

## IPENZ ENGINEERING UPDATE February 2010



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- **SPECIAL FOCUS...Compressed air systems -Use and energy efficiency.**

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

### √IPENZ 32/01 **Project feasibility study: the key to successful implementation of sustainable and socially responsible construction management practice.**

Li-yin Shen, Vivian W.Y. Tam, Leona Tam, Ying-bo Ji, Journal of Cleaner Production, Volume 18, Issue 3 (February 2010) Pages 254-259.

This paper introduces a new approach for conducting project feasibility studies by embracing the principles of sustainable development. Construction projects, in particular infrastructures, have a major influence on the attainment of sustainable development, thus project sustainability needs to be considered. This becomes a pressing issue particularly in those developing countries or regions, such as China, where a huge amount of construction works are currently performed and remain to happen in the future. A previous study has addressed little on the relevance of project feasibility studies to project sustainability performance. The importance of incorporating sustainable development principles in conducting project feasibility studies is not effectively understood by project stakeholders. This paper addresses major challenges of undertaking project feasibility studies in line with sustainable construction practice with reference to the Chinese construction industry. A case study approach is the major research method in this study. The research team collected 87 feasibility study reports from various projects.

### √IPENZ 32/02 **Major challenges to the successful implementation and practice of programme management in the construction environment: A critical analysis.**

Zayyana Shehu, Akintola Akintoye. International Journal of Project Management, Volume 28 Issue 1 (January 2010) Pages 26-39.

### √IPENZ 32/03 **Conflict-resolution competencies for the construction professional.**

Tobin, A. Proceedings of the ICE – Management, Procurement and Law, Volume 162 Issue MP4 (November 2009) Pages 181-184.

### √IPENZ 32/04 **Engineer's role in resolving disputes in offshore projects.**

Ma, A. Proceedings of the ICE – Management, Procurement and Law, Volume 162 Issue MP4 (November 2009) Pages 191-196.

### √IPENZ 32/05 **An Excel-based decision support system for scoring and ranking proposed R&D projects.**

De Piante Henriksen, A. and Palocsay, S. International Journal of Information Technology & Decision Making, Volume 7 Issue 3 (September 2008) Pages 529-546.



**√IPENZ 32/06 Leading the dispersed workforce.**

Reilly, R. and Lojeski, K. Mechanical Engineering, Volume 131 Issue 11 (November 2009) Pages 30-34.

**√IPENZ 32/08 How to pick a good fight.**

Joni, S and Beyer, D. Harvard Business Review, Volume 87 Issue 12 (December 2009) Pages 48-57. Peace and harmony are overrated. Though conflict-free teamwork is often held up as the be-all and end-all of organizational life, it actually can be the worst thing to ever happen to a company. Look at Lehman Brothers. When Dick Fuld took over, he transformed a notoriously contentious workplace into one of Wall Street's most harmonious firms. But his efforts backfired – directors and managers became too agreeable, afraid to rock the boat by pointing out that the firm was heading into a crisis. Research shows that the single greatest predictor of poor company performance is complacency, which is why every organization needs a healthy dose of dissent. Not all kinds of conflict are productive, of course – companies need to find the right balance of alignment and competition and make sure that people's energies are pointed in a positive direction. In this article, two seasoned business advisers lay down ground rules for the right kinds of fights.

**√IPENZ 32/09 Imperatives for handling the heat.**

Longenecker, C. and Ariss, S. Industrial Management, Volume 51 Issue 5 (September 2009) Pages 8-12.

In times of rapid change and economic pressure, the possibility of managerial failure in terms of executing vital strategic and operational tasks rises. This failure can be traced back to the inability of managers to adjust their roles to take into account the current organisational reality, but managers must learn to deal with the heat of such economic pressures.

**√IPENZ 32/10 The death of the filing cabinet.**

Thilmany, J. Mechanical Engineering, Volume 131 Issue 12 (December 2009) Pages 44-46.

**√IPENZ 32/11 Much more than meets the eye: The role of psychological well-being in job performance, employee retention and cardiovascular health.**

Wright, T. Organizational Dynamics, Volume 39 Issue 1 (January-March 2010) Pages 13-23. This article looks at the many facets of psychological well-being (PWB) and how it relates to employees and their performance with resultant implications for selecting and training staff.

**√IPENZ 32/12 Case Study and Statistical Analysis of Utility Conflicts on Construction Roadway Projects and Best Practices in Their Avoidance.**

Goodrum, P., Smith, A and Kari, F

Journal of Urban Planning & Development, Volume 134 Issue 2 (June 2008) Pages 63-70.

**√IPENZ 32/13 Profiles in safety.**

Campbell, B. Engineered Systems, Volume 25 Issue 1 (January 2008) Pages 50,52-56

**√IPENZ 32/14 Safety perception survey.**

Ryan, D. Professional Safety, Volume 54 Issue 12 (December 2009) Pages 22-27.

**√IPENZ 32/15 Getting from estimate to budget.**

Kennedy, D. Industrial management, Volume 51 (November 2009) Pages 25-30.

Headlines are now reforecasting a mega-project that was looking positive as \$1 billion over budget. How did this overrun suddenly happen and why did no one see it coming? While there are sufficient instructions on how to estimate costs, there is less available on what happens after the initial estimate has been completed. This article looks at the confusion that arises during execution when arbitrary amendments in estimates occur during planning. The advantages of raising or lowering budgets at the initial stages.

**√IPENZ 32/16 The many colors of success: What do executives want out of life?**

Manfred, F. and De Vries, K. Organizational Dynamics, Volume 39, Issue 1, January-March 2010, Pages 1-12.

160 senior executives were interviewed for this research project. The paper begins by defining success in terms of common markers such as family, wealth, recognition, power, etc. It then asks what lies beneath these markers and goes on to consider focus, persistence and self-mastery as well as the price of success.

**√IPENZ 32/17 Analysis of cost and schedule performance of international development projects.**

Kamrul Ahsan, Indra Gunawan International Journal of Project Management, Volume 28, Issue 1, January 2010, Pages 68-78.

This study focuses on cost and schedule issues of international development (ID) projects. Through empirical analysis we examine ID project cost and schedule performance and the main reasons for poor project outcome. We look at 100 projects that are sponsored by the Asian Development Bank and hosted by several Asian countries. The study identifies that most late projects experience cost underrun - an unusual cost and schedule variation relation in projects. Further we identify the root causes of project delay and cost underrun. Research findings will benefit ID project professionals, organizations and the ID project body of knowledge. The study can be extended to analyse other developing country projects sponsored by different donors.

**√IPENZ 32/18 Stop blaming resistance to change and start using it.**

Ford, J and Ford, L. Organizational Dynamics, Volume 39 Issue 1 (January-March 2010) Pages 24-36.

After exploring resistance and why we blame it when faced with change, this article outlines how the energy of resistance can rather be channelled to improve the change process in terms of purpose, strategy, participation, etc. In this way the planning and implementation of change can be made smarter, faster and cheaper.



√IPENZ 32/19 **What do engineering students learn in sustainability courses? The effect of the pedagogical approach.**

Segalas, J., Ferrer-Balas, D and Mulder, K. Journal of Cleaner Production, Volume 18, Issue 3 (February 2010) Pages 275-284.

The introduction of sustainable development (SD) courses into engineering education has been a key goal for many universities. This paper presents the results of a 5-year research project that analysed how SD competences were introduced into technological universities.

√IPENZ 32/20 **Community investment programs in developing country infrastructure projects.**

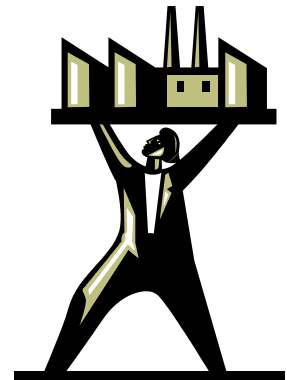
Montgomery, R., Palma, A. and Hoagland-Grey, H. Journal of Infrastructure Systems, Volume 14 Issue 3 (September 2008) Pages p241-252.

In developing countries, the social, environmental and economic context of local communities can be positively impacted by the way private sector infrastructure companies operate. This means providing community investment programmes that target economic development, poverty reduction, social inequality reduction and environmental improvements. Under the umbrella of corporate social responsibility, such programs can involve philanthropy or charitable donations, volunteering by employees and partnerships. In this paper ideas for infrastructure projects are considered whilst highlighting the benefits of programmes for both companies and communities. In addition, possible challenges, issues and opportunities are also examined.

## Technical Aspects of Engineering

√IPENZ 32/21 **A new lateral force distribution formula for base-isolated structures.**

Khoshnoudian, F. and Esrafil, S. Proceedings of the ICE – Structures and Buildings, Volume 161 Issue SB5 (October 2008) Pages 277-298.



√IPENZ 32/22 **Axially loaded RC columns strengthened by steel cages.**

Adam, J. and others. Proceedings of the ICE – Structures and Buildings, Volume 162 Issue SB3 (June 2009) Pages 199-208.

√IPENZ 32/23 **A method for estimating fundamental periods of tall buildings.**

Wang, L. and Wang, Q. Proceedings of the ICE – Structures and Buildings, Volume 160 Issue SB6 (December 2007) Pages 327-338.

√IPENZ 32/24 **Examples of open caisson sinking in Scotland.**

Allenby, D., Waley, G. and Kilburn, D. Proceedings of the ICE – Geotechnical Engineering, Volume 162 Issue GE1 (February 2009) Pages 59-70.

√**IPENZ 32/25 Observed increases in offshore pile driving resistance.**

Bhattacharya, S., Carrington, T. and Aldridge T. Proceedings of the ICE – Geotechnical Engineering, Volume 162 Issue GE1 (February 2009) Pages 71-80.

√**IPENZ 32/26 Time and cost saving strategies for water pipe lining operations.**

Rockaway, T. and Ball, R. Journal of Infrastructure Systems, Volume 14 Issue 3 (September 2008) Pages 178-184.

√**IPENZ 32/27 Brewery digesters as power source for healthcare network.**

Greer, D. BioCycle, Volume 50 Issue 12 (December 2009) Pages 42-45.

√**IPENZ 32/28 Assessing freshwater use impacts in LCA: Part I–inventory modelling and characterisation factors for the main impact pathways.**

Milà i Canals, L. and others. The International Journal of Life Cycle Assessment, Volume 14 Issue 1 (January 2009) Pages 28-42.

√**IPENZ 32/29 Life-cycle assessment of a 2-MW rated power wind turbine: CML method.**

Martínez, E. and others. The International Journal of Life Cycle Assessment, Volume 14 Issue 1 (January 2009) Pages 52-63.



√**IPENZ 32/30 Building a breakwater with prefabricated caissons on soft clay.**

Yan, S. and others. Proceedings of the ICE – Geotechnical Engineering, Volume 162 Issue GE1 (February 2009) Pages 3-12.

√**IPENZ 32/31 Quo vadis efficiency analysis of water distribution? A comparative literature review.**

Walter, M. and others. Utilities Policy, Volume 17 Issues 3-4 (September-December 2009) Pages 225-232.

√**IPENZ 32/32 Productivity and efficiency in the water industry.**

Abbott, M. and Cohen, B. Utilities Policy, Volume 17 Issues 3-4 (September-December 2009) Pages 233-244.

√**IPENZ 32/33 Ground energy systems: Delivering the potential.**

Preene, M. and Powrie, W. Proceedings of the ICE – Energy, Volume 162 Issue EN2 (May 2009) Pages 77-84.

√IPENZ 32/34 **A comparative study between thermophilic and mesophilic membrane aerated biofilm reactors.**

Liao, B. Q. and Liss, S. N. Journal of Environmental Engineering and Science, Volume 6 Issue 2 (March 2007) Pages 247-252.

√IPENZ 32/35 **A comparative study of ultrasonic pretreatment and an internal recycle for the enhancement of mesophilic anaerobic digestion.**

Muller, C. D. et al. Water Environment Research, Volume 81 Issue 12 (December 2009) Pages 2398-2410.

√IPENZ 32/36 **BACnet® and the Smart Grid**

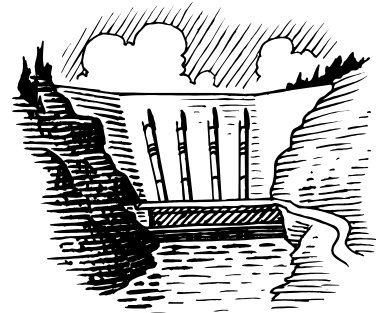
Holmberg, D. G. and Bushby, S. T. ASHRAE Journal, Volume 51 Issue 11 (November 2009) Pages B8-B12.

√IPENZ 32/37 **Commercial building retuning: A low-cost way to improve energy performance**

Brambley, M. R. and Katipamula, S. ASHRAE Journal, Volume 51 Issue 10 (October 2009) Pages 12-14,16-18,20,23.

√IPENZ 32/38 **The relationship between large reservoirs and seismicity.**

Honquin, C., Zeping, X and Ming, L. Water Power and Dam Construction, Volume 62 Issue (January 2010) Pages 29-22.



√IPENZ 32/39 **Investigation of liquefaction and pore water pressure development in layered sands.**

Özener, P. T., Özeydin, K. and Berilgen, M. M. Bulletin of Earthquake Engineering, Volume 7 Issue 1 (February 2009) Pages 199-219.

√IPENZ 32/40 √IPENZ 32/33 **A comparison of seismic risk maps for Italy.**

Crowley, H. Bulletin of Earthquake Engineering, Volume 7 Issue 1 (February 2009) Pages 149-180.

√IPENZ 32/41 **Improved recycling with life cycle information tagged to the product.**

Luttrupp, C. and Johansson, J. Journal of Cleaner Production, Volume 18 Issue 4 (March 2010) Pages 346-354.

√IPENZ 32/42 **Production of irrigation water from bioremediation of acid mine drainage: Comparing the performance of two representative systems.**

Martins, M. et al. Journal of Cleaner Production, Volume 18 Issue 3 (February 2010) Pages 248-253.

**√IPENZ 32/43 Soil improvement works for an offshore land reclamation.**

Chu, J., Bo, M. and Arulrajah, A. Proceedings of the ICE – Geotechnical Engineering, Volume 162 Issue GE1 (February 2009) Pages 21-32.

**Focus on... Compressed Air : Part One.  
Compressed Air Use and energy efficiency****√IPENZ 32/44 A review on compressed-air energy use and energy savings.**

R. Saidur, N.A. Rahim, M. Hasanuzzaman. Renewable and Sustainable Energy Reviews, Volume 14 Issue 4 (May 2010) Pages 1135-1153.

Compressed-air systems account for about 10% of total industrial-energy use for few selected countries as found in literature. Compressed air is typically one of the most expensive utilities in an industrial facility. This paper describes a comprehensive literature review about compressed air energy use, savings, and payback period of energy efficient strategies. This paper compiles latest literature in terms of thesis (MS and PhD), journal articles, conference proceedings, web materials, reports, books, handbooks on compressed air energy use, efficiency, energy savings strategies. Computer tools for compressed air analysis have been reviewed and presented in this paper. Various energy-saving measures, such as use of highly efficient motors, VSD, leak prevention, use of outside intake air, reducing pressure drop, recovering waste heat, use of efficient nozzle, and use of variable displacement compressor to save compressed-air energy have been reviewed. Based on review results, it has been found that for an electric motor used in a compressed-air system, a sizeable amount of electric energy and utility bill can be saved using high efficient motors and applying VSDs in matching speed requirements. Also, significant amounts of energy and emission are reducible through various energy-saving strategies. Payback periods for different energy savings measures have been identified and found to be economically viable in most cases.

**√IPENZ 32/45 Compressed air system best practice programmes: What needs to change to secure long-term energy savings for New Zealand?**

Neale, J. R. and Kamp, P. J. J. Energy Policy, Volume 37 Issue 9 (September 2009) Pages 3400-3408.

The establishment of a compressed air system (CAS) best practice programme is a key component of one of the initial industrial energy efficiency programmes being driven by New Zealand government ministries and agencies. In a global context this is not a new initiative in that existing programmes have been functioning in Europe and USA, yet in each of these cases the impact ten years-on has been patchy with limited long-term improvements in overall energy efficiency. The New Zealand CAS best practice programme currently under development is sponsored by the Electricity Commission (EC) and the Energy Efficiency Conservation Authority (EECA). It takes a new approach in policy direction, with variations from those used in other international programmes. A significant level of electricity levy money is to be committed to this programme and it is timely to highlight its merits and potential weaknesses, and what is required to generate long-term energy savings beyond the levels achieved by more mature overseas programmes.

√IPENZ 32/46 **Air compressor efficiency in a Vietnamese enterprise.**

Yang, M. Energy Policy, Volume 37 Issue 6 (June 2009) Pages 2327-2337.

√IPENZ 32/47 **Strategies to optimize compressed air systems.**

Perry, W. Plant Engineering, Volume 63 Issue 1 (January 2009) Pages 10-13.

√IPENZ 32/48 **Understand compressor types to make the right selection.**

Bartos, J. Plant Engineering, Volume 60 Issue 1 (January 2006) Pages 42-45.

√IPENZ 32/49 **Blowing off inefficient compressor systems.**

Crichton, K. Manufacturers' Monthly (June 2008) Pages 40-42.

Reviews use of inefficient compressor systems in Australia.

√IPENZ 32/50 **Utility grade compressed air systems.**

Eaton, J. C., Wilder, L. L. and Feustel, D. D. Energy Engineering, Volume 105 Issue 3 (2008) Pages 66,69-78.

√IPENZ 32/51 **Assessment of a compressed air system.**

Sheckler, M. S. Energy Engineering, Volume 104 Issue 1 (2007) Pages 13-22.

√IPENZ 32/52 **Comparing compressor efficiency.**

Wagner, H. Pollution Engineering, Volume 37 Issue 11 (November 2005) Pages 16-19.

√IPENZ 32/53 **A decision-based analysis of compressed air usage patterns in automotive manufacturing.**

Yuan, C. Y. et al. Journal of Manufacturing Systems, Volume 25 Issue 4 (2006) Pages 293-300.

√IPENZ 32/54 **Efficient use of compressed air makes sense and cents.**

Pellett, R. Hydraulics & Pneumatics, Volume 59 Issue 8 (August 2006) Pages 38,41-43.

√IPENZ 32/55 **Energy management opportunities on a compressed air system in a packaging facility.**

Dalglish, A. Z. and Grobler, L. J. Energy Engineering, Volume 103 Issue 4 (2006) Pages 42-52.

Foss, R. S. Energy Engineering, Volume 102 Issue 1 (2005) Pages 49-60.

√IPENZ 32/56 **Compressed air energy audit—"The real story" energy engineering.**

Koski, A. Energy engineering, Volume 99 Issue 3 (2002) Pages 59-70.

√IPENZ 32/57 **Improving compressed air system efficiency. Know what you really need.**

Terrell R. E. Energy Engineering, Volume 96 Issue 1 (1999) Pages 7-15.

√IPENZ 32/58 **Understanding the basics of compressed air systems.**

Herron, D. J. Energy Engineering, Volume 96 Issue 2 (1999) Pages 19-31.

√IPENZ 32/59 **Beyond leaks: Demand-side strategies for improving compressed air efficiency.**

Howe, B. and Scales, B. Energy Engineering, Volume 95 Issue 1 (1998) Pages 31-40.

√IPENZ 32/60 **Beyond air leaks – How to do compressed air systems analysis.**

Parekh, P. S. Energy Engineering, Volume 95 Issue 6 (1998) Pages 7-28.

√IPENZ 32/61 **Energy savings with compressed air.**

Risi, J. D. Energy Engineering, Volume 92 Issue 6 (1995) Pages 49-59.

**COMPRESSED AIR—Part Two Energy storage systems** will appear in IPENZ Engineering Update March 2010.

## SPECIAL TOPICS IN PREVIOUS IPENZ ENGINEERING UPDATES

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