Welcome

by Mark Tyrer, Chairman of Cementitious Materials Group

This is the second edition of this Newsletter and I should start by thanking the editorial team for their sterling efforts in preparing the first. Yanfei Yue, Jonathan Backus, Shi Shi and Jun Ren have worked tirelessly on this newsletter and I must report that I have had nothing but praise for their efforts. The response to issue 1 has been very encouraging and on behalf of the Cementitious Materials Group (‘CMG’) at IOM3, I would also like to thank those people who have contacted us with comments and suggestions for future editions. Also, may I take the opportunity to invite contributions from readers, especially events listings, book reviews, recruitment notes, discussions or ‘news and views’.

Plans for our annual Cement and Concrete Science conference (Portsmouth, 2nd & 3rd September) are going well. It is very pleasing to see that once again, the standard of contributions is extremely high, with considerable interest from overseas. Regrettably, this means we cannot possibly accommodate all the papers offered as oral presentations. However, we will offer poster authors the opportunity to say a few words of introduction to their work and urge everyone to attend the poster sessions, where the authors will be available to answer questions. Places are still available, so if you have not yet booked your place, please look at:

http://www.port.ac.uk/departments/academic/sces/ccs2013/

Next year, the group will contribute to the Second Young Researchers’ Forum in Construction Materials to be held at University College London on 19th February 2014. This is an opportunity for post graduates and new appointees to industry to present their work. The event is co-promoted by several institutions: the Institute of Concrete Technology (who are organising the event – contact: raman_mangabhai@o2.co.uk); Mineralogical Society (Applied Mineralogy Group); Society of Chemical Industry (Construction Materials Group) and ourselves (CMG-IOM3). These meetings are deliberately wide in scope, spanning all construction materials and proceedings for the last one are available from the SCI, which gives some idea of the content and format.

http://www.ucl.ac.uk/aim/conference-info/yrf

Finally, a few words on standards. The CMG has recently nominated Jon Knights (http://jkmc.co.uk/) to represent the interests of IOM3 on the British Standards Committee: B/517/1 ‘Concrete production and testing’ to whom I extend our thanks and I look forward to his reports in future. Many other readers will be active in standards committees, codes of practice development and expert working groups, but IOM3 does not keep a register of its members’ interests. It would be useful for us all to know who is active in these areas and I invite you to let us know of your activities at the usual e-mail address:

cmg.iom3.newsletter@gmail.com

If there is sufficient interest, this might form a useful basis for an article in Materials World, but in any case, will be reported here in the future.

I look forward to seeing everyone in Portsmouth.

Mark Tyrer
This image will be familiar to many readers ‘of a certain age’ and is taken from the 1971 film *Get Carter* starring Sir Michael Caine. The imperative to ‘Get Chartered’ (apologies for the play on words) though not as great as it would be at gun point, is no doubt pressing at the back of many of our minds.

Once a graduate enters their chosen profession, the institution(s) of which they are members, will encourage them to maintain a regular Continuing Professional Development (‘CPD’) record and in due course, invite them to apply for higher levels of membership and ultimately (after four years of practice) become Chartered members. There are two drivers for this; keeping up to date with evolving methods, regulations, standards and practice and also adding new skills which will broaden their experience. Once this is sufficient, the member becomes eligible to seek registration as a Chartered Engineer (C.Eng.) Chartered Scientist (C.Sci.) or other chartered practitioner. The route to doing this is rigorously defined by the Engineering Council or the Science Council in the UK, who prescribe to the institutions (known as Licensed Bodies) their particular requirements. Depending on the field in which the applicant works, their experience and qualifications, this will consist of an application form and examples of their work such as client reports, published papers, books, standards, maps, designs or drawings. In addition, some form of examination is usual and in recent years this has commonly been a formal interview conducted by two or more scrutineers appointed by the institute.

All this sounds rather daunting but remember, it is in the interests of the institutions to see their most able members chartered. Consequently, most offer considerable guidance through the application procedure and will appoint a local mentor to advise the applicant of how best to present their work. No awarding body wants applications to fail, so it is common for the mentors to recommend the final stage of the application is made only when the applicant has a strong case for registration.

Is it worth it? That rather depends on who you ask and in what field they work. Engineering in the UK has always had a disproportionately poor image in the eyes of many otherwise intelligent and well informed people. It is a sad truth that too few practitioners in other professions are able to distinguish between a chartered civil engineer and the man digging the road. The same ignorance is commonplace in many companies who corporately describe many of their unskilled and semi-skilled workers as ‘engineers’ whilst demonstrably employing hundreds of chartered engineers! That said, the engineering world maintains a high level of respect for Chartered Engineers and the majority of senior engineers in this country are chartered. In some countries, only people with a similar status have the legal authority to sign for the completion of certain projects, but that stricture seems unlikely to be adopted here. If someone seeks a professional career in engineering, they would be well advised to seek registration when they become eligible.

In science however, the requirements are much more varied as the prevalence of higher degrees is relatively high. It is more common at present to see a job advertisement requiring applicants to have a Ph.D. than to see a specification for someone registered as C.Sci., C.Chem. or C.Geol., for example. Things are changing however. A look through the pile of magazines on my desk, shows several job adverts with just those requirements and it seems likely that as the number of chartered scientists in senior positions increases, then so too will their demand for similarly qualified applicants.

Curiously, the UK academic community has not opted for chartered status as yet and many academics never seek chartership of any sort (although many do) especially in engineering. The Higher Education Academy offers four levels of membership (though not chartership) and in recent years, it has become common for advertisements to require HEA membership, or the willingness of an applicant to acquire it once appointed. The Association for Science Education uniquely offers the designation C.Sci. Teach. in partnership with the Science Council, which is aimed principally at science teachers in the schools and colleges, rather than at University level.
In conclusion, one might ask what is the ‘best’ route to chartership and of course the answer is different for different people. As you are reading this in an IOM3 newsletter, it is very likely that that is the route you will follow, but *Materials, Minerals and Mining* span an enormous field. People who consider themselves to be principally chemists or geologists, might seek their registration with the RSC or GSL, whilst a look at the Science or Engineering Council websites show the wide range of *Awarding Bodies* operating in the UK. Closer to home, the IOM3 offers a range of chartered registration options, reflecting applicants’ experience and field of practice (C.Sci.; C.Eng.; C.Env). Members who regularly work in Europe may additionally seek registration as a ‘Eur.Ing’. -the European Engineer status recognised across 32 European states and administered by FEANI, the European Federation of National Engineering Associations.

If you are considering applying or upgrading your membership, the first port of call should be the IOM3 web pages at:

http://www.iom3.org/content/professional-qualifications

In addition, our membership department (01782 221717) offer help with applications and can generally find someone who can answer questions about chartership applications. Although the process is somewhat involved, you should not be put off making those first important steps.

Mark Tyrer is a Fellow of three institutions and is regularly reminded by each of them, that he never returned his application forms to become chartered. He has recently determined to complete the forms. He also chairs the Cementitious Materials Group at IOM3.

---

**Editorial Board**

**Honorary Editorial Board**

- **Prof. Mark Tyrer**  
  Consulting Scientist & Researcher Manager,  
  Mineral Industry Research Organization (MIRO)  
  Email: m.tyrer@mtyrer.net

- **Dr. Leon Black**  
  Senior Lecturer,  
  School of Civil Engineering,  
  Leeds University  
  Email: L.Black@leeds.ac.uk

- **Dr. Yun Bai**  
  Senior Lecturer,  
  *Advanced & Innovative Materials (AIM)* Group,  
  Department of Civil, Environmental & Geomatic Engineering (CEGE),  
  University College London (UCL)  
  Email: yun.bai@ucl.ac.uk

**Student Editorial Board**

- **Shi Shi**  
  (PhD student, *Advanced & Innovative Materials (AIM)* Group, CEGE, UCL)  
  Email: shi.shi.11@ucl.ac.uk

- **Jonathon Backus**  
  (PhD student, Center for Built Environment Research (CBER), Queen’s University Belfast)  
  Email: jbackus01@qub.ac.uk

- **Jun Ren**  
  (PhD student, *Advanced & Innovative Materials (AIM)* Group, CEGE, UCL)  
  Email: jun.ren.11@ucl.ac.uk

- **Yanfei Yue**  
  (PhD student, *Advanced & Innovative Materials (AIM)* Group, CEGE, UCL)  
  Email: yanfei.yue.11@ucl.ac.uk
MPA clarifies CE ruling

The Mineral Products Association (MPA) wants to make it clear that, although it is commonly said that CE marking of all construction products became mandatory as of 1 July 2013, this is not the case for ready-mixed concrete and some other construction materials.

The MPA explains that only products with a harmonised standard or European Technical Approval/Assessment can be CE marked. Ready-mixed concrete does not have a harmonised standard and nor is it likely to in the future; therefore it cannot be CE marked. The harmonised European standard for reinforcement is pending, so again will not be CE marked from 1 July.

A listing of all harmonised standards is available here.

The MPA notes that, in most cases, CE marking has little to do with quality. The association recommends purchasing ready-mixed concrete from suppliers with third party accreditation, such as QSRMC or BSI. For assurance of quality reinforcement, the MPA recommends specifying CARES certification.

Click here for general information, a briefing note for engineers and for information on the harmonised standards for concrete.


Cement Sustainability Initiative releases results of GNR 2011

The Cement Sustainability Initiative (CSI) has released data for the 2011 Getting the Numbers Right (GNR) programme. The results reveal that specific net CO$_2$ emissions/t of cementitious material fell by 17% from 756 kg/t in 1990 to 629 kg/t in 2011. Compared to 2010, real improvements in efficiency and emissions can be seen across the board:

1. Gross specific emissions per tonne of cementitious material fell from 654 kg/t in 2010 to 646 kg/t in 2011.
2. Net specific emissions per tonne of cementitious material were reduced from 638 kg/t in 2010 to 629 kg/t in 2011.
4. Specific electricity use (cement) fell from 110 kWh/t in 2010 to 107 kWh/t in 2011.
5. The amount of clinker in cement dropped from 75.9% in 2010 to 75.6% in 2011.
6. Alternative fuel use increased from 12.3% in 2010 to 13.3% in 2011.

The information for 2011 covers 888 million t of cement production (25% of global cement production or 55% of production outside of China). The 2011 data on China covers 106 million t of cement, which accounts for around 5%. In order to ensure that the database is a reliable source of information, 95% of the data is verified independently at participating company level.

This year, GNR also includes country reports on Thailand, Morocco, Philippines and Egypt, which outline emission mitigation initiatives on a national level.

“GNR demonstrates how an effective measuring, reporting and verification system can be developed and managed for and by an entire industry sector. GNR has become established as a valuable source of independently verified emissions data, which is now used globally by the cement industry to improve energy efficiency and further reduce emissions. It is also accessed widely by policy-makers, analysts and other interested stakeholders,” said Philippe Fonta, WBCSD Managing Director.

Scientists discover how to turn liquid cement into liquid metal

Scientists at Argonne National Laboratory (US Department of Energy), together with a team of scientists from Japan, Finland, and Germany, have discovered a way of turning liquid cement into liquid metal.

The team of scientists studied mayenite, a component of alumina cement made of calcium and aluminum oxides. They melted it at temperatures of 2000 °C using an aerodynamic levitator with carbon dioxide laser beam heating. The material was processed in different atmospheres to control the way that oxygen bonds in the resulting glass. The levitator keeps the hot liquid from touching any container surfaces and forming crystals. This let the liquid cool into a glassy state that can trap electrons in the way needed for electronic conduction.

“This new material has lots of applications, including as thin-film resistors used in liquid-crystal displays, basically the flat panel computer monitor that you are probably reading this from at the moment,” said Chris Benmore, who led the research together with Shinji Kohara from Japan Synchrotron Radiation Research Institute/SPRING-8.

This metallic-glass material has positive attributes, including better resistance to corrosion than traditional metal, less brittleness than traditional glass, conductivity, low energy loss in magnetic fields, and fluidity for ease of processing and moulding. Previously, only metals have been able to transition to a metallic glass form. Cement does this by a process called electron trapping, a phenomena only previously seen in ammonia solutions. Understanding how cement joined this exclusive club opens the possibility of turning other solid normally insulating materials into room-temperature semiconductors.

The results were reported this week in the Proceeding of the National Academy of Sciences in the article “Network topology for the formation of solvated electrons in binary CaO–Al₂O₃ composition glasses”. Further details about the project can be found on the Argonne National Laboratory website.

Technical Manager (Concrete Technology)

East Midlands
Attractive Salary + Car & Package
Start Date: ASAP
Duration: Permanent

My Client is a wholly owned subsidiary of one of the UK’s leading landscaping and building materials supplier, they specialise in manufacturing and supplying quality decorative garden and patio landscape products through Builders Merchants, Landscape and Garden Centres.

As a result of a recent internal promotion and the continued development of their business over recent years they wish to further strengthen their management team through the introduction of a concrete specialist to take on the role of Technical Manager. This position will form part of the senior management team reporting directly to the Group Production Director.

As Technical Manager you have a strong knowledge of modern concrete manufacturing as you will be responsible for the technical aspects of delivering business and process improvements and for the implementation of strategic projects in order to reduce manufacturing costs, improve product quality. In addition candidates will have a very thorough understanding of SHE.

Candidates will have a sound understanding of Concrete Technology as they will be involved in the management of the optimisation of all concrete mix designs. Being a six sigma would be an advantage.

Of graduate calibre or equivalent, you must have proven management experience in a similarly fast-paced engineering environment. With strategic vision and personal presence, you must have sound leadership, communication and management skills. Success in this role will result, in time, with additional responsibilities and status.

The role will cover a number of manufacturing plants and therefore requires the successful candidate to travel widely with some nights away on a regular basis.

In return, you can expect every opportunity to make your mark with a company that is determined to lead the way in UK and international markets. Salary and benefits offered will fully reflect our client's expectations and will include where appropriate a relocation package.

Interested?

Then please apply by email with full CV and current salary details. To: John Soulsby, SCA Search & Selection, PO Box 2849, Sutton In Ashfield, Nottinghamshire, NG17 1AA.
Telephone: 01938 811931
E-mail: JohnSoulsby@SCA-Search.com.

Jobs with Hanson

Hanson Cement is a major producer of cement and ground granulated blast furnace slag (GGBS), a cement replacement in ready-mixed and precast concrete. We are part of Hanson UK, a leading supplier of heavy construction materials and a division of Heidelberg Cement Group.

Operative
Location: Stafford (ST19), Stafford , ST19 5RR
Salary: Unspecified
Date posted: 03/08/2013 18:03
Job type: Permanent
Company: Hanson Group
Contact: James Langley
Ref: Totaljobs/1644
Job ID: 57060851

We are looking to recruit Operatives for our new packed products operation at our Pottal Pool Quarry nr Cannock in Staffordshire.

The position will involve multiple duties that support our production and distribution process. These activities will include operating packing lines to the movement of stock and materials by forklift truck or loading shovel.

Planning Technician
Location: Tinwell, Stamford (PE9) , PE9 3SX
Salary: Unspecified
Date posted: 03/08/2013 18:03
Job type: Permanent
Company: Hanson Group
Contact: Kerry Mason
Ref: Totaljobs/1690
Job ID: 57119766

We have a vacancy for a Planning Technicians based at Ketton. The successful candidate will work within a team responsible for the effective planning of distribution resources at national level. Key business performance will need to be achieved in areas such as on time delivery, own resource utilisation and the control of hired haulage costs. Other requirements include the control of drivers hours and prompt provision of vehicles for service/repairs.

The role demands strong communication and system skills. The successful Technician will need to demonstrate problem solving ability in a pressurised environment. Candidates should have a sound knowledge of and commitment to transport planning systems, as the correct utilisation of the systems in use is key to the success of the operation. You will be required to demonstrate an understanding of appropriate legislation e.g. the EC Road Transport Directive (Drivers hours).

http://www.totaljobs.com/CompanyBrowse/Hanson-Group_Vacancies_c331642.html
**Academic Vacancy**

**Research Associate in Geothermal cements for Deep Borehole Disposal of spent nuclear fuel**

Department of Materials Science and Engineering
University of Sheffield - Faculty of Engineering

**Job Reference Number:** UOS006765  
**Contract Type:** Fixed-term for 36 months  
**Working Pattern:** Full time  
**Salary:** Grade 7 - £28,685 to £33,230 per annum  
**Closing Date:** 18 July 2013

The successful candidate will lead development of a geothermal cement for potential application to the disposal concept for high level nuclear waste. The research programme is funded by EPSRC.

As Research Associate, you will be part of the Deep Borehole research Group, situated in the Department of Materials Science and Engineering. You will report directly to the grant holder, Dr Travis but will also interact with other key members of the deep borehole research group including: Professor Fergus Gibb – a leading pioneer of this disposal concept and Dr Neil Milestone, an international expert on geothermal cements, based in New Zealand.

The research programme will focus on the following:

- Identification and testing of potentially suitable candidate cements from those commercially available.
- Formulation of a new geothermal cement or improvement of an existing cement including extensive property testing (durability, reactivity, setting time, rheology and microstructural analysis).
- Thermodynamic modelling (phase diagrams) and numerical heat flow modelling to determine temperature distributions of down-hole conditions.
- The successful candidate will undertake research predominantly based at Sheffield but will be required to travel to New Zealand in the spring of 2014 and spend 6 months working with Dr Milestone at the IRL where they will be trained in experimental research on geothermal cements and conduct a programme of research.

Applicants should hold or be close to completion of a PhD in an engineering or physical science discipline with experience relevant to the geological disposal of nuclear waste. They should also have a recent background in laboratory skills and must be computer literate.

Interviews and other selection action to take place on 5 August 2013. Full details will be provided to the invited candidates.

You can view the supporting documentation by clicking on **About the Job** and **Apply** to submit your application.

---

**Research Fellow - Civil Engineering**

Queen's University Belfast - School of Planning, Architecture & Civil Engineering

**Ref:** 13/102771

The position is part of an EC/FP7 Marie Curie Industry-Academia Partnership Pathways (IAPP) project entitled 'Development of sustainable, lower carbon, pre-cast concrete infrastructure' to develop significantly lower energy, durable concrete products for future sustainable infrastructure by maximising the inclusion of waste products and to combine with corrosion resistant Fibre Reinforced Polymer (FRP) fibres and rebars which are stronger, lighter and have a lower carbon footprint than equivalent steel rebars. The post is available from 1 October 2013 for 24 months.

**Anticipated interview date:** Tuesday 13th August 2013  
**Salary scale:** £30,424 - £39,649 per annum (including contribution points).

**Closing date:** Monday 5th August 2013

Please click on the 'Apply' and to apply online or alternatively contact the Personnel Department, Queen's University Belfast, BT7 1NN. Telephone (028) 90973044 FAX: (028) 90971040 or e-mail on personnel@qub.ac.uk

The University is committed to equality of opportunity and to selection on merit. It therefore welcomes applications from all sections of society and particularly welcomes applications from people with a disability.

Fixed term contract posts are available for the stated period in the first instance but in particular circumstances may be renewed or made permanent subject to availability of funding.

---

Got something that you’d like to share? Know of any vacancies that you’d like advertised?

We’d welcome any contributions to the newsletter and encourage readers to send in letters for consideration for the newsletter. Send them into cmg.iom3newsletter@gmail.com
KTP Associate Positions (x2) with Pelamis Wave Power, Edinburgh and the Concrete Technology Unit, University of Dundee

**SALARY:** Associate 1 (3 year post, £27k pa) Associate 2 (2 year post, £24k pa)

**JOB DESCRIPTIONS:**

Pelamis Wave Power (PWP) is recognised as the world’s most advanced wave power developer and is the inventor, designer, manufacturer and operator of the Pelamis Wave Energy Converter (WEC). The company wish to develop concrete as the primary construction material for their WEC and, in collaboration with the Concrete Technology Unit (CTU), University of Dundee, are undertaking a Knowledge Transfer Partnership (KTP) project to investigate design, construction and manufacturing processes associated with this.

Two associate positions have arisen and will be based jointly within PWP and the CTU.

**KTP Associate 1** will, in conjunction with the academic partner and company design and develop appropriate concrete mixes for the marine offshore wave power applications and develop and implement scale testing regimes for the development of the components of the machine. The candidate will develop models of performance of the different components and identify and support implementation of solutions for joints and end-caps. S/he will embed knowledge in the company on concrete mix design through the transfer of knowledge on concrete performance factor design and testing. This associate will liaise closely with KTP Associate 2 regarding the manufacturing proposals developed.

**KTP Associate 2** will be involved in the practical implementation of concrete as a primary structural material for use in the Pelamis Wave Energy Converter (WEC). The candidate will be expected to assist in providing designs of effective concrete-concrete and concrete-steel connections, transferring knowledge on concrete reinforcement, tensioning and pre-stressing. Through working with KTP Associate 1, the academic team at CTU and the design team at PWP, the candidate will advance designs of these critical interfaces for durability and manufacturability and evaluate section design and manufacturing methods for volume production of optimised large-scale concrete components.

Skills required of the successful candidates:

KTP Associate 1 should ideally be qualified at a post-doctoral level with a PhD in concrete materials/structures and a preferred track record in marine concrete, structural engineering materials/grouts, laboratory physical modelling and experimental design.

KTP Associate 2 should be qualified with a good (1st Class / 2.1) MEng level degree in civil/structural engineering with preferred experience in design and analysis of concrete reinforced/post tensioned structures. Experience of finite element analysis software is also preferred.

Both candidates must:

- be self-motivated and manage work effectively with a degree of autonomy.
- have the flexibility to apply knowledge and experience to develop and innovate.
- have a flexible approach to working within a small highly motivated team.
- demonstrate a capability to undertake the tasks detailed in the job description.

The roles are initially a 36 month (Associate 1) / 24 month (Associate 2) contract. A substantial training budget is provided and employment prospects within the industry beyond the initial contract period are very strong and exciting for the right candidate.

**Closing Date:** 21 August 2013

For further information, and to apply for either of the posts (Ref: ASE0208 or Ref: ASE0209), please visit: [http://www.jobs.dundee.ac.uk/fe/tpl_uod01.asp](http://www.jobs.dundee.ac.uk/fe/tpl_uod01.asp)
Cement and Concrete Science Conference 2013
Monday 2nd and Tuesday 3rd September
Welcome to the 33rd annual Cement and Concrete Science conference, hosted by the School of Civil Engineering and Surveying (SCES), University of Portsmouth.

The conference will provide an opportunity for academic researchers, students and industrialists to meet and discuss their research on topics in: Cement hydration and microstructure, Alternative binders, Concrete durability, Waste re-use and encapsulation using cements and Sustainability issues.

Conference Programme

- Conference Venue
- Conference Dinner
- Accommodation
- Registration

Sponsorship
Sponsorship opportunities are available, including conference sessions, conference dinner and drinks reception, student presentations and poster prizes.

The event has been jointly organised by the University of Portsmouth and Cementitious Materials Group of the Institute of Materials, Minerals and Mining.

If you have queries regarding the conference, then please do not hesitate to Contact Us.

See you then……
Prof. Chris Cheeseman

Self-introduction

Chris Cheeseman joined the Department of Civil and Environmental Engineering at Imperial College London in 1990, initially working with Professor Roger Perry. This followed periods in industry with Redland Technology, Morgan Materials Technology and Morgan Matroc. He has a DPhil from Oxford University (high temperature properties of ceramics) and BSc in Physics and Materials Science from the University of Warwick.

Current position and place of work

Chris is now Professor of Materials Resources Engineering and the leader of a major research group working on the beneficial reuse of waste materials and resource efficiency within the Environmental and Water Resource Engineering (EWRE) Section. Chris is also the Director of the PhD Research Programme in the Department.

Main field of interest

The major environmental and social impacts of materials, products and processes are now widely recognised. The focus of my research is on sustainable materials, waste management, resource efficiency and the circular economy. These are key areas of research if we are to achieve more sustainable development and they provide significant opportunities for innovation. Waste management research has developed significantly over recent years. The main emphasis has changed from disposal technologies to beneficial reuse of materials and wastes as resources. This type of interdisciplinary research falls between the more traditional fields of environmental engineering, materials processing, waste recycling and civil engineering and therefore involves collaboration with both industry and other researchers at Imperial and beyond.

Contact: c.cheeseman@imperial.ac.uk

Charikleia Spathi

After graduating from the National Technical University of Athens in Greece with a MEng in Chemical Engineering, I completed a Master’s in Environmental Engineering and Business Management at Imperial College London (ICL). I am currently in the second year of my PhD, which is funded by EPSRC and PIRA International under the supervision of Professor Chris Cheeseman and Dr Luc Vanderperre at ICL. My research activities focus on the development of sustainable, value-added reuse applications for wastepaper sludge ash (WPSA). The principal aim is to develop and optimise an economically viable process for manufacturing lightweight fillers (LWFs).

We are looking forward to meeting you here......
Monthly websites

More information on the Cement and Concrete Group, with a comprehensive links page, can be found at:
http://www.iom3.org/CMC

Materials Science and Engineering Information Gateways
http://www.iom3.org/content/linkmsei

Venue Hire

The Institute offers a range of venue hire options at both its headquarters in London's West End and its new state-of-the-art centre in Grantham.

The Boilerhouse has been transformed by IOM3 with the use of cutting-edge materials into one of the most striking buildings outside London. Located 5 minutes from the A1, the venue features unique spaces, offering different facilities for a wide range of uses including meetings, workshops, conferences and exhibitions.

See the Boiler house website for full details of rooms, rates and capacities.

1 Carlton House Terrace offers a range of rooms suitable for board meetings for a dozen people, right up to dinners, conferences and receptions accommodating up to 120.

Full room layouts, capacities and rates.

Disclaimer

This newsletter is a compilation of items sent by subscribers or obtained from reliable sources. It is assumed that the information sources are accurate, and neither Editorial Board nor the IOM3 bear responsibility for the accuracy of this newsletter.

“The only thing that stands between you and your dream is the will to try and the belief that it is actually possible.”

- Joel Brown
The following is a selection of recent literature as selected by the editors, incorporated into the titles are hyperlinks to the papers. The editors take no responsibility for the content nor availability of the papers.

- **Structures and Buildings (ICE proceedings)**
  - Mechanical performance of corroded steel bars in concrete
    Jin Xia; Wei-liang Jin; Yu-xi Zhao; Long-yuan Li
    DOI: 10.1680/stbu.11.00048

- **Magazine of Concrete Research**
  - Drying shrinkage cracking characteristics of ultra-high-performance fibre reinforced concrete with expansive and shrinkage reducing agents
    Jung-Jun Park; Doo-Yeol Yoo; Sung-Wook Kim; Young-Soo Yoon
    DOI: 10.1680/macr.12.00069
  - Discussion: Analysis of reinforced concrete frames subjected to column loss
    Jinkoo Kim; Jisung Yu; Jun Yu
    DOI: 10.1680/macr.12.00171
  - The effect of sand ration on the properties of self-compacting concrete
    Hui Zhao; Wei Sun; Xiaoming Wu; Bo Gao
    DOI: 10.1680/macr.11.00089
  - Effect of nano-calcium carbonate on early-age properties of ultra-high-performance concrete
    Jessica Camiletti; Ahmed M. Soliman; Moncef L. Nehdi
    DOI: 10.1680/macr.12.00015
  - Influence of chloride salt type on critical chloride content of reinforcement corrosion in concrete
    Linhua Jiang; Rong Liu; Lili Mo; Jinxia Xu; Hu Yang
    DOI: 10.1680/macr.12.00082
  - Quantitative damage evaluation of AAR-affected concrete by DIP technique
    Li Shuguang; Chen Gaixin; Lu Yihui
    DOI: 10.1680/macr.12.00092
  - Controlling strength gain and permeability using slag cement
    Neil T. Reed; W. Micah Hale
    DOI: 10.1680/macr.12.00100
  - Influence of initial curing temperature on the long-term strength of concrete
    Runxiao Zhang; Nannan Shi; Dahai Huang
    DOI: 10.1680/macr.12.00107
Viscosity evaluation of SCC based on flow simulation in the L-box test
Hadi Lashkarbolouk; Mohammad R. Chamani; Amir M. Halabian; Ahmad R. Pishehvar
DOI: 10.1680/macr.12.00115

The risk of alkali–silica reaction in concrete made with non-conforming cement
Anthony Jones; Robert Cather
DOI: 10.1680/macr.12.00120

Study on compressive strength behaviour of normal concrete and self-compacting concrete subjected to elevated temperatures
D. Rama Seshu; A. Pratusha
DOI: 10.1680/macr.12.00108

Effect of side chains on the dispersing properties of polycarboxylate-type superplasticisers in cement systems
Xiongyi Peng; Xia Li; Dongzhi Chen; Deyun Ma
DOI: 10.1680/macr.12.00111

Reduction of alkali–silica reaction expansion of mortars by utilisation of pozzolans
H. Süleyman Gökçe; Osman Şimşek; Serdar Korkmaz
DOI: 10.1680/macr.12.00118

Correlation between low-order probability distribution functions and percolation of porous concrete
Sang-Yeop Chung; Tong-Seok Han
DOI: 10.1680/macr.12.00125

Study on microstructure, rheology and thermal stability of cement epoxy asphalt mortar multiphase materials
Xinglong Fang; Zhiming Chen; Zhen Jiao; Guomin Xiao; Li Shao
DOI: 10.1680/macr.12.00128

Typical plastic shrinkage cracking behaviour of concrete
Riaan Combrinck; William Peter Boshoff
DOI: 10.1680/macr.12.00139

Mix proportioning of self-compacting normal and high-strength concretes
Rola Deeb; Bhushan Lal Karihaloo
DOI: 10.1680/macr.12.00164

Five-phase composite sphere model for chloride diffusivity prediction of recycled aggregate concrete
Jingwei Ying; Jianzhuang Xiao; Luming Shen; Mark A. Bradford
DOI: 10.1680/macr.12.00180

Electrical resistivity monitoring and characterisation of early age concrete
Xiaosheng Wei; Lianzhen Xiao
DOI: 10.1680/macr.12.00127
Mechanical characteristics of self-compacting concrete with and without fibres
Farhad Aslani; Shami Nejadi
DOI: 10.1680/macr.12.00153

Effect of superplasticisers on the surface characteristics of fly ash
Dafeng Zheng; Yanlin Qin; Xiaohong Sun; Xueqing Qiu; Hongming Lou; Dongjie Yang
DOI: 10.1680/macr.12.00170

Kinetic model to predict cement susceptibility to delayed ettringite formation. Part 1: Theoretical concept
Pelmane L. Mulongo; Stephen O. Ekolu
DOI: 10.1680/macr.12.00184

Kinetic model to predict cement susceptibility to delayed ettringite formation. Part 2: Model validation and application
Pelmane L. Mulongo; Stephen O. Ekolu
DOI: 10.1680/macr.12.00183

Pore size distribution modification of OPC paste through inclusion of fly ash and sand
B. Kondraiivendhan; B. Bhattacharjee
DOI: 10.1680/macr.12.00182

Relationship of moisture content with temperature and relative humidity in concrete
Jianhua Jiang; Yingshu Yuan
DOI: 10.1680/macr.12.00190

Estimating the original cement content and water–cement ratio of Portland cement concrete and mortar using backscattered electron microscopy
Hong Seong Wong; Kyle Matter; Nicholas R. Buenfeld
DOI: 10.1680/macr.12.00201

Degradation characteristics of foamed concrete with lightweight aggregate and polypropylene fibre under freeze–thaw cycles
Xianjun Tan; Weizhong Chen; Hongming Tian; Jingqiang Yuan
DOI: 10.1680/macr.12.00145

Predicting life expectancy of concrete septic tanks exposed to sulfuric acid attack
Md Saeed Hasan; Sujeeva Setunge; David W. Law; Tom C. K. Molyneaux
DOI: 10.1680/macr.12.00231

An experimental study on the performance of self-compacting lightweight concrete exposed to elevated temperature
Xi Wu; Zhi-min Wu; Jian-jun Zheng; Tamon Ueda; Sheng-hui Yi
DOI: 10.1680/macr.12.00218

The effects of waste concrete properties on recycled aggregate concrete properties
H. Süleyman Gökçe; Osman Şimşek
DOI: 10.1680/macr.12.00181
Adding limestone fines, fly ash and silica fume to reduce heat generation of concrete
Albert K. H. Kwan; Jia-jian Chen; Pui-lam Ng; Wilson W. S. Fung
DOI: 10.1680/macr.12.00209

Effect of leaching from freshly cast concrete on pH
David W. Law; Sujeeva Setunge; Robert Adamson; Louise Dutton
DOI: 10.1680/macr.12.00169

Study on early autogenous shrinkage and crack resistance of fly ash high-strength lightweight aggregate concrete
Yingli Gao; Hailun Zhang; Shuai Tang; He Liu
DOI: 10.1680/macr.13.00004

Effects of specimen size and shape on compressive and tensile strengths of self-compacting concrete with or without fibres
Farhad Aslani
DOI: 10.1680/macr.13.00016

Simulation of temperature rises in hardening Portland cement concrete and fly ash blended concrete
Xiao-Yong Wang
DOI: 10.1680/macr.13.00019

Adding limestone fines as cement paste replacement to reduce shrinkage of concrete
Albert K. H. Kwan; Max McKinley; Jia-Jian Chen
DOI: 10.1680/macr.13.00028

➤ Journal of Materials in Civil Engineering (ASCE)

Robust SCC Mixes through Mix Design
Sandra Nunes, Paula Milheiro-Oliveira, Joana Sousa Coutinho, and Joaquim Figueiras

Use of Recycled Sand Produced at Construction Sites in Bedding Mortars
Leonardo F. R. Miranda, Camila S. Constantino, Carla R. Monich, and Antônio A. de M. Neto
J. Mater. Civ. Eng. 25(2), 236-242 (2013); pp. 236-242 (7 pages)

Influence of Fly Ash on Slump Loss and Strength of Concrete Fully Incorporating Recycled Concrete Aggregates
Weerachart Tangchirapat, Chaiyarat Rattanashotinunt, Rak Buranasing, and Chai Jaturapitakkul
J. Mater. Civ. Eng. 25(2), 243-251 (2013); pp. 243-251 (9 pages)

Mechanical Properties and Freeze-Thaw Durability of Strengthening Mortars
Pietro Bocca and Alessandro Grazzini

Efficient Utilization of Recycled Concrete Aggregate in Structural Concrete
Nyok Yong Ho, Yang Pin Kelvin Lee, Wee Fong Lim, Tarek Zayed, Keat Chuan Chew, Giau Leong Low, and Seng Kiong Ting
Monitoring the Evolution of Accelerated Carbonation of Hardened Cement Pastes by X-Ray Computed Tomography
Jiande Han, Wei Sun, Ganghua Pan, and Wang Caihui

High-Volume Fly Ash Concrete with and without Hydrated Lime: Chloride Diffusion Coefficient from Accelerated Test
J. Hoppe Filho, M. H. F. Medeiros, E. Pereira, P. Helene, and G. C. Isaia

Influence of Fungus on Properties of Concrete Made with Waste Foundry Sand
Gurdeep Kaur, Rafat Siddique, and Anita Rajor

Study of Robustness of Self-Compacting Concretes Made with Low Fines Content
L. García, M. Valcuende, S. Balasch, and J. Fernández-Llubrez

Mortars Made with Fine Granulate from Shredded Tires
D. Pedro, J. de Brito, and R. Veiga
J. Mater. Civ. Eng. 25(4), 519-529 (2013); pp. 519-529 (11 pages)

Flexural Strength of Cement Paste Beam under Chemical Degradation: Experiments and Simplified Modeling
Hu Yang, Linhua Jiang, Yan Zhang, and Qi Pu

Use of the Falling-Head Method to Assess Permeability of Freshly Mixed Cementitious-Based Materials
Joseph J. Assaad and Jacques Harb

Use of Natural Zeolite to Produce Self-Consolidating Concrete with Low Portland Cement Content and High Durability
Ali Akbar Ramezanianpour, Ali Kazemian, Morteza Sarvari, and Babak Ahmadi

Triple Blending with Fly Ash Microsphere and Condensed Silica Fume to Improve Performance of Cement Paste
J. J. Chen and A. K. H. Kwan

Effective Medium Approach for Evaluating the Oxygen Diffusivity of Concrete
Jianjun Zheng
J. Mater. Civ. Eng. 25(6), 711-717 (2013); pp. 711-717 (7 pages)

Durability of Fly Ash–Based Geopolymer Structural Concrete in the Marine Environment
D. V. Reddy, Jean-Baptiste Edouard, and Khaled Sobhan
J. Mater. Civ. Eng. 25(6), 781-787 (2013); pp. 781-787 (7 pages)

Reaction Products in Carbonation-Cured Lightweight Concrete
Hilal El-Hassan, Yixin Shao, and Zaid Ghouleh
J. Mater. Civ. Eng. 25(6), 799-809 (2013); pp. 799-809 (11 pages)
Assessment of the Durability Performance of Fiber-Cement Sheets  
M. Jamshidi, H. R. Pakravan, and F. Pacheco-Torgal  
J. Mater. Civ. Eng. 25(6), 819-823 (2013); pp. 819-823 (5 pages)

Investigation into Laboratory Abrasion Test Methods for Pervious Concrete  
Qiao Dong, Hao Wu, Baoshan Huang, Xiang Shu, and Kejin Wang  

Experimental Investigations of Performance Characteristics of Rice Husk Ash–Blended Concrete  
A. Muthadhi and S. Kothandaraman  
J. Mater. Civ. Eng. 25(8), 1115-1118 (2013); pp. 1115-1118 (4 pages)

Strength Characteristics of High-Volume Fly Ash–Based Recycled Aggregate Concrete  
P. Saravanakumar and G. Dhinakaran  
J. Mater. Civ. Eng. 25(8), 1127-1133 (2013); pp. 1127-1133 (7 pages)

Materials and Structures

Rheology, fiber dispersion, and robust properties of Engineered Cementitious Composites  
Mo Li, Victor C. Li  
DOI 10.1617/s11527-012-9909-z

Structural behavior of alkali activated fly ash concrete. Part 1: mixture design, material properties and sample fabrication  
Joseph Robert Yost, Aleksandra Radlińska, Stephen Ernst, Michael Salera  
DOI 10.1617/s11527-012-9919-x

Structural behavior of alkali activated fly ash concrete. Part 2: structural testing and experimental findings  
Joseph Robert Yost, Aleksandra Radlińska, Stephen Ernst, Michael Salera, Nicholas J. Martignetti  
DOI 10.1617/s11527-012-9985-0

Compaction-interaction packing model: regarding the effect of fillers in concrete mixture design  
S. A. A. M. Fennis, J. C. Walraven, J. A. den Uijl  
DOI 10.1617/s11527-012-9910-6

Influence of short dispersed and short integral glass fibres on the mechanical behaviour of textile-reinforced concrete  
Rabea Barhum, Viktor Mechtcherine  
DOI 10.1617/s11527-012-9913-3

Modeling of chloride-induced corrosion in reinforced concrete structures  
Juhui Zhang, Moe M. S. Cheung  
DOI 10.1617/s11527-012-9914-2

Rheology of concrete: a study case based upon the use of the concrete equivalent mortar  
DOI 10.1617/s11527-012-9915-1
An experimental study on the residual mechanical properties of fiber reinforced concrete with high temperature and load
Young-sun Kim, Tae-gyu Lee, Gyu-yong Kim
DOI 10.1617/s11527-012-9918-y

Defined-performance design of ecological concrete
S. A. A. M. Fennis, J. C. Walraven, J. A. den Uijl
DOI 10.1617/s11527-012-9922-2

Characterization of the interfacial bond between old concrete substrate and ultra high performance fiber concrete repair composite
Bassam A. Tayeh, B. H. Abu Bakar, M. A. Megat Johari
DOI 10.1617/s11527-012-9931-1

An examination of the reactivity of fly ash in cementitious pore solutions
Katherine L. Aughenbaugh, Ryan T. Chancey, Paul Stutzman, Maria C. Juenger, David W. Fowler
DOI 10.1617/s11527-012-9939-6

Effects of nano- and micro-limestone addition on early-age properties of ultra-high-performance concrete
J. Camiletti, A. M. Soliman, M. L. Nehdi
DOI 10.1617/s11527-012-9940-0

Early age and hardened performance of cement pastes combining mineral additions
Gonzalo Barluenga, Irene Palomar, Javier Puentes
DOI 10.1617/s11527-012-9944-9

A new approach to assessing the performance of ASR inhibitors in concrete
Mario Berra, Umberto Costa, Teresa Mangialardi, Antonio E. Paolini, Renato Turriziani
DOI 10.1617/s11527-012-9947-6

Sulfate resistance of Portland-limestone cements in combination with supplementary cementitious materials
Amir Mohammad Ramezanianpour, R. Douglas Hooton
DOI 10.1617/s11527-012-9953-8

X-ray radiation shielding properties of cement mortars prepared with different types of aggregates
Tung-Chai Ling, Chi-Sun Poon, Wai-Shung Lam, Tai-Po Chan, Karl Ka-Lok Fung
DOI 10.1617/s11527-012-9959-2

Tensile and compressive creep deformations of hardening concrete containing mineral additives
G. M. Ji, T. Kanstad, Ø. Bjøntegaard, E. J. Sellevold
DOI 10.1617/s11527-012-9962-7

Effect of silica fume addition and repeated loading on chloride diffusion coefficient of concrete
Wu-man Zhang, Heng-jing Ba
DOI 10.1617/s11527-012-9963-6
Advances in Cement Research

Volume 25, Issue 3, June 2013
Compressive strength of calcium aluminate mortar determined by ultrasonic non-destructive test method
143-154
Sipusic Juraj; Ukrainczyk Neven; Vrbos Nevenka
DOI: 10.1680/adcr.11.00068

Volume 25, Issue 3, June 2013
Five year monitoring of curing solutions of heat-cured mortars affected by delayed ettringite formation
155-163
Aubert Jean-Emmanuel; Escadeillas Gilles; Leklou Nordine
DOI: 10.1680/adcr.11.00069

Volume 25, Issue 2, April 2013
Strength development of optimised cementitious materials containing fly ashes and silica fume
90-97
Al-Nageim Hassan; Sadique Monower; Atherton William; et al
DOI: 10.1680/adcr.11.00045

Volume 25, Issue 2, 2013
Effect of alkalis on the mineral formation and properties of alite-sulfoaluminate cement
98-103
Liu, Xiaocun; Liu, Tong; Wu, Yuanchao; et al.
DOI: 10.1680/adcr.11.00050

Cement-Lime-Concrete

September - October 2012 (5)
Computer-aided prediction of physical and mechanical properties of high strength concrete containing Fe₂O₃ nanoparticles
265-285
A. NAZARI
The theoretical fundamentals of heat and moisture transport in hardening concrete
286-294
J. ŚLUŠAREK

November - December 2012 (6)
Measurement of linear thermal expansion coefficient of concrete at high temperatures: A comparison of isothermal and non-isothermal methods
363-372
A. TRNÍK, I. MEDVED', R. ČERNÝ
Three principles of concrete corrosion prevention
434
W. KURDOWSKI, A. BOCHENEK, ST. TRACZYK

January - February 2013 (1)
Autoclaved materials from natural zeolite
1-9
M. KRÓL, W. MOZGAWA, W. PICHÔR, K. BARCZYK
The influence of nanosilica with different morphology on the mechanical properties of cement mortar
24-32
E. HORSZCZARUK, E. MIJOWSKA, K. CENDROWSKI, S. MIJOWSKA, P. SIKORA

Effect of chloride salt and freeze-thaw cycling on the microstructure of concrete
74-80
M. LI, Y. ZHANG, Z. WU, CH. QIAN, W. SUN

Selected properties of concretes with an addition of fractioned siliceous and fluidised bed fly ash
81-90
Autor: J. ŚLIWIŃSKI, T. TRACZ, J. DEJA, A. ŁAGOSZ

Cement and Concrete Research

Volume: 45, March 2013
H-1 NMR relaxometry as an indicator of setting and water depletion during cement hydration
1-14
Wang, Biyun; Faure, Pamela; Thiery, Mickael; et al.

Evaluation of fiber orientation in plant fiber-cement composites using AC-impedance spectroscopy
37-44
Wansom, S.; Janjaturaphan, S.

Volume: 46, April 2013
C(4)A(3)S hydration in different alkaline media
41-49
Sanchez-Herrero, M. J.; Fernandez-Jimenez, A.; Palomo, A.

Volume: 47, May 2013
Electrically induced chloride ion transport in alkali activated slag concretes and the influence of microstructure
31-42
Ravikumar, Deepak; Neithalath, Narayan

Hydration of calcium aluminates and calcium sulfoaluminate studied by Raman spectroscopy
43-50
Torrens-Martin, David; Fernandez-Carrasco, Lucia; Martinez-Ramirez, Sagrario

Volume: 48, June 2013
Mechanical properties and compositional heterogeneities of fresh geopolymer pastes
9-16
Favier, A.; Habert, G.; de Lacailiere, J. B. d'Espinose; et al.

Parametrical study of transient thermal strain of ordinary and high performance concrete
40-52
Mindeguia, Jean-Christophe; Hager, Izabela; Pimienta, Pierre; et al.
The roles of hydration and evaporation during the drying of a cement paste by localized NMR
86-96
Van Landeghem, Maxime; de Lacaille, Jean-Baptiste d'Espinose; Bluemich, Bernhard; et al.

Volume: 49, July 2013
Rheological models for predicting plastic viscosity and yield stress of fresh concrete
1-9
Mahmoodzadeh, F.; Chidiac, S. E.

An attempt to validate the ultra-accelerated microbar and the concrete performance test with the degree of AAR-induced damage observed in concrete structures
29-37
Leernann, Andreas; Merz, Christine

🚀 ACI Materials Journal

VOL. 110, NO. 3, MAY-JUN 2013
Novel Cementitious Binder Incorporating Cement Kiln Dust: Strength and Durability
297-304
Chaunsali, Piyush; Peethamparan, Sulapha

Detection and Characterization of Early-Age Thermal Cracks in High-Performance Concrete
323-330
Hubbell, David; Glisic, Branko

Alkali-Activated Natural Pozzolan Concrete as New Construction Material
331-337
Bondar, Dali; Lynsdale, Cyril J.; Milestone, Neil B.

VOL. 110, NO. 2, MAR-APR 2013
Unrestrained Short-Term Shrinkage of Calcium-Hydroxide-Based Alkali-Activated Slag Concrete
127-135
Yang, Keun-Hyeok; Cho, Ah-Ram; Song, Jin-Kyu

Modeling the Effect of Curing Temperature and Pressure on Cement Hydration Kinetics
137-147
Pang, Xueyu; Meyer, Christian; Darbe, Robert; et al.

Contribution of Specimen Surface Friction to Size Effect and Rupture Behavior of Concrete
169-176
Kampmann, Raphael; Roddenberry, Michelle; Ping, W. Virgil
A preliminary study of synthesized-in situ fiber in cement materials, Pages 10-13
Ying Li, Hongfa Yu, Lina Zheng, Jing Wen, Chengyou Wu, Yongshan Tan

Microscopic reinforcement for cement based composite materials, Pages 14-25
Mingli Cao, Cong Zhang, Jianqiang Wei

The effect of fibre chemical treatment on the steel fibre/cementitious matrix interface, Pages 77-83
D.V. Soulioti, N-M. Barkoula, F. Koutsianopoulos, N. Charalambakis, T.E. Matikas

The use of ladle furnace slag in soil stabilization, Pages 126-134
Juan M. Manso, Vanesa Ortega-López, Juan A. Polanco, Jesús Setién

An investigation on the use of zeolite aggregates for internal curing of concrete, Pages 135-144
Sadegh Ghouchian, Mateusz Wyrzykowski, Pietro Lura, Mohammad Shekarchi, Babak Ahmadi

Thaumasite sulfate attack in Portland and Portland-limestone cement mortars exposed to sulfate solution, Pages 162-173
Amir Mohammad Ramezanianpour, R. Douglas Hooton

Oil palm shell lightweight concrete containing high volume ground granulated blast furnace slag, Pages 231-238
Payam Shafigh, Mohd Zamin Jumaat, Hilmi Bin Mahmud, U. Johnson Alengaram

Binding mechanism and properties of alkali-activated fly ash/slag mortars, Pages 291-298
Maochieh Chi, Ran Huang

Alkali activation of blended cements containing oil shale ash, Pages 367-377

Polymer concrete with recycled PET: The influence of the addition of industrial waste on flammability, Pages 378-389
Karina Guerra Tonet, Jane Proszek Gorninski

Study on interfacial transition zone properties of recycled aggregate by micro-hardness test, Pages 455-460
G.C. Lee, H.B. Choi

A preliminary study of alkali-activated slag blended with silica fume under the effect of thermal loads and thermal shock cycles, Pages 522-532
Alaa M. Rashad, Mervat H. Khalil

Hygrothermal properties of lightweight concrete: Experiments and numerical fitting study, Pages 543-555
Juan José del Coz Díaz, Felipe Pedro Álvarez Rabanal, Paulino José García Nieto, Javier Domínguez Hernández, Beatriz Rodríguez Soria, Jose María Pérez-Bella

Application of anionic asphalt emulsion as an admixture for concrete, Pages 556-565
Michał Boltryk, Dorota Malaszkiewicz
Strength development in clay–fly ash geopolymer, Pages 566-574
Patimapon Sukmak, Suksun Horpibulsuk, Shui-Long Shen

A serial two-stage viscoelastic–viscoplastic constitutive model with thermodynamical consistency for characterizing time-dependent deformation behavior of asphalt concrete mixtures, Pages 584-595
Lu Sun, Yaoting Zhu

Influence of sugar-cane bagasse ash and fly ash on the rheological behavior of cement pastes and mortars, Pages 691-701

The future of construction materials research and the seventh UN Millennium Development Goal: A few insights, Pages 729-737
F. Pacheco-Torgal, J.A. Labrincha

Chemical shrinkage behavior of pastes made with different types of cements, Pages 854-862
Wanchai Yodsudjai, Kejin Wang

Durability and mechanical properties of high strength concrete incorporating ultra fine Ground Granulated Blast-furnace Slag, Pages 875-881
Susanto Teng, Tze Yang Darren Lim, Bahador Sabet Divsholi

Volume 41 (April 2013)
Effects of fibre hybridization on multiple cracking potential of cement-based composites under flexural loading, Pages 15-20
Kamilie Tosun-Felekoglu, Burak Felekoglu

Effects of micro-structure characteristics of interfacial transition zone on the compressive strength of self-compacting geopolymer concrete, Pages 91-98
Samuel Demie, Muhd Fadhil Nuruddin, Nasir Shafiq

The influence of admixtures type on the air-voids parameters of non-air-entrained and air-entrained high performance SCC, Pages 109-124
Beata Łaźniewska-Piekarczyk

Controlling microstructure in cement based mortars by adjusting the particle size distribution of the raw materials, Pages 139-145

A novel polymer concrete made with recycled glass aggregates, fly ash and metakaolin, Pages 146-151
Shi-Cong Kou, Chi-Sun Poon

Effect of composition variations on bond properties of Self-Compacting Concrete specimens, Pages 252-262
Ioannis P. Sfikas, Konstantinos G. Trezos

Metakaolin as cementitious material: History, scours, production and composition – A comprehensive overview, Pages 303-318
Alaa M. Rashad

Corrosion behaviour of steel rebars in reinforced concrete containing thermoplastic wastes as aggregates, Pages 419-426
S. Gavela, A. Ntzioni, E. Rakanta, N. Kouloumbi, V. Kasselouri-Rigopoulou

Study of the material properties of fly ash added to oyster cement mortar, Pages 532-537
Her-Yung Wang, Wen-Ten Kuo, Chih-Chung Lin, Chen Po-Yo
Mechanism analysis and effect of styrene–acrylate copolymer powder on cement hydrates, Pages 538-544
Ru Wang, Lijuan Yao, Peiming Wang

Rheological performance and compressive strength of superplasticized cementitious mixtures with micro/nano-SiO2 additions, Pages 708-716
L.E. Zapata, G. Portela, O.M. Suárez, O. Carrasquillo

Alkali-activated metakaolin: A short guide for civil Engineer – An overview, Pages 751-765
Alaa M. Rashad

Strength and durability of cement with forest waste bottom ash, Pages 897-910
Maria da Luz Garcia, Joana Sousa-Coutinho

Volume 42 (May 2013)

Properties of pervious geopolymer concrete using recycled aggregates, Pages 33-39
Vanchai Sata, Ampol Wongsa, Prinya Chindaprasirt

Mechanical behavior of lightweight concrete steel deck, Pages 78-86
Yu-Cheng Kan, L.-H. Chen, Tson Yen

Kaolin-based geopolymers: Effect of mechanical activation and curing process, Pages 105-113
Ayi D. Hounsi, Gisèle L. Lecomte-Nana, Gnandé Djétéli, Philippe Blanchart

Effect of early cement hydration on the chemical stability of asphalt emulsion, Pages 146-151
Fazhou Wang, Yunpeng Liu, Shuguang Hu

Volume 43 (June 2013)

Sulfuric acid resistance of blended ash geopolymer concrete, Pages 80-86
M.A.M. Ariffin, M.A.R. Bhutta, M.W. Hussin, M. Mohd Tahir, Nor Aziah

Carbon dioxide equivalent (CO2-e) emissions: A comparison between geopolymer and OPC cement concrete, Pages 125-130
Louise K. Turner, Frank G. Collins

A ternary optimisation of mineral additives of alkali activated cement mortars, Pages 131-138
Serdar Aydın

The effect of chlorides on the thaumasite form of sulfate attack of limestone cement concrete containing mineral admixtures at low temperature, Pages 156-164
K. Sotiriadis, E. Nikolopoulou, S. Tsivilis, A. Pavlou, E. Chaniotakis, R.N. Swamy

Application of water treatment sludge in the manufacturing of lightweight aggregate, Pages 174-183
Chung-Ho Huang, Shun-Yuan Wang

Mesoporous structure and pozzolanic reactivity of rice husk ash in cementitious system, Pages 208-216
Viet-Thien-An Van, Christiane Rößler, Danh-Dai Bui, Horst-Michael Ludwig

Experimental evaluation and modeling of drying shrinkage behavior of metakaolin and calcined kaolin blended concretes, Pages 337-347
Kasım Mermerdaş, Erhan Güneyisi, Mehmet Gesoğlu, Turan Özturan
Mechano-chemical activation of high-Ca fly ash by cement free blending and gypsum aided grinding, Pages 480-489
Monower Sadique, Hassan Al-Nageim, William Atherton, Linda Seton, Nicola Dempster

Mix design for fly ash based oil palm shell geopolymer lightweight concrete, Pages 490-496
Ramin Hosseini Kupaei, U. Johnson Alengaram, Mohd Zamin Bin Jumaat, Hamid Nikraz

**Volume 44 (July 2013)**
Sulfuric acid resistance of blended ash geopolymer concrete, Pages 80-86
M.A.M. Ariffin, M.A.R. Bhutta, M.W. Hussin, M. Mohd Tahir, Nor Aziah

Influence of superplasticizer on composition and pore structure of C–S–H, Pages 87-91
Ping Duan, Zhonghe Shui, Wei Chen, Chunhua Shen

Workability and proportion design of pumping concrete based on rheological parameters, Pages 267-275
Haibo Xie, Feng Liu, Yurun Fan, Huayong Yang, Jian Chen, Jin Zhang, Chungen Zuo

Mortars of alkali-activated blast furnace slag with high aggregate:binder ratios, Pages 607-614

Disposing used engine oils in concrete – Optimum dosage and compatibility with water reducers, Pages 734-742
Joseph Jean Assaad

Development of green engineered cementitious composites using iron ore tailings as aggregates, Pages 757-764
Xiaoyan Huang, Ravi Ranade, Wen Ni, Victor C. Li

**Journal of Environmental Management**

**Volume 117, 15 March 2013**
Utilization of cathode ray tube waste: Encapsulation of PbO-containing funnel glass in Portland cement clinker, Pages 180-186
Nirut Lairaksa, Anthony R. Moon, Natt Makul

Study on the effects of white rice husk ash and fibrous materials additions on some properties of fiber–cement composites, Pages 263-267
Yahya Hamzeh, Kamran Pourhooshyar Ziabari, Javad Torkaman, Alireza Ashori, Mohammad Jafari

**Volume 118, 30 March 2013**
An environmental impact calculator for greenhouse production systems, Pages 186-195
Marta Torrellas, Assumpció Antón, Juan Ignacio Montero

**Applied Clay Science**

**Volume 73, March 2013 (Special issue articles on Geopolymers)**
Geopolymers: a new and smart way for a sustainable development, Page 1
P. Benito, C. Leonelli, V. Medri, A. Vaccari

Modifications induced by the thermal treatment of kaolin and determination of reactivity of metakaolin, Pages 2-10
B. Fabbri, S. Gualtieri, C. Leonardi

Clay reactivity: Production of alkali activated cements, Pages 11-16
C. Ruiz-Santaquiteria, A. Fernández-Jiménez, J. Skibsted, A. Palomo
In situ synchrotron X-ray pair distribution function analysis of the early stages of gel formation in metakaolin-based geopolymers, Pages 17-25
Claire E. White, Katharine Page, Neil J. Henson, John L. Provis

Defining existence domains in geopolymers through their physicochemical properties, Pages 26-34
Elodie Prud'homme, Alexandre Autef, Najet Essaidi, Philippe Michaud, Basma Samet, Emmanuel Joussein, Sylvie Rossignol

Effect of thermal pre-treatment conditions of common clays on the performance of clay-based geopolymeric binders, Pages 35-41
T. Seiffarth, M. Hohmann, K. Posern, Ch. Kaps

Novel hybrid organic-geopolymer materials, Pages 42-50
Claudio Ferone, Giuseppina Roviello, Francesco Colangelo, Raffaele Cioffi, Oreste Tarallo

Reprint of Hot-pressure forming process of PVC/geopolymer composite materials, Pages 51-55
Xiao-ling Song, Xue-min Cui, Kun-sheng Lin, Guang-jian Zheng, Yan He

Alkali-bonded ceramics with hierarchical tailored porosity, Pages 56-64
Elena Landi, Valentina Medri, Elettra Papa, Jiri Dedecek, Petr Klein, Patricia Benito, Angelo Vaccari

Aluminosilicate coatings with enhanced heat- and corrosion resistance, Pages 65-70
Pavel V. Krivenko, Sergey G. Guzy

Performance of fibre reinforced, low density metakaolin geopolymers under simulated fire conditions, Pages 71-77
William D.A. Rickard, Les Vickers, Arie van Riessen

Mix-design and characterization of alkali activated materials based on metakaolin and ladle slag, Pages 78-85
Maria Chiara Bignozzi, Stefania Manzi, Isabella Lancellotti, Elie Kamseu, Luisa Barbieri, Cristina Leonelli

Encapsulation of Mg–Zr alloy in metakaolin-based geopolymer, Pages 86-92
Adrien Rooses, Prune Steins, Adeline Dannoux-Papin, David Lambertin, Arnaud Poulesquen, Fabien Frizon

Slags with a high Al and Fe content as precursors for inorganic polymers, Pages 93-102

Effect of sulphate and nitrate anions on heavy metal immobilisation in ferronickel slag geopolymers, Pages 103-109
Kostas Komnitsas, Dimitra Zaharaki, Georgios Bartzas

Volume 75-76, May 2013
Characterization of alkali activated kaolinitic clay, Pages 120-125
Faten Slaty, Hani Khoury, Jan Wastiels, Hubert Rahier

Synthesis and mechanical properties of novel composites of inorganic polymers (geopolymers) with unidirectional natural flax fibres (phormium tenax), Pages 148-152
Mohammad Alzeer, Kenneth MacKenzie
March 2013
Volume 96, Issue 3
Pages 665–1002
Very High Volume Fly Ash Cements. Early Age Hydration Study Using Na$_2$SO$_4$ as an Activator (pages 900–906)
Shane Donatello, Ana Fernández-Jimenez and Angel Palomo
Article first published online: 12 FEB 2013 | DOI: 10.1111/jace.12178

Effect of Temperature on C$_3$S and C$_3$S + Nanosilica Hydration and C–S–H Structure (pages 957–965)
Isabel F. Sáez del Bosque, Manuel Martín-Pastor, Sagrario Martínez-Ramírez and María Teresa Blanco-Varela
Article first published online: 27 NOV 2012 | DOI: 10.1111/jace.12093

April 2013
Volume 96, Issue 4
Pages 1003–1337
Effects of Epoxy Resin on Gelcasting Process and Mechanical Properties of Alumina Ceramics (pages 1107–1112)
Rui Xie, Kechao Zhou, Xueping Gan and Dou Zhang
Article first published online: 15 MAR 2013 | DOI: 10.1111/jace.12256

Formation of Sol–Gel In Situ Derived BTO/NZFO Composite Ceramics with Considerable Dielectric and Magnetic Properties (pages 1240–1247)
Bin Xiao, Yanling Dong, Ning Ma and Piyi Du
Article first published online: 12 FEB 2013 | DOI: 10.1111/jace.12181

May 2013
Volume 96, Issue 5
Pages 1339–1672
Impedance Analysis of Dielectric Nanoparticles Enabled via a Self-Assembled Monolayer (pages 1490–1496)
Sasidhar Siddabattuni, Thomas P. Schuman, Vladimir Petrovsky and Fatih Dogan
Article first published online: 12 FEB 2013 | DOI: 10.1111/jace.12203

June 2013
Volume 96, Issue 6
Pages 1673–2004
In situ Diamond Anvil Cell–Raman Spectroscopy and Nanoindentation Study of the Pressure-Induced Phase Transformation in Pure and Zinc-Doped β-Eucryptite (pages 1909–1915)
Subramanian Ramalingam, Corinne E. Packard and Ivar E. Reimanis
Article first published online: 28 FEB 2013 | DOI: 10.1111/jace.12220

Effect of Magnesium Doping on Hydration Morphology and Mechanical Property of Calcium Phosphate Cement Under Non-Calcined Synthesis Condition (pages 1944–1950)
Tao Yu, Jiandong Ye and Ming Zhang
Article first published online: 28 FEB 2013 | DOI: 10.1111/jace.12235

Susan A. Bernal, John L. Provis, Volker Rose and Ruby Mejí a de Gutiérrez
Article first published online: 19 MAR 2013 | DOI: 10.1111/jace.12247
“Metakaolin-Slag-Clinker Blends.” The Role of Na⁺ or K⁺ as Alkaline Activators of These Ternary Blends (pages 1991–1998)
Ana Fernández-Jiménez, Fatima Zibouche, Nassima Boudissa, Ines García-Lodeiro, Mohamed Tahar Abadlia and Angel Palomo
Article first published online: 11 MAY 2013 | DOI: 10.1111/jace.12272

July 2013
Volume 96, Issue 7
Pages 2005–2337
Opportunities for Advanced Ceramics and Composites in the Nuclear Sector (pages 2005–2030)
William Edward Lee, Matthew Gilbert, Samuel Thomas Murphy and Robin William Grimes
Article first published online: 11 JUN 2013 | DOI: 10.1111/jace.12406

Low Temperature Synthesis of High Alumina Cements by Novel Co-Melt Precursors and Their Implementation as Castables with Some Micro Fine Additives (pages 2124–2131)
Vijay Kumar, Vinay Kumar Singh and Abhinav Srivastava
Article first published online: 5 JUN 2013 | DOI: 10.1111/jace.12403

➢ Journal of Hazardous Materials

Volumes 248–249, Pages 1-496 (15 March 2013)
Immobilisation of lead smelting slag within spent aluminate—fly ash based geopolymers
Pages 29-36
M.B. Ogundiran, H.W. Nugteren, G.J. Witkamp

Crystal chemistry of the high temperature product of transformation of cement-asbestos
Pages 69-80
Alberto Viani, Alessandro F. Gualtieri, Simone Polliastri, Caterina Rinaudo, Alessandro Croce, Giancarlo Urso

Volumes 250–251, Pages 1-490 (15 April 2013)
Dissolution kinetics of magnesium hydroxide for CO₂ separation from coal-fired power plants
Pages 292-297
Hari Krishna Bharadwaj, Joo-Youp Lee, Xin Li, Zhouyang Liu, Tim C. Keener

Volumes 252–253, Pages 1-462 (15 May 2013)
CO₂ adsorption on chemically modified activated carbon
Pages 19-28
Burcu Selen Caglayan, A. Erhan Aksoylu

Change of carcinogenic chrysotile fibers in the asbestos cement (eternit) to harmless waste by artificial carbonatization: Petrological and technological results
Pages 390-400
Martin Radvanec, Lubomír Tuček, Ján Derco, Katarína Čechovská, Zoltán Németh

➢ Cement and Concrete Composites

Volume 37, Pages 1-336 (March 2013)
Carbon nanotube cement-based transducers for dynamic sensing of strain
Pages 2-11
Annibale Luigi Materazzi, Filippo Ubertini, Antonella D’Alessandro
Hydration and properties of sodium sulfate activated slag  
*Pages 20-29*  
A.M. Rashad, Y. Bai, P.A.M. Basheer, N.B. Milestone, N.C. Collier

Impact of metakaolin characteristics on the rheological properties of mortar in the fresh state  
*Pages 95-107*  
F. Cassagnabère, P. Diederich, M. Mouret, G. Escadeillas, M. Lachemi

How does fly ash mitigate alkali–silica reaction (ASR) in accelerated mortar bar test (ASTM C1567)?  
*Pages 143-153*  
Seyed M.H. Shafaatian, Alireza Akhavan, Hamed Maraghechi, Farshad Rajabipour

Use of mineral admixtures to improve the resistance of limestone cement concrete against thaumasite form of sulfate attack  
*Pages 267-275*  
A. Skaropoulou, K. Sotiriadis, G. Kakali, S. Tsivilis

Properties of interfacial transition zones in recycled aggregate concrete tested by nanoindentation  
*Pages 276-292*  
Jianzhuang Xiao, Wengui Li, Zhihui Sun, David A. Lange, Surendra P. Shah

**Volume 38, Pages 1-108 (April 2013)**

Durability of very high volume fly ash cement pastes and mortars in aggressive solutions  
*Pages 12-20*  
Shane Donatello, Angel Palomo, Ana Fernández-Jiménez

Evaluation of three test methods for determining the alkali–silica reactivity of glass aggregate  
*Pages 57-64*  
Cihat Yuksel, Reza Saleh Ahari, Babak Abbaspoursani Ahari, Kambiz Ramyar

Utilization of volcanic ashes for the production of geopolymers cured at ambient temperature  
*Pages 75-81*  
H.K. Tchakoute, A. Elimbi, E. Yanne, C.N. Djangang

Comparison of carbonation depths measured on in-field exposed existing r.c. structures with predictions made using *fib*-Model Code 2010  
*Pages 92-108*  
Matteo Guiglia, Maurizio Taliano

**Volume 39, Pages 1-140 (May 2013)**

Chloride transport through cementitious membranes using pulsed current  
*Pages 18-22*  
B. Díaz, X.R. Nóvoa, B. Puga, V. Vivier

A comparison study of Portland cement hydration kinetics as measured by chemical shrinkage and isothermal calorimetry  
*Pages 23-32*  
Xueyu Pang, Dale P. Bentz, Christian Meyer, Gary P. Funkhouser, Robert Darbe

Hydration and strength development in ternary portland cement blends containing limestone and fly ash or metakaolin  
*Pages 93-103*  
Kirk Vance, Matthew Aguayo, Tandre Oey, Gaurav Sant, Narayanan Neithalath
## Advances in Applied Ceramics

**Volume 112, Number 3, April 2013**

### Synthesis and applications of black ceramic from recycled industrial wastes

pp. 146-148(3)

**Yang, Y G; Xu, J H; Cai, B; Wang, Q C; Xiu, D P; Zhao, Z B; Sun, Q Z; Cao, S L**

### Non-Conventional Cementitious Binders

pp. 177-178(2)

**Black, Leon; Cheeseman, Chris; Tyrer, Mark**

- Novel geopolymeric material cured at room temperature
- pp. 179-183(5)
- **Tashima, M M; Soriano, L; Monzó, J; Borrachero, M V; Payá, J**

### Development of new cement based matrices for safe disposal of hazardous metals: cadmium and caesium

pp. 190-196(7)

**Guerrero, A; Goñi, S; Lorenzo, M P; Ibañez, J A**

### Effect of fly ash-gypsum blend on porosity and pore size distribution of cement pastes

pp. 197-201(5)

**Khatib, J M; Wright, L; Mangat, P S**

### Linked low carbon manufacture of cement and precast concrete

pp. 202-206(5)

**Maries, A; Hills, C D; Carey, P; Ostle, S-J**

### Bilayered ceramic dental composites with adhesive or reactive bonded interfaces

pp. 227-234(8)

**Liu, Y H; Feng, H L; Grüner, D; Wang, X; Bao, Y W; Qiu, Y; Xing, N; Shen, Z J**

## Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy

**Volume 104, Pages 1-554 (March 2013)**

FT-Raman, FT-IR, UV spectroscopic, NBO and DFT quantum chemical study on the molecular structure, vibrational and electronic transitions of clopidogrel hydrogen sulfate form 1: A comparison to form 2

pp. 409-418

**Anubha Srivastava, Rashmi Mishra, Poonam Tandon, A.K. Bansal**
<table>
<thead>
<tr>
<th>Volume 105, Pages 1-632 (15 March 2013)</th>
<th>Sensitive metal ions (II) determination with resonance Raman method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 52-56</td>
<td>Zhi Yu, Lucas A. Bracero, Lei Chen, Wei Song, Xu Wang, Bing Zhao</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 106, Pages 1-320 (April 2013)</th>
<th>Infrared and Raman spectroscopic characterization of the phosphate mineral fairfieldite – Ca$_2$(Mn$^{2+}$,Fe$^{2+}$)$_2$(PO$_4$)$_2$·2(H$_2$O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 216-223</td>
<td>Ray L. Frost, Yunfei Xi, Ricardo Scholz, Fernanda Maria Belotti, Andres Lopez</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 107, Pages 1-398 (15 April 2013)</th>
<th>Quantum mechanical study of the structure and spectroscopic (FT-IR, FT-Raman), first-order hyperpolarizability, NBO and HOMO–LUMO analysis of S-S-2 methyamino-1-phenyl propan-1-ol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 386-398</td>
<td>G. Ramachandran, S. Muthu, S. Renuga</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 108, Pages 1-342 (May 2013)</th>
<th>A Raman spectroscopic study of the basic carbonate mineral callaghanite Cu$_2$Mg$_2$(CO$_3$)(OH)$_6$·2H$_2$O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 171-176</td>
<td>Jiří Čejka, Jiří Sejkora, Ivana Jebavá, Yunfei Xi, Sara J. Couperthwaite, Ray L. Frost</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 109, Pages 1-348 (15 May 2013)</th>
<th>Infrared and Raman spectroscopic characterisation of the sulphate mineral creedite – Ca$_3$Al$_2$SO$_4$(F,OH)·2H$_2$O – and in comparison with the alums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 201-205</td>
<td>Ray L. Frost, Yunfei Xi, Ricardo Scholz, Andrés López, Amanda Granja</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 111, Pages 1-304 (July 2013)</th>
<th>Influence of water vapour and carbon dioxide on free lime during storage at 80 °C, studied by Raman spectroscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 299-303</td>
<td>E. Dubina, L. Korat, L. Black, J. Strupi-Šuput, J. Plank</td>
</tr>
</tbody>
</table>

#### Thermochimica Acta

<table>
<thead>
<tr>
<th>Volume 557, Pages 1-86 (10 April 2013)</th>
<th>Preparation, characterization, and thermal properties of the microencapsulation of a hydrated salt as phase change energy storage materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 1-6</td>
<td>Jin Huang, Tingyu Wang, Panpan Zhu, Junbin Xiao</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 561, Pages 1-98 (10 June 2013)</th>
<th>Thermogravimetric analysis of limestones with different contents of MgO and microstructural characterization in oxy-combustion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 19-25</td>
<td>Fabiana de Souza, Saulo Roca Bragança</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Volume 564, Pages 1-82 (20 July 2013)</th>
<th>Chemo-physical modeling of cement mortar hydration: Role of aggregates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pages 70-82</td>
<td>Jena Jeong, Hamidréza Ramészani, Nordine Leklou, Pierre Mounanga</td>
</tr>
</tbody>
</table>
Effects of chemical composition of fly ash on efficiency of metal separation in ash-melting of municipal solid waste
Pages 605-614
Takashi Okada, Hiroki Tomikawa

Recycling of municipal solid waste incinerator fly ash by using hydrocyclone separation
Pages 615-620
Ming-Sheng Ko, Ying-Liang Chen, Pei-Shou Wei

Aggregate material formulated with MSWI bottom ash and APC fly ash for use as secondary building material
Pages 621-627
R. del Valle-Zermeño, J. Formosa, J.M. Chimenos, M. Martínez, A.I. Fernández

Flue gas desulfurization gypsum and coal fly ash as basic components of prefabricated building materials
Pages 628-633
Antonio Telesca, Milena Marroccoli, Daniela Calabrese, Gian Lorenzo Valenti, Fabio Montagnaro