

Profile



Irish engineer **Victoria Janssens** has recently applied her talents in Hong Kong on the Zaha Hadid-designed hotel tower at the City of Dreams, Macau, and on the Mercedes-Benz Stadium in Atlanta – all thanks to a decision to risk working overseas. She talks to Jackie Whitelaw.



The word that sums up the current theme of Victoria Janssens' career is "connections".

The 31-year-old is working as a Senior Structural Engineer for BuroHappold in Hong Kong, where she has been focusing on the design of steel connections for the new Zaha Hadid-designed hotel tower in the City of Dreams leisure and entertainment complex in Macau.

Also in the professional arena, she is now providing construction-stage design support for the members and connections forming the curvaceous, free-form roof of what will be one of the world's largest underground rail stations. Located at West Kowloon in Hong Kong, this will serve as the terminus for the high-speed rail link to mainland China.

And on the personal front, it was a connection that opened the door to the job in Hong Kong and the huge, high-profile, name-making projects that are available to work on from the island.

Human connections

There's nothing sinister about the latter. When Janssens wanted to move out to Hong Kong to work in 2014, she did the very sensible thing of asking a contact. This was someone she had kept in touch with from earlier work experience with BuroHappold in Leeds, who was herself now working in Hong Kong. Through her she found out whether the consultant was hiring. It



Figure 1
Ornidale
Block, Vancouver

B+H ARCHITECTS

was – and here Janssens is.

That experience has reinforced her instinct that building and maintaining a good network is as important to an engineer's career as building great structures, particularly if you want to do a bit of globetrotting.

"If you have the right experience, contacts can provide that bit of extra help, which can be particularly useful if you want to work overseas," says the Irish woman. "Construction is a tight-knit industry and it is important to develop and maintain a good network. It also helps when you need advice, in that you can pick up the telephone and ask questions.

"You also learn a lot from talking to different people; construction is an evolving industry and you will get left behind if you lock yourself away in front of a computer. We need to interact with and learn from other engineers, architects and construction professionals."

Taking a chance

Janssens has learned from experience how hard it can be to get a foot in the door in a new market with no contacts. Two-and-a-half years

before the move east, in 2012, she and her engineer partner had wanted to work abroad and had upped sticks from Dublin and moved west to Vancouver in Canada.

"I'd always wanted to travel and work somewhere else in the world," she says, "and I had always been attracted to North America. My partner and I had previously spent some time travelling in the States but decided Canada would be an easier place to get a visa. We settled on Vancouver because of the temperate climate on the west coast and its similar feel to San Francisco – a city that we both loved.

"But it was very difficult to get a job before arriving in Canada. Like many other expats, we got open work visas and went."

The first few months were pretty challenging, she remembers. "It was hard to get work. I spent two months sending applications and hearing nothing back. But then it all happened! I was called for an interview with a local firm, Wicke Herfst Maver Structural Engineers, had an interview with one of the founding partners and found myself



Figure 2
Fifth
tower of City of
Dreams, Macau



ZAHA HADID ARCHITECTS

on the dramatic structures being designed in Hong Kong.

The fifth tower of City of Dreams (Figure 2) was Janssens' first BuroHappold project at the Hong Kong office, described by the consultant as 'the most challenging

large-scale steelwork of its kind to ever be accomplished'. 'It's a wonderful expression of architecture, a 40-storey structure encased by a striking steel exoskeleton,' Janssens says.

'The steel exoskeleton works together with the pair of concrete lift cores to form a dual system resisting lateral loads. I was responsible for designing the connections for the internal steel framing, most notably for the floor system which shared the loads between the lateral force-resisting systems.

'I was designing for shears and bending, but also for large axial forces, which meant conventional steel connections could not be used in many locations. There were about 12 000 connections in total with limited repetition; I spent a full year designing them.'

From never having done connections before, Janssens is now a developing expert. And in her next role for BuroHappold she provided construction-stage support for the steel members and connections of the West Kowloon Terminus station roof (Figure 3).

'In the UK and many other places, the steel fabricator would typically design the steel connections, but in Hong Kong it is more common for the structural engineer to take on this role – particularly when dealing with complex geometry.

'It has been a steep but enjoyable learning curve, developing the knowledge to deal with the interaction of different actions and achieving the required release conditions, while ensuring the connection could be safely fabricated and provided the necessary construction tolerances. Working at this level of detail has been invaluable experience and has changed the way I think about a structure.'

Cutting-edge research

Janssens has been fascinated by steel buildings for a long time. After her engineering degree at Trinity College Dublin (which, as for so many structural engineers, had been preceded by a brief spell studying architecture before she found that not to be the right challenge for her skills), Janssens opted to study for a PhD. The decision was in part thanks to some prescient advice from a practising structural engineer.

'In 2007 I was in the final year of my degree and applying for graduate positions as well as considering a PhD. At one point, a potential employer pulled me aside and wisely mentioned that if I could secure the funding for a PhD, I should take up the opportunity. I decided to take the advice and, as the economic difficulties unfolded over the coming months, I was very fortunate to have a secure job for three years researching the progressive collapse of steel buildings.'

The work put her at the cutting edge of structural steel research, following closely on from the publication of numerous reports and guidelines after the collapse of the World Trade Center towers on 9/11.

'The Structural Eurocodes have changed the approach to robustness for high-risk structures and I was involved in European research to establish a risk-based framework

employed.

'WHM is a relatively young company – it celebrated its seventh birthday while I was there – and was an exciting, dynamic working environment. With about 20 people in the office, I was thrown in at the deep end and was given a lot of responsibility early on.'

Janssens worked on a variety of projects, from architecturally challenging single-family homes to large mixed-use developments. If there was a favourite, it was the redevelopment of an Edwardian commercial building which required the retention of the original brick façade, but demolition and replacement of the structure behind with a new six-storey office block (Figure 1).

'I led the development of the wood-concrete composite floor system for the new building, intended to reflect the original structure with the underside of the ceiling as exposed wood and a polished concrete floor on top.

'Unfortunately, the floor system ran into difficulties with the local building department. Concrete became more cost-effective, even if only marginally so, and the new building was redesigned as a reinforced-concrete structure after I left. This was still a very interesting project and full of challenges, such as addressing the interface with the adjacent structures and detailing the system to tie back the existing facade to the new structure. Vancouver is in a seismic region, which adds a lot of complexity to the structural design. I learned a lot.'

Steel connections

After two-and-a-half years, it was time for a change of scene and an opportunity to work



Figure 3
West
Kowloon
Terminus,
Hong Kong

for assessing the robustness of structures like stadia and high-rise buildings.

"I was involved in developing guidance on quantifying the consequences of structural failure in terms of potential loss of life, as well as the economic costs. This was very much a first effort at collecting information more commonly used in the insurance profession and has since garnered a lot of interest in the academic community."

Making a name

Steel, it would seem, is in her blood. She has recently returned from a five-month spell in New York working on the retractable roof of the Mercedes-Benz Stadium – the new home for the NFL's Atlanta Falcons (Figure 4).

"The BuroHappold New York office was looking for help with the design of the roof steelwork and I happily volunteered to help out. The stadium features an iconic retractable roof made up of eight petals which open like the aperture of a camera. This was a great project to be part of," Janssens says.

So, what next? For the moment Janssens says she is in a job she loves in a place she loves and is handling any homesickness



Figure 4
Mercedes-Benz
Stadium, Atlanta

MERCEDES-BENZ STADIUM

through the media of Skype and FaceTime. "I've thought that I might return to academia but I think that may be further down the line, if at all. What is most important to me now is that I continue learning and enjoying what I do. At the same time I would like to establish a name for myself through working on iconic structures and pushing the limits of structural engineering."

She would recommend a bit of globetrotting to everyone as a way of developing their career and themselves. "I've grown a lot working in different places and with different individuals from different cultures. It's good to step outside of your comfort zone. You learn a lot and it's a great way to improve yourself both personally and professionally," she says.

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HOW SHOULD STRUCTURAL ENGINEERS BALANCE SAFETY AND SERVICEABILITY REQUIREMENTS WITH A HUMAN DESIRE FOR ELEGANCE AND BEAUTY?

Our health and well-being is affected by our environment. The appearance and character of the built environment around us strongly affects how we feel, and structural designers should be concerned with creating elegance and beauty as well as ensuring safety and serviceability.

Describe the contribution of structural engineers towards creating an elegant, attractive and appropriately human-centred built environment, and suggest what changes in their education and professional development might enable them to do this more effectively.

Answers should be in the form of a written paper (max. 1500 words) and may include relevant imagery that supplements the text.

The judges will be looking for originality, value to the structural engineering profession and clarity of presentation.

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