Articles and Abstracts

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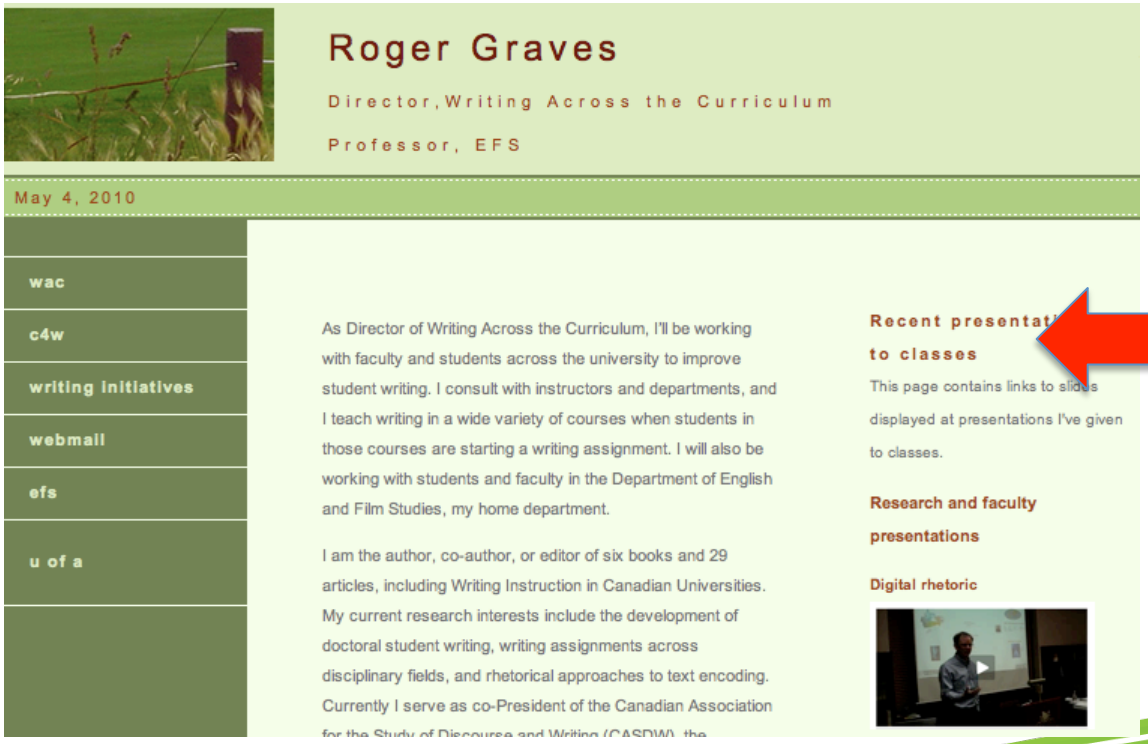

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Writing Across the Curriculum

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1. Flexibility of your writing processes
2. Ability to get feedback on drafts
3. Familiarity with the genre, complexity of the genre
4. Complexity of the task (purpose): description is less complex than analysis/synthesis
5. Number of audiences/readers, diversity within these groups

Who is your audience for the technical paper?
Describe this reader.

What is your purpose?

Introduction

Results

Discussion

Conclusion

Announce the topic and scope of the paper

Indicate why the topic is important or worth reading about

Identifies the problems the new technology offers a solution to

Identifies the solution offered by the new technology

1. Introduction

The use of concrete and self-compacting concrete (SCC) as a tool for effective recycling has been actively researched for the last few years. Examples of these efforts include materials derived from buildings following demolition (Diotallevi et al., 2004; Limbachiya and Roberts, 2004), scrap and ground used tires (Bignozzi and Sandrolini, 2006; Hernandez-Olivares et al., 2002; Khatib and Bayomy, 1999), waste glass (mainly binary soda-lime glass) (Bignozzi and Sandrolini, 2004; Shao et al., 2000) and residues from ceramic raw materials (Bignozzi et al., 2004). These materials were successfully used as a partial or complete replacement for natural aggregates and/or fillers. These studies have environmentally friendly consequences, such as safeguarding of non-renewable raw materials, reducing the exploitation of quarries and reducing landfill disposal, all of which result in the creation of new conglomerates with peculiar characteristics. For example, the introduction of tire rubber into a concrete mix generally leads to lighter and somewhat tougher material (Bignozzi and Sandrolini, 2006; Khatib and Bayomy, 1999). More recently, self-compacting technology has enabled the significant improvement of the mechanical strength of rubberised concrete (Bignozzi and Sandrolini, 2006). In addition, when glass waste (average grain size $\leqslant 38$ μm) is added to a concrete mixture, the material may exhibit pozzolanic properties (Bignozzi and Sandrolini, 2004; Shao et al., 2000).

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Athabasca oil sands of Alberta, Canada are unconsolidated mixtures of bitumen, silica sands, mineral fine solids and water. A water-based extraction process (WBEP) is used to extract bitumen from the oil sands. In this process, the oil sands ore is first mixed with hot or warm water to liberate the bitumen from the sand grains and to aerate the bitumen with entrained air bubbles. The aerated bitumen is enriched by flotation to obtain bitumen froth. The recovered bitumen froth contains about 60% bitumen, 30% water and 10% solids by weight. An appreciable fraction of the water is present as emulsified water droplets. To further separate the water droplets and fine solids prior to bitumen upgrading, the bitumen froth is diluted with a light hydrocarbon solvent (diluent) (e.g., naphtha or alkane). The purpose of adding a diluent is to reduce the density and viscosity of bitumen to facilitate water and solids removal by gravity, cycloning and/or centrifugation. However, small droplets of water (about three to five microns in diameter) still remain in the solvent-diluted bitumen. These droplets contain dissolved salts that are carried along with the bitumen into downstream upgrading processes, where the chloride salts can lead to corrosion issues. Therefore, minimizing the content of the water in the diluted bitumen is essential. 1

Additionally, the various purification treatments involved in the separation process produce waste in turn. This waste includes ceramic residues and colored glass fragments that are usually separated from the glass cullet by optoelectronic equipment. This fraction of colored glass is usually sent to a landfill, except in the North of Italy where it is further treated by purification processes.

The objective of this paper is to investigate a new application of matt waste in the construction industry by exploiting its activity as filler for self-compacting concrete and as a partial Portland cement replacement (up to 50%) for newly blended cement.

As mobile electronic devices become more widely integrated into society, the demand for portable energy sources has drastically increased. Conventional sources of power such as electrochemical cells are the most prevalent in the portable power market. Despite their efficiency, batteries' finite life and chemical composition causes inconveniences as well as environmental damage. Recent development of mobile energy sources has been focused on the use of kinetic energy rather than chemical energy. There is an abundance of motion energy in the form of ambient vibrations and naturally occurring motions, both of which remain largely untapped. A viable alternative to batteries has been developed to harvest unused motion energy. Motion energy harvesters are able to harness mechanical motions and convert them into useful electrical energy. However, these small scale electric generators are limited to a narrow range of frequencies, making them ineffective in many applications. A new generator developed by Veryst Engineering bypasses these limitations.

Present graphs and tables in this section

Summarize and describe

Present arguments to explain the data

Cite other research articles in this section

3. Results and discussion

Fresh concrete results obtained for SCC-C and SCC-MW are reported in Table 1. The target values were always attained for both the Slump Flow and J-Ring tests. When MW filler was used, no segregation occurred and good cohesiveness was visually assessed. To evaluate concrete viscosity, the time required to reach a 500 mm spread diameter (t_{500}) in the Slump Flow test was recorded. For both the formulations, t_{500} was about 4 s, which is well below the limit value of 12 s reported in the Italian standard (UNI 11041). Good reproducibility of Slump Flow, J-Ring and t_{500} results was observed for SCC-MW, prepared for each investigated hardening time according to the mix design reported in Table 1.

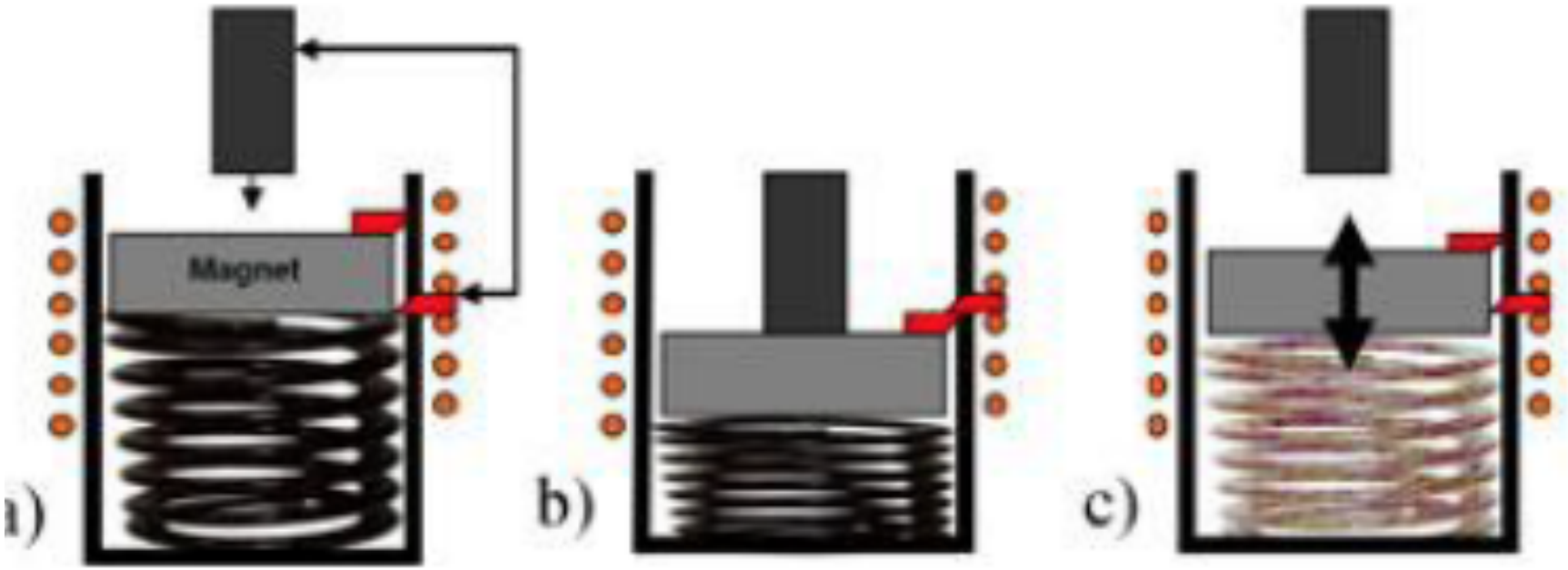

Figure 1: Catch and Release Concept **a)** spring absorbs energy from input motion **b)** system is latched at a fixed displacement **c)** system oscillates at its natural frequency

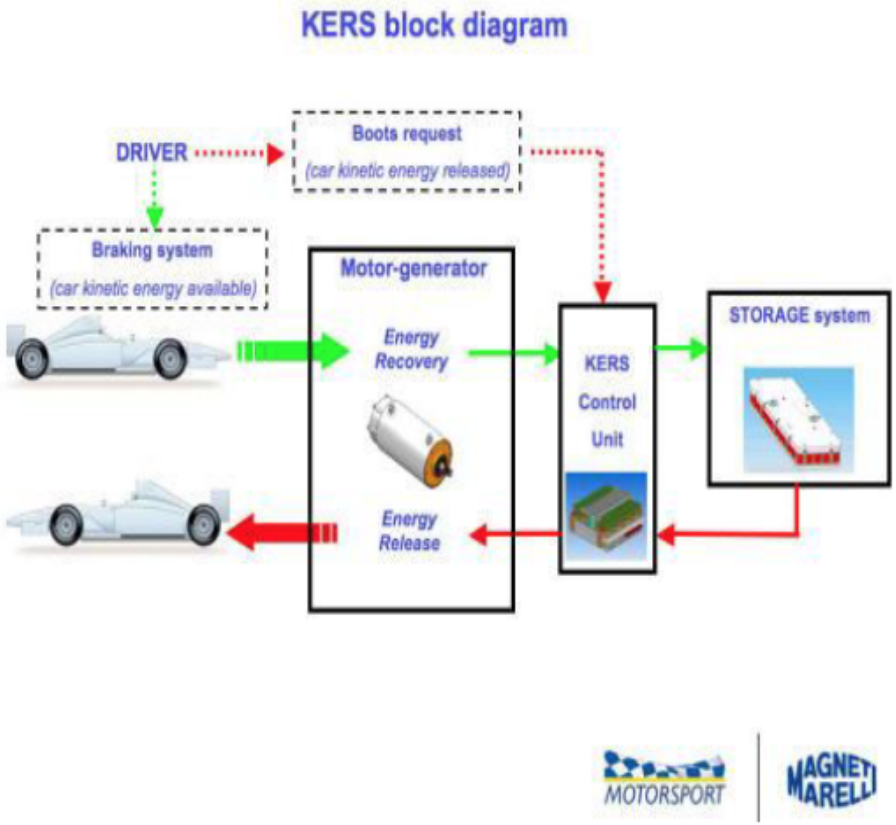

Fig. 1. The flow and conversion of energy in electrical KERS [2].

Present visual evidence in this section

Consider including tables and graphs to present arguments in favor of how to interpret the data

Present arguments that tell readers how to interpret the results

Cite other research

Energy motion harvesters are portable power sources which are free of chemicals. They generate electrical energy from kinetic energy via electromagnetic induction. Presently, commercial harvesters are able to harness ambient vibrations induced by machines, and other motions of high and consistent frequency. The catch-and-release concept developed by Veryst Engineering overcomes the limitations of commercially available harvesters. The system's independent oscillations allow these new harvesters to be used effectively in a broader range of applications. The new design can potentially be used to harness naturally occurring, low frequency motions. This paves the way for future medical applications such as pacemakers and medical sensors.

REFERENCES

[1] S. P. Beeby, M. J. Tudor, and N. M. White, "Energy harvesting vibration sources for microsystems applications," *Meas. Sci. Technol.*, vol. 17, pp. R175–R195, Oct. 2006. [Online].Available: http://iopscience.iop.org/0957-0233/17/12/R01/pdf/0957-0233_17_12_R01.pdf.[Accessed: 14 March 2012]

[2] B. S. Hendrickson and S. B. Brown, "Motion Energy Harvesting Using Catch-and-Release Mechanism," in *Energy Sustainability*, Jacksonville., FL, 2008.[Online].[Accessed: 14 March 2012]

[3] Faraday's Law of Induction, *Tony DiMauro*," [Online] 2008.Available: http://sdsu-physics.org/physics180/physics196/Topics/faradaysLaw.html. [Accessed: 14 March 2012].

[4] B. S. Hendrickson and S. B. Brown, "Marvest of Motion," *ME Magazine*, September 2008. [Online]. Available: http://memagazine.asme.org/articles/2008/september/harvest_motion.cfm.[Accessed: 8 March 2012].

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Look in the article's Introduction for the question they are asking

Look in the Results for the findings

- Limit your use of technical language (jargon)
- Define essential technical terms (def)
- Include background information to give some context for your subject matter (backgd)
- Provide the details that connect your topic and its significance (details)
- Explain significance explicitly and clearly (you can't expect non-specialist readers to fill in any gaps)

NASA's polar satellite has revealed one of the power sources behind the gossamer glow of the aurora: Alfvén waves, oscillations in Earth's magnetic field that resemble the quivering of a Slinky toy. John Wygant of the University of Minnesota and Andreas Keiling of the Center for Space Research on Radiation in Toulouse, France, used Polar's instruments to study energy flowing along the lines of the geomagnetic field. "Field lines have a certain tension. Charged particles are tied to those lines, so when the field wiggles around, they wiggle too," Wygant says. Magnetic waves moving along those lines can catch electrons and accelerate them to speeds up to 30,000 miles a second. Eventually the particles crash into air molecules, giving up their energy in the form of the green, blue, red, and violet light of the aurora.

Wherever Keiling and Wygant detected a powerful electromagnetic wiggling, the associated field lines led down to a region of aurora. Polar's instruments also showed that the energy in each electron stream was proportional to the intensity of the display. Similar Alfvén waves may transport energy away from the surface of the sun, heating the solar atmosphere to millions of degrees. (196 words)

Sodium hydroxide (NaOH) is used as a chemical additive to enhance bitumen recovery from oil sands by surface-mining extraction process. The addition of NaOH adjusts the pH of the slurry water to pH ~8.5 (approximate pH of process water). The change in pH of oil sand slurry affects the process performance. In the current study, the effect of pH was investigated by varying the caustic usage up to about 0.7 wt. % (based on the mass of oil sand). Many parameters such as: Naphthenic acid, divalent cations and the surface charges of particles, bitumen and air bubbles have a significant impact on bitumen recovery and froth quality. A Study of the extraction process at a fundamental level improves our understanding of the key parameters that govern bitumen recovery.

A. S. Brown. (2011, May). From Whales to Fans: A second look at a piece of sculpture led to a promising technology. *Mechanical Engineering Magazine Online*. Available: http://MEMagazine.asme.org/Articles/2011/May/From_Whales_Fans.cfm.

Keywords: lift, drag, airfoils, aerodynamics, fluid dynamics, vortices

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