IPENZ ENGINEERING UPDATE July 2007

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Risk Management/Project Management/Cost Management/Financing

√ IPENZ 05/01 **Modelling the cost of railway asset renewal projects using pairwise comparisions.**
Ling, D et al. Proceedings of the Institution of Mechanical Engineers, Volume 220 Issue F4 (December 2006) Pages 331-346.
Discusses a railway renewal project cost estimating model which can be used at the early stage of a project life cycle when there is a lack of quantitative data and detailed project definition.

IPENZ 05/02 **Alternative project delivery systems for public transportation projects.**
Rizk, T and Fouad, N. International Journal of Construction Education and Research, Volume 3 Issue 1 (2007) Pages 51-65.
Design-Bid-Build (DBB) is a popular project delivery method in construction projects which use public money. There is an increasing use of alternative project delivery systems, including Design Build (DB), Construction Management at Risk (CM@R), and Job Order Contracting (JOC). A survey of American DOTs compared DBB with other alternative project delivery systems. It reviewed project quality, project cost and timeliness of project delivery and concluded that some transportation projects can be more efficiently delivered using alternative project delivery systems.

√ IPENZ 05/03 **Anatomy of a successful partnering program on a megaproject**.
Anderson, L., Douglas, R and Kaub, B. Leadership and Management in Engineering, Volume 6 Issue 3 (July 2006) Pages 1532-6748.

√ IPENZ 05/04 **Alignment at the top : a case study investigating this critical factor in project implementation.**
Hacker, M and Doolen, T. Engineering Management Journal, Volume 19 Issue 1 (March 2007) Pages 38-42.

IPENZ 05/05 **Business and management: Key financial concepts for design engineers.**
Naguib, R. ASHRAE Journal, Volume 49 Issue 6 (2007) Pages 64-68.
Design engineers need to be mindful of financial issues when showing clients the engineering merits of their designs.

Management/Leadership/Strategic Planning/Recruitment/Training and Development

√ IPENZ 05/06 **Leading in the knowledge worker age.**
Covey, Stephen. Leader to Leader, Issue 41 (Summer 2006) Pages 11-15.
Today's leader needs to have a good understanding of his team's worth and potential. Older styles of management are not likely to be successful.

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√ IPENZ 05/07 **Discovering your authentic leadership**
George, Bill et al. Harvard Business Review, Volume 85 Issue 2 (February 2007) , Pages 129-138.
The article discusses leadership traits and characteristics. The article focuses on "authentic" leadership, consisting of people who find their own voice rather than emulating those perceived to be good leaders. The article details research done to discover how leaders developed their leadership abilities and interviews with 125 leaders in profit and nonprofit enterprises.

√ IPENZ 05/08 **Attrition rates of mature engineers**.
Kennedy, D. Engineering Management Journal, Volume 18 Issue 3 (September 2006) Pages 36-40.

√ IPENZ 05/09 **Using the balanced scorecard as a strategic management system.**
Kaplan, Robert S Norton, David P. Harvard Business Review, Volume 85 Issue 7/8 (July/August 2007) Pages 150-161.
The balanced scorecard introduced by Kaplan and Norton revolutionized conventional thinking about performance metrics. The scorecard allowed companies to track financial results while monitoring progress in building the capabilities needed for growth. The tool was not intended to be a replacement for financial measures but rather a complement--and that's just how most companies treated it. Some companies went a step further, however, and discovered the scorecard's value as the cornerstone of a new strategic management system. In this article from 1996, the authors describe how the balanced scorecard can address a serious deficiency in traditional management systems: the inability to link a company's long-term strategy with its short-term financial goals.

√ IPENZ 05/10 **Workforce training initiatives for megaproject success**
Fayek, A., Yorke, M and Cherlet, R Canadian Journal of Civil Engineering, Volume 33 Issue 12 (2006) Pages 1561-1570.
One of the most significant impacts on project outcomes is skilled labour. There is an aging workforce in the construction industry and a need to attract new workers. It is recognized that there is an economic advantage in implementing advanced training on projects.

√ IPENZ 05/11 **The 4 principles of enduring success.**
Stadler, C. Harvard Business Review, Volume 85 Issue 7/8 (July/August 2007) Pages 62-72.
When your company is doing well, and money is pouring in, how do you know if it could be doing better? How can you tell which management practices are making the difference--and which are merely not doing obvious harm? To find out, Professor Stadler and a team at Innsbruck University's business school conducted a massive benchmarking study comparing nine pairs of European companies over 50 years. Each pair was from the same industry (and preferably, the same country) and included one exceptional performer and one less impressive, but solid performer. The project yielded four main findings, which Stadler calls the four principles of enduring success.

√ IPENZ 05/12 **Overloaded circuits: Why smart people underperform.**
Hallowell, E. Harvard Business Review, , Volume 83 Issue 1 (January 2005) Pages 54-62
Today's hyperkinetic work environment can lead to newly recognized neurological phenomenon called attention deficit trait or ADT. People with ADT have difficulty staying organized, setting

priorities, and they feel a constant low level of panic and guilt.

√ IPENZ 05/13 **Civil engineering : a changing profession.**
Flavell, E., Begbie, H and Flowers, S. Leadership and Management in Engineering, Volume 6 Issue 3 (July 2006) Pages 129-134.

IPENZ 05/14 **Design engineers' responses to safety situations.**
Toole, T. Journal of Professional Issues in Engineering Education and Practice, Volume133 Issue 2 (2007) Pages 126-131.

Technical Aspects of Engineering –Abstracts available upon request.

√ IPENZ 05/15 **International railway comparisons.**
Hatano, L., Smith, R and Hillmansen, S. Proceedings of the Institution of Mechanical Engineers, Volume 221 Issue F1 (March 2007) Pages 117-123.

√ IPENZ 05/16 **The railway as a socio-technical system : human factors at the heart of successful rail engineering.**
Wilson, J et al. Proceedings of the Institution of Mechanical Engineers, Volume 221 Issue F1 (March 2007) Pages 101-115.

√ IPENZ 05/17 **Standard data models for interoperability of municipal infrastructure asset management systems.**
Halfawy, M. Canadian Journal of Civil Engineering, Volume 33 Issue 12 (December 2006) Pages 1459-1469.

√ IPENZ 05/18 **Investigating hydraulic removal of air from water pipelines.**
Escaraemia, M. Proceedings of the Institution of Civil Engineers : Water Management, Volume 160 Issue WM1 (March 2007) Pages 25-34.

√ IPENZ 05/19 **Case based reasoning approach for managing sewerage assets.**
Fenner, R., McFarland, G and Thorne, O. Proceedings of the Institution of Civil Engineers : Water Management, Volume 160 Issue WM1 (March 2007) Pages 15-24.

IPENZ 05/20 **A physical probabilistic model to predict failure rates in buried PVC pipelines.**
Davis, P et al. Reliability Engineering and System Safety, Volume 92 Issue 9 (2007) Pages 1258-1266.

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IPENZ 05/21 **The importance of precedent hydro-climatological conditions for the mass transfer of pollutants in separated sewer systems and corresponding tributaries during storm events.**
Krein, A. et al. Water, Air, and Soil Pollution, Volume 182 Issue 1-4 (2007) Pages 357-368.

IPENZ 05/22 **Use of nondestructive test deflection data for predicting airport pavement performance.**
Gopalakrishnan, K. and Thompson, M. Journal of Transportation Engineering, Volume 133 Issue 6 (2007) Pages 389-395.

IPENZ 05/23 **Use of geosynthetics in deicing facilities at the Cleveland airport.**
Petno, D. and Athanassopoulos, C. Geosynthetics, Volume 25 Issue 3 (2007) Pages 16-23.

IPENZ 05/24 **Estimation of vehicular emissions by capturing traffic variations.**
Nesamani, K. et al. Atmospheric Environment, Volume 41 Issue 14 (2007) Pages 2996-3008.

IPENZ 05/25 **Waste from road transport: development of a model to predict waste from end-of-life and operation phases of road vehicles in Europe.**
Giannouli, M. el. Journal of Cleaner Production, Volume 15 Issue 11-12 (2007) Pages 1169-1182.

√ IPENZ 05/26 **Transportation choices and air pollution effects of telework.**
Kitou, E and Horvath, A. Journal of Infrastructure Systems, Volume 12 Issue 2 (2006) Pages 121-134.

IPENZ 05/27 **Estimating the effects of traffic congestion on fuel consumption and vehicle emissions based on acceleration noise.**
Greenwood, I., Dunn, R and Raine, R. Journal of Transportation Engineering, Volume 133 Issue 2 (2007) Pages 96-104.

IPENZ 05/28 **Comparing cost and process performance of activated sludge (AS) and biological aerated filters (BAF) over ten years of full scale operation.**
Hansen, R., Thøgersen, T and Rogalla, F. Water Science and Technology, Volume 55 Issue 8-9 (2007) Pages 99-106.

√ IPENZ 05/29 **Response surface optimization of substrates for thermophilic anaerobic codigestion of sewage sludge and food waste.**
Journal of the Air & Waste Management Association, Volume 57, Issue 3 (March 2007) Pages 309-318.

√ IPENZ 05/30 **Reanalysis of a municipal landfill slope failure near Cincinnati, Ohio, USA.**
Chugh, A.. Stark, T and Kees A. Canadian Geotechnical Journal, Volume 44, Issue 1 (January 2007) Pages 33-53.

IPENZ 05/31 **Modelling the risk of contaminant intrusion in water mains.**
Yan, J., Vairavamoorthy, K and Gorantiwar, S. Proceedings of the Institution of Civil Engineers: Water Management, Volume 160 Issue 2 (2007) Pages 123-132.

√ IPENZ 05/32 **Lead particles in potable water.**
American Water Works Association. Journal, Volume 99, Issue 6 (June 2007) Pages 107-117.

√ IPENZ 05/33 **Delay between sensing and response in water contamination events.**
Bristow, E and Brumbelow, K. Journal of Infrastructure Systems, Volume 12 Issue 2 (2006) Pages 87-95.

IPENZ 05/34 **Biogas production from anaerobic waste stabilisation ponds treating dairy and piggery wastewater in New Zealand.**
Park, J. and Craggs, R. Water Science and Technology, Volume 55 Issue 11 (2007) Pages 257-264.

IPENZ 05/35 **Long-term evaluation of a sequential batch reactor (SBR) treating dairy waste water for carbon removal.**
Gutierŕez, S. et al. Water Science and Technology, Volume 55 Issue 10 (2007) Pages 193-199.

IPENZ 05/36 **Dairy waste water treatment by combining ozonation and nanofiltration.**
Laśzlo,Ź. et al. Separation Science and Technology, Volume 42 Issue 7 (2007) Pages 1627-1637.

√ IPENZ 05/37 **Nitrogen removal in streams of agricultural catchments : a literature review.**
Birgand, F et al. Critical Reviews in Environmental Science and Technology, Volume 37 Issue 5 (2007) Pages 381-487.

IPENZ 05/38 **Compressive strength characteristics of cement stabilized rammed earth walls.**
Jayasinghe, C and Kamaladasa, N. Construction and Building Materials, Volume 21 Issue 21 (2007) Pages 1971-1976.

√ IPENZ 05/39 **Seismic design criteria for slab-column connections.**
Hueste, M et al. ACI Structural Journal, Volume 104 Issue 4 (July/August 2007) Pages 448-458.

√ IPENZ 05/40 **Shake table studies of bridge columns with double interlocking spirals.**
Correal, J. et al. ACI Structural Journal, Volume 104 Issue 4 (July/August 2007) Pages 393-401.

√ IPENZ 05/41 **Reducing energy consumption for seawater desalination.**
American Water Works Association. Journal, Volume . 99 Issue 6 (June 2007) Pages 95-106.

√ IPENZ 05/42 **New desalination pump and energy recovery technologies.**
MacHarg, J. American Water Works Association. Journal, Volume 99, Issue 6 (June 2007) Pages 54-61.

√ IPENZ 05/43 **Development of a ground-source heat pump system with ground heat exchanger utilizing the cast-in-place concrete pile foundations of buildings.**
Sekine, K. et al. ASHRAE Transactions, Volume 113 (2007) Pages 558-566.

√ IPENZ 05/44 **Climate change scenarios for New Zealand rainfall.**
Sansom, J. and Renwick, J. Journal of Applied Meteorology, Volume 46 Issue 5 (May 2007) Pages 573-587.

√ IPENZ 05/45 **Repair and rehabilitation of wood utility poles with fibre-reinforced polymers.**
Polyzois,,D and Kell, J. Canadian Journal of Civil Engineering. Volume. 34, Issue 1 (January 2007) Pages116-119.

√ IPENZ 05/46 **Effect of chromium on anticorrosive performance of zinc hot dip galvanized coatings.**
Pistofidis, N., Vourlias, G and Stergioudis,*G.* Corrosion Engineering, Science, and Technology, Volume 42, Issue 1 (March 2007) Pages 16-21.

√ IPENZ 05/47 **High temperature corrosion of superheater materials below deposited biomass ashes in biomass combusting atmospheres.**
Cha, S Corrosion Engineering, Science, and Technology, Volume 42, Issue 1 (March 2007) Pages 50-61.

√ IPENZ 05/48 **Hybrid treatment systems for dye wastewater.**
Hai, F., Yamamoto, K and Fukushi, K. Critical Reviews in Environmental Science and Technology, Volume 37 Issue 4 (2007) Pages 315-377.

√ IPENZ 05/49 **Exhaust ventilation energy saving in car manufacturing and other industries.**
Litomisky, A. Energy Engineering, Volume 104 Issue 3 (2007) Pages 54-79.

√ IPENZ 05/50 **Tips for applying commission.**
Doty, S. Energy Engineering, Volume 104 Issue 3 (2007) Pages 6-19.

√ IPENZ 05/51 **Review of recent advances toward transcritical CO2 cycle technology.**
Grool, E and Jun-Hyeung Kim. HVAC&R Research, Volume 13 Issue 3 (May 2007) Pages 499-521.

√ IPENZ 05/52 **Terrorism prevention, preparedness and response in built facilities.**
Then, S. and Loosemore, M. Facilities, Volume 24 Issue 5/6 (2006) Pages 157-177.

√ IPENZ 05/53 **Rapid assessment checklist for sustainable buildings.**
Gething, B and Bordass, B. Building Research and Information, Volume 34 Issue 4 (July/August 2006) Pages 416-426.

IPENZ 05/54 **Estimates of self-compacting concrete 'potential' durability.**
Assie,´ S., Escadeillas, G and Waller, V. Construction and Building Materials, Volume 21 Issue 10 (2007) Pages 1909-1917.

√ IPENZ 05/55 **Rapid bridge replacement under emergency situation : case study.**
Yong, B., Burkett, W and Nash, P. Journal of Bridge Engineering, Volume 11 Issue 3 (May 2006) Pages 266-273.

√ IPENZ 05/56 **Long-term behavior of precast segmental cantilever bridges.**
Celso, I. Journal of Bridge Engineering, Volume 11 Issue 3 (May 2006) Pages 340-349.

IPENZ 05/57 **Prioritization of bridges and tunnels in earthquake risk mitigation using multicriteria decision analysis: Application to Lisbon.**
Bana e Costa, C., Oliveira, C and Vieira, V. Omega, Volume 36 Issue 3 (2008) Pages 442-450.

IPENZ 05/58 **Earthquake failures of cantilever projections buildings.**
Dogan, M., Unluoglu, E., and Ozbasaran, H. Engineering Failure Analysis, Volume 14 Issue 8 Spec Iss (2007) Pages 1458-1465.

IPENZ 05/59 **Use of cement and quicklime to accelerate ripening and immobilize contaminated dredging sludge.**
Brouwers, H. et al. Journal of Hazardous Materials, Volume 145 Issue 1-2 (2007) Pages 8-16.

√ IPENZ 05/60 **Characterizing the risks to aquatic ecosystems : a tentative approach in the context of freshwater dredged material disposal.**
Babut, M et al. Integrated Environmental Assessment and Management, Volume 2 Issue 4 (October 2006) Pages 330-343.

SPECIAL FOCUS ON.....FLOODS

√ IPENZ 01/61 **Integrated assessment of changes in flooding probabilities due to climate change.**
Kleinen, T and Petschel-Held, G (2007) Climatic Change, Volume 81 Issue 3-4 (2007) Pages, 283-312.

IPENZ 05/62 **Multi-criteria design support systems for flood hazard mitigation and emergency response in urban watersheds.**
Levu, J et al. Journal of the American Water Resources Association, Volume 43 Issue 2 (April 2007) Pages 346-358.

IPENZ 05/63 **Flood prediction using Time Series Data Mining**
Damle, C and Yalcin, A. Journal of Hydrology, Volume 333 Issue 2-4 (2007) Pages 305-316.

√IPENZ 05/64 **A partnership approach to managing flood risk..**
Crossman, M. and others. Proceedings of the Institution of Civil Engineers: Civil Engineering, Volume 159 Special issue 2 (2006) Pages 41-45.
Flood risk poses a significant threat to many communities and, whereas measures can be taken to reduce the likelihood and impact of flooding, the risk can never be eliminated altogether . Insurance provides a useful means of spreading the residual risk and this paper provides a description of the UK partnership that enables insurance, backed by private-sector capital, to be made available on the basis of Government commitment to manage risks. It describes the benefits of this approach compared with that taken in other parts of Europe and makes the case for further broadening and deepening of partnership as climate change and socio-economic development give rise to increasing risks.

IPENZ 05/65 **Climatic background to past and future floods in Australia.**
Pittock, B. et al. Advances in Ecological Research, Volume 39 (2006) Pages 13-39.

IPENZ 05/66 **Integrating 1D and 2D hydrodynamic models for flood simulation.**
Lin, B et al. Proceedings of the Institution of Civil Engineers: Water Management, Volume 159 Issue 1 (2006) Pages 19-25.

IPENZ 05/67 **Floods as catalysts for policy change: Historical lessons from England and Wales.**
Johnson, C., Tunstall, S and Penning-Rowsell, E. International Journal of Water Resources Development, Volume 21 Issue 4 (2005) Pages 561-575.

IPENZ 05/68 **Flood management under climatic variability and its future perspective in Japan.**
Ikeda, T., Yoshitani, J and Terakawa, A. Water Science and Technology, Volume 51 Issue 5 (2005) Pages 133-140

√IPENZ 05/69 **Performance of flood embankments in England and Wales.**
Dyer, M. Proceedings of the Institution of Civil Engineers: Water Management, Volume 157 Issue 4 (2004) Pages 177-186.
The effective performance of flood embankments during extreme flood events is critical for the provision of sustainable flood defences. However flood embankments can become less effective over a period of time for a number of reasons. The review considers the traditional methods used to construct flood embankments compared with modern techniques, the type of local materials used for

construction, the range of possible geotechnical factors that can lead to a loss of performance and finally case histories of embankment breaches.

√ IPENZ 05/70 **Chichester emergency flood alleviation project, winter 2000/2001.**
Hoad, R., Gilham, A and Fawcett, D. Proceedings of the Institution of Civil Engineers : Water and Maritime Engineering, Volume 156 Issue WM4 (December 2003) Pages 297-304.

IPENZ 05/71 **Effective flood alleviation design and construction.**
Bradley, W. Proceedings of the Institution of Civil Engineers: Municipal Engineer, Volume 158 Issue 2 (2005) Pages 107-113.
Innovation and best practice designs can be encouraged through an effective design process. The award-winning Harbertonford Flood Defence Scheme was described as 'the future of flood defence schemes' and delivered a combination of in-village river channel improvement and upstream flood attenuation to alleviate regular flooding and the misery it caused. This paper focuses on how the design was developed and implemented to demonstrate the benefits that can be delivered through good teamwork and effective management of the civil engineering process.

√ IPENZ 05/72 **Performance of sandbags for domestic flood defence.**
Reeve, D and Badr, A. Proceedings of the Institution of Civil Engineers : Water and Maritime Engineering, Volume 156 Issue WM4 (December 2003) Pages 341-349.

√ IPENZ 05/73 **A flood failure flowchart for buildings**.
Kelman, L and Spence, R. Proceedings of the Institution of Civil Engineers : Municipal Engineer, Volume 156 Issue ME3 (September 2003) Pages 207-214.
This paper identifies the main pathways by which flood-induced pressure differentials may damage residential properties in England. The process looks beyond slow-rise floods and subsequent damage from water contact in order to consider pressures induced by depth differentials, velocity and waves. A Flood Failure Flowchart is presented which provides first-order insight into the main failure modes which should be quantified in detail. Uncertainties remain due to lack of information and weaknesses in the analysis, particularly the reliance on British Standards which are not currently adequate for designing to mitigate all forms of flood damage. British Standards, possibly in the form of a rating system with guidelines, could nonetheless provide an appropriate mechanism for formalising the vulnerabilities which residential buildings experience from flood pressures. The lack of literature in this area suggests that prior recommendations on flood damage reduction did not necessarily have a strong basis overall because they were bounded to exclude flood-induced pressures. This paper is thus only a first step towards systematically identifying and categorising potential failure modes of residences during floods.