The course of change….

Organisers of major events and festivals around the world employ the science of Crowd Dynamics as part of their design and safety planning, while police forces across the UK incorporate it into their routine work. The science was developed over two decades by Prof. Dr. G. Keith Still FIMA Professor of Crowd Dynamics and Crowd Management at Bucks New University. As venues become bigger and events more global, demand has increased for his specialist knowledge and experience at dealing with crowds.

The UK Cabinet Office Emergency Planning College and bucks New University is part of the Crowd Dynamics success story since 1999, spreading the word about safety through tailored courses on the behaviour and management of crowds, as Professor Still explains…

At the start of my courses on Crowd Dynamics, I always ask how many of the delegates have come to the end of an event and said "We were lucky that time." Usually most of them acknowledge with a sheepish "Yes". But I hope that one day the room will be silent, because successful crowd management isn't about chance. It's thorough planning, preparation and risk management. It's about information, communication and design. But most of all it is about understanding people.
My father was a police officer for 25 years before he retired. And while the job might have changed substantially since his time in the force, it still holds true that the last thing any officer wants to do is pull bodies out of the crowd. Crowd Dynamics is an established scientific approach to crowd safety and, as a company; we have been running courses at the UK Cabinet Office Emergency Planning College in Easingwold for 12 years now. And consistently I've noticed it's the police delegates that have the most instant empathy with the application of the science of Crowd Dynamics. They're also the most aware of the consequences of crowd reactions to police actions – of cause and effect.

While working with the operations team in a stadium control room I first became acutely aware of the problems of crowd dynamics. The Silver Command made a late decision about the deployment of horses to guide crowds leaving the stadium, affecting the lives of 30,000 people. While he was an experienced senior officer, he was trying to fit his experience into a new environment; rather like trying to fit a square peg into a round hole. It was clear the police needed to understand crowds more rigorously, as well as recognise the elements of cause and effect of crowd management decisions. It became a question of how to teach this science in an accessible manner, making the knowledge relevant to real situations.

Our courses aren't designed to replace policing experience. They're designed to give officers better tools in applying their bank of experience to the dynamics of crowds; to be able to predict the time to critical density, and understand the early warning signs of a crowd in distress. Using a range of crowd modelling tools, we cover every aspect of planning and managing a public event in a systematic way; looking at what should happen if one element of the situation falls down. For example if there is a problem in the design, the management systems have to be excellent to compensate. One of the tools we use is the DIM-ICE model, a systematic check list for risk assessment and crowd management. Delegates consider the three ways a crowd can be influenced, (design, information and management), outlining these features against the three different phases of behaviour (coming in, circulating and going out – Ingress, Circulation and Egress – ICE), in a matrix of nine boxes. The delegates then consider the same matrix for emergency situations – asking what changes.

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Normal	Ingress	Circulation	Egress
Design			
Information			
Management			

Emergency	Ingress	Circulation	Egress
Design			
Information			
Management			

DIM-ICE MODEL

It is delightful to see the enthusiasm of delegates and to actively shape their experiences with scientific tools. Increasingly the case studies police officers bring with them for discussion are more detailed and challenging. But no one is thrown in at the deep end. We begin with simple grids and calculations, looking at how many people in a moving crowd can fit into a confined space, and then packing the space to examine what it feels like to be part of the crowd. We explore the effects of density on groups of strangers, as well as working out upper safety limits and discussing the implications for assessing them, before looking at the maths in more detail. I see delegates struggle initially with a few of the concepts, and then the light bulb moment arrives and they suddenly know how it all comes together. That makes my job worthwhile.

Crowd Dynamics is more than sums, We add the psychology of human behaviour, design, location, and number of venues, the global terrorist threat, and all the things that change in an emergency situation, It's about understanding people's reactions and decisions when they're part of a group, and learning to predict how they might move in any given situation. The key to this is to keep an eye on the big picture, while systematically tackling the small stuff, a bit like doing a jigsaw. A common mistake is that officials often start with maps and plans (the BIG picture). Then they talk their way through all the detail and by the end of a planning meeting everyone has different pieces of the jigsaw. On the courses we teach them how to reduce the complexity into bite size chunks and tackle every section in part, then as a whole. It's at that point they start to realise it's not just about their own role, but a huge connected system of liabilities and responsibilities, that have to be managed on behalf of the crowd.

Now more than ever it's important that police know this stuff. Since the 2007 corporate manslaughter act was passed anyone organising an event is held liable for accidents and incidents, so if forces take on the responsibility for policing the event they take on the legal ramifications. Commonplace decisions, like positioning of police cars, or signage, can give rise to implications of crowd safety. And with venues packing in people to try and recoup costs the margin for error is dramatically reduced. Given the change in the law, plus the debate about culpability after Hillsborough, and the advances in the science, every force in the UK should be applying a

standardised methodology to their involvement in public events. 20 years ago there wasn't even the phrase 'Crowd Dynamics.' There was crowd control, and then crowd management, but it's very much about Crowd Dynamics. Hillsborough, for example, was a bad design – it had inherent problems – by teaching how to assess crowd dynamics in entry points like Leppings Lane we can predict the rates of passage, capacity and crowd behaviour. This is a powerful tool in the hands of an experienced police officer.

The next challenge for the police will be the Olympics. As advisers at Beijing and Sydney, Olympic planning has been part of our business for many years and we are running workshops for the Metropolitan police for 2012. While much of the infrastructure is being purpose built, there are still challenges like a Victorian transport system already working at capacity. The Olympics have been a terrorist target in past. A home made bomb can cause havoc in large crowd, not in terms of just immediate damage but driving the crowd to narrow confined spaces. Primary and secondary devices can be devastating and by identifying the areas that would be the MOST dangerous we can highlight where additional countermeasures, surveillance and management can be best deployed.
There is an incorrect media impression that policing is all about riot shields and baton charges. However 90% of dealing with crowds is planning; management, barriers, information, stewarding, and low level policing. Putting this in simple terms if the police HAVE to address issues of public order, that's when crowd management strategy has failed.

Last year I was an expert witness at a case at the Supreme Court in New York State where a quick, multi-million dollar settlement was reached because of the strength of testimony from 'the Scotsman who knows crowds.' It's hard to argue with the maths, even if you're a lawyer. And the more police officers get to grips with the maths, and develop a scientific and systematic understanding of crowd actions and reactions, the safer the job will be, and the fewer cases will make it to the courts. Currently I'm engaged as the Expert Witness for the Public Prosecution in Duisburg (21 dead, 511 injured – Love Parade)

I normally finish my workshops with contact details and promise to help with the relevant information as needed. A word to the wise "You don't want me as expert witness for the prosecution."

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