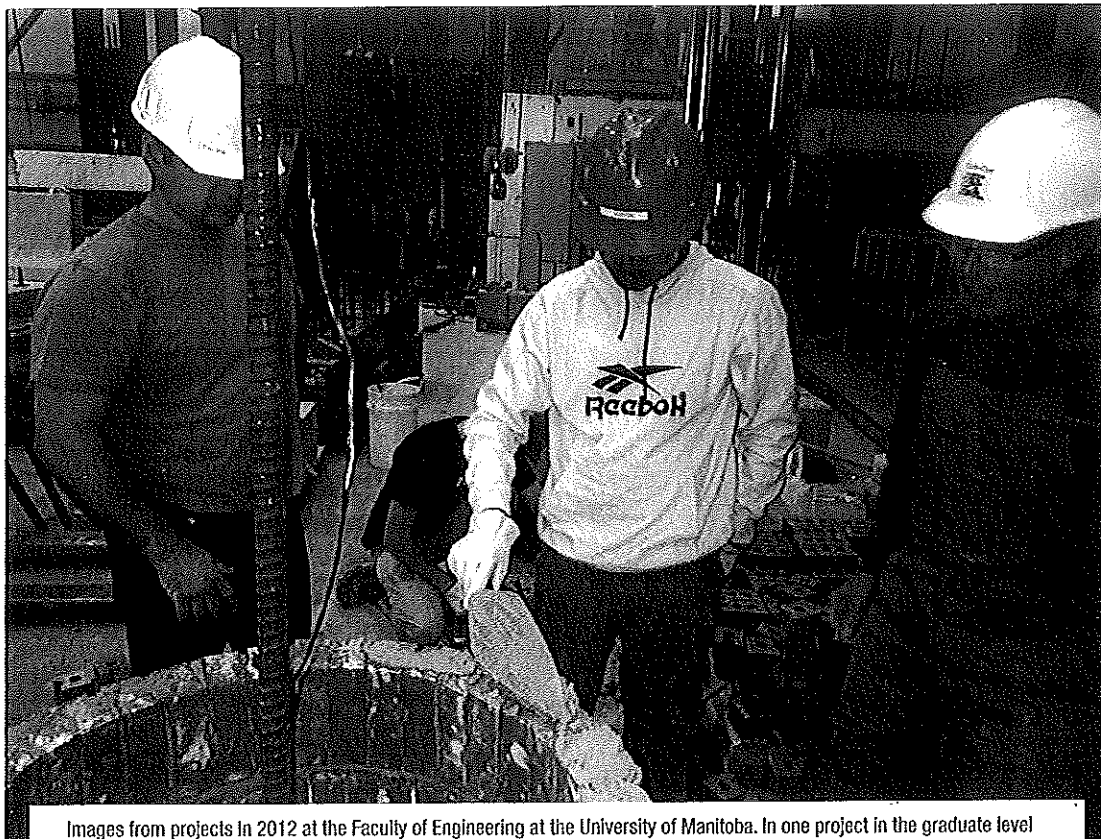


Pledge by Masonry Industry Helps U of M Structural Engineering Students

Thanks to a generous annual pledge, the University of Manitoba has steadily increased its research and course offerings in masonry construction with great success. *By Lisa Kopochinski*



Images from projects in 2012 at the Faculty of Engineering at the University of Manitoba. In one project in the graduate level course, CIVL 7140—Advance Masonry Design, students designed a tower from Sagrada Família by Gaudí in Barcelona, Spain. As part of the same project, a scaled model of the tower was constructed in the university's heavy structures lab to familiarize the students with masonry construction procedures and challenges. Materials were donated by Expecrete and MMI.

Prior to 2009, few masonry-specific courses were being offered and little research was done on the subject at the University of Manitoba. However, this all changed when member firms of the Manitoba Masonry Institute (MMI) and the Manitoba Masonry Contractors Association (MMCA) — concerned with the quality of design and work being performed in the industry — pledged to support a project at the university to teach design to structural engineering students. That pledge involved providing \$50,000 per year for five years courtesy of the Canadian Concrete Masonry Producers Association (CCMPA) — some of which was designated to masonry research — and the fruits of that labour have begun to bloom.

"The process was slow but satisfying," says MMI President Harry Laarveld, "but we are very pleased with the progress to date. This is obviously a long-term commitment from both industry and faculty."

Laarveld says the initial industry concerns that prompted the pledge was a total lack of understanding, particularly among younger designers.

"Because of that — not so much the quality — but the amount of masonry designed in projects was concerning. It was this steady decrease [in quality] that prompted us to work with the university to assure we did everything possible to educate and improve awareness in the course

design. We are an old industry, and in our minds a superior one, so why would everybody not just want this in their design? That complacent attitude needed to change from within and we have."

Fariborz Hashemian, Ph.D., P.Eng., a practicing engineer and an assistant professor at the Faculty of Engineering at the U of M, says over

the last five years research activity in the area of masonry materials and construction has been impressive with a grant from the CCMPA.

"Since 2009, with the boost by the CCMPA/MMI grant, several researchers have included masonry research in their portfolio. These projects at the University of Manitoba include cold-weather concrete masonry construction;

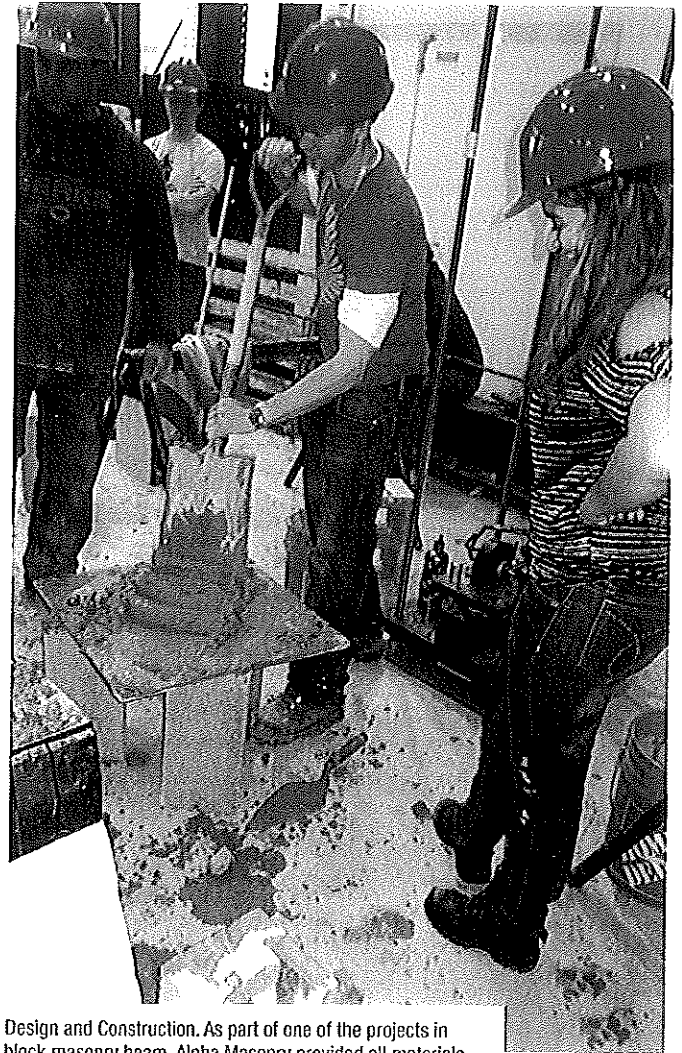
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Photos from the first undergraduate course, CIVL 4020—Masonry Design and Construction. As part of one of the projects in this course, students designed, constructed and tested a concrete block masonry beam. Alpha Masonry provided all materials and expert masons.

introducing nano-particles and materials into the mortar mix and grout mix to increase the heat of hydration during cold masonry construction; and cold-weather concrete masonry construction — determining cure criteria for mortar and grout using dielectric sensors."

Research taking place this year by Hashemian and other faculty members, such as Mohamed Bassuoni, Ph.D. from the Department of Civil Engineering, includes the following:

- Structural design with architectural implications - working on a masonry design project to develop design and construction methods for building Guastavino domes and vaults for the Canadian climate;
- Structural design with architectural implications - developing design and construction methods for arches for the Canadian climate and construction industry;
- Sustainability of masonry construction - energy audit of masonry construction

comparing it with other construction materials;

- Life-cycle analysis of masonry building and comparing it with other construction materials; and
- Cold-weather concrete masonry construction using cure criteria for mortar and grout that were developed using dielectric sensors to build wall assemblies.

This latter study will start with MSc and continue to a PhD study that will focus on developing sensors specifically for masonry.

Hashemian is extremely thankful for the \$50,000 per year pledge from the CCMFA with MMI and MMCA facilitating. "It's been very effective. Without this funding, it would have been almost impossible to start and continue research and teaching in the field of masonry at the University of Manitoba."

In addition to the above-mentioned research, he adds that a number of publications have been

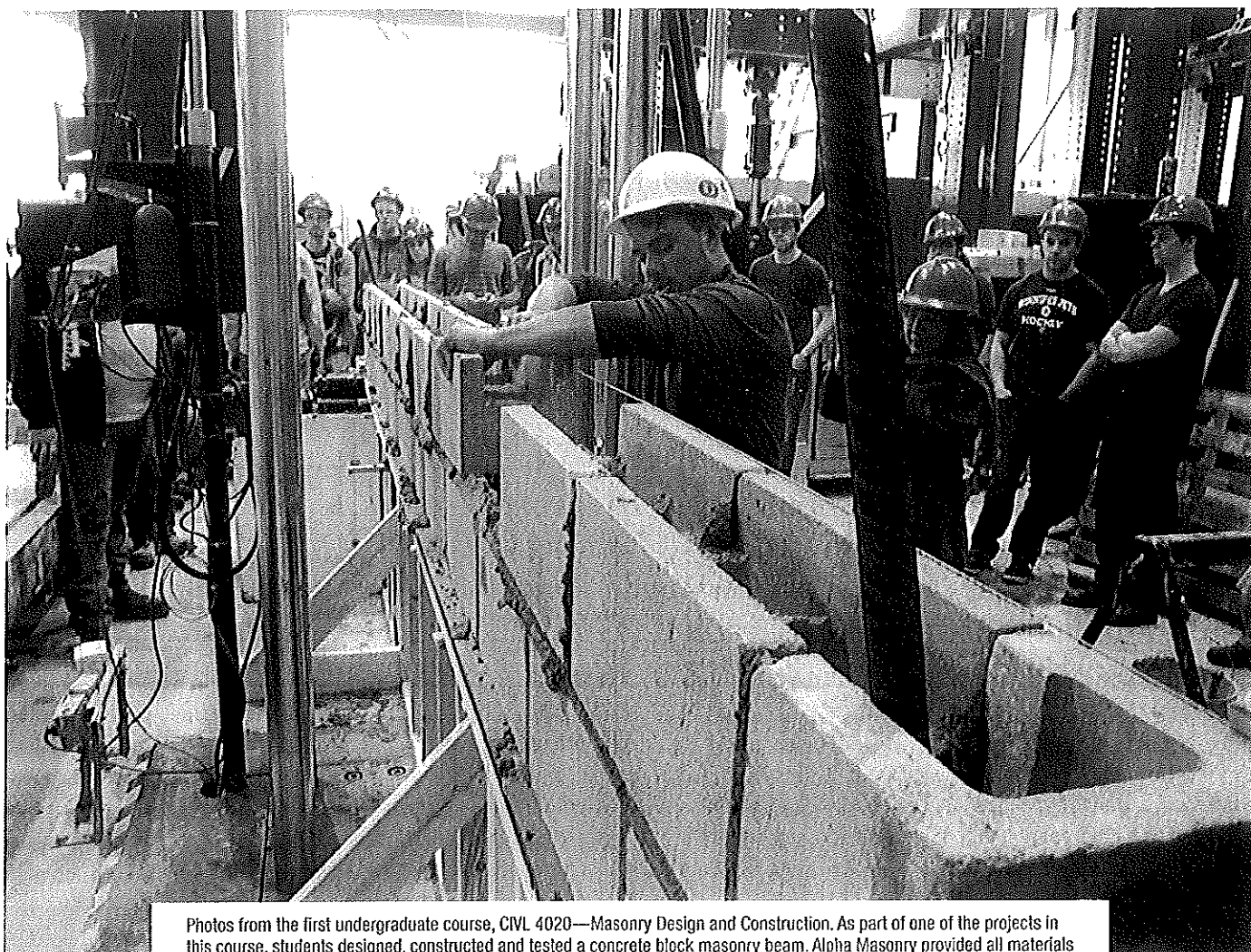
produced as a result of the research activity under CCMFA funding.

Course Offerings

With respect to masonry courses being offered, engineering students can now delve into the following areas of study: Advanced Masonry Design and Construction; Fundamentals of Building Science — with an emphasis on proper envelope design for masonry; and Masonry Design and Construction, a structural engineering elective course.

"Initially, masonry design was part of an elective course (Structural Design 3)," says Hashemian. "This course included concrete precast design, wood design and masonry design. Therefore, structural engineering students have always been taught masonry. However, now we have a dedicated design course for masonry, which focuses on design, detailing, construction and building envelope design specifically for masonry."

While Hashemian believes the university now offers enough courses to ensure a good quality



Photos from the first undergraduate course, CIVL 4020—Masonry Design and Construction. As part of one of the projects in this course, students designed, constructed and tested a concrete block masonry beam. Alpha Masonry provided all materials and expert masons.

of masonry design education, he says the next step in education is "to develop yearly workshops that would bring together the design and construction industry through construction of a sample masonry detail or project. The first workshop will be offered this summer. We have done a lot of work, but there is still more to be done. With masonry, there is a lot of material to study."

Laarveld adds that as part of the current programs at the university, MMI and MMCA are also engaged in a very positive co-op program where engineering students are hired to work in the field of masonry for various employers.

"A consequence of that program is that students have chosen to do their masters degrees in masonry. That would not have happened without both the co-op program and improved course availability. We are hopeful that we will be able to continue this co-operation with the university beyond the pledge of five years. The success to date would dictate the necessity of it."

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