 199 – 203.

√**IPENZ 23/68 Wireless structural health monitoring at the Humber Bridge UK.**

Hoult, N. et al. Proceedings of the Institution of Civil Engineers : Bridge Engineering. Volume 161 Issue BE4 (December 2008) Pages 189-195.

√**IPENZ 23/69 TDR monitoring for integrity of structural systems.**

Su, M. and Chen, Y. Journal of Infrastructure Systems. Volume 6 Issue 2 (2000) Pages 67-72.

√**IPENZ 23/70 Jane Coston Cycle Bridge: a model for managing vibration.**

Black, M. and Webster, G. Civil Engineering. Volume 159 Issue 3 (August 2006) Pages 120-125.

√**IPENZ 23/71 Bridge distress caused by approach embankment settlement.**

Jones, A., Stewart, D. and Danilewicz, C. Proceedings of the Institution of Civil Engineers : Geotechnical Engineering. Volume 161 Issue GE2 (April 2008) Pages 63-74.

## Special focus topics in previous IPENZ Engineering Updates

### IPENZ Update Link

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