



INTERNATIONAL COUNCIL FOR RESEARCH AND INNOVATION IN BUILDING AND CONSTRUCTION

# INFORMATION

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## **W087 – Post-Construction Liability and Insurance**

**W087 arranges Mock Trial: “Duty of Care vs. Duty of Result”**

**CIB World Building Congress, 3<sup>rd</sup> April from 14.00 to 18.00 hours**

*by*

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*W087 – Post-Construction Liability and Insurance arranges a Mock Trial at the CIB World Building Congress. The Trial will take place at April 3<sup>rd</sup>, from 14.00 to 18.00 hrs. CIB Members are invited to attend this special event that deals with issues that can be considered crucial to organisations working in the construction area.*

### **The Trial: Duty of Care versus Duty of Result**

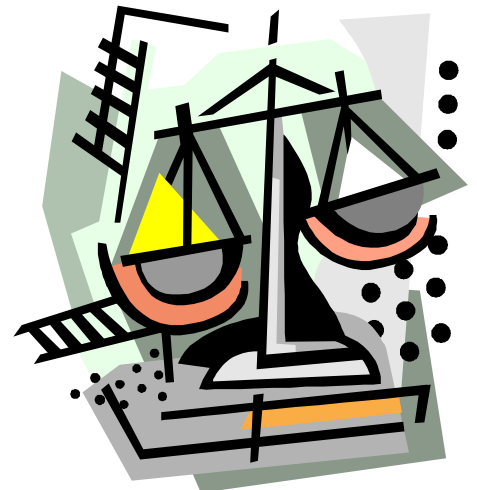
A trial set in a court of law to examine whether producers of buildings should be under a duty to achieve a particular result or to meet the standards of reasonable care and skill prevailing in their industry or profession.

Lawyers from W087 membership will act as advocates: George Tan will act as the Duty of Care and Anthony Lavers will act as Duty of Result; both will call expert witnesses, representing insurers, professional bodies and technical experts in construction.

The hearing will be presided over by a member of the judiciary of the host nation: Master Tómas Kennedy-Grant of the High Court of New Zealand.

The trial will be set in the High Court of Utopia, a nation whose construction industry and legal system need to determine the standards which they will expect of their architects, engineers and contractors.

The case will be based, so far as possible, on extracts from real projects and cases.



Those attending will receive a copy of the documents referred to, to enable them to follow the proceedings.

### **The Case: Showdown in Utopia**

A mock court hearing of the design duties owed by a contractor and a professional engineer when a building fails.

#### *The background*

In January 1994, Megathon Chemicals, an international corporation, entered into a design-and-build agreement with Technocrat Contractors of Utopia. The project was to design and construct warehouses and an office on the outskirts of Paradiso, Utopia's capital city, for a contract sum of US\$10 million. Technocrat appointed Epsilon Plus of Paradiso as their Consultant Engineers in February 1994. The building was completed in November 1994 and Megathon began to use it in December 1994.

#### *The problem*

The warehousing was on three floors, in which containers of chemicals were to be moved and stacked by forklift trucks. Epsilon Plus designed the floors in accordance with the then current view held by Utopia's engineers of an overseas Code of Practice (in the absence of any local equivalent). After the expiry of the Defects Liability Period under the construction contract in November 1995, the floor surfaces began to show signs of heavy wear and by September 1996 serious cracks had developed. Megathon's workers complained about the physical discomfort, which they suffered from the vibration caused by the forklifts operating over increasingly uneven surfaces. The cracks became so large in places that they threatened to over-balance the loaded forklifts.

Megathon's premises were closed for four months at the end of 1997 for US\$5 million of remedial work. Megathon estimates the consequent loss of profit during 1998 at US\$3 million. Technical experts blame the problem on the design of the floors.

#### *The legal issues*

Megathon tried during 1999 to persuade Technocrat and/or Epsilon Plus to accept responsibility for its losses, but in December 2000 commenced legal proceedings against both, claiming US\$8 million.

- Megathon alleges that Technocrat is in breach of its obligations under the design-and-build contract, in that the design was not fit for its purpose.
- Megathon makes an alternative claim against Epsilon Plus, on the ground that the engineers have failed in their professional duty by using an inadequate design.
- Technocrat denies liability on the ground that neither it nor Epsilon Plus should be under a duty to do any more than use reasonable care and skill in accordance with the then-current standards of Utopian designers.
- Technocrat contends that in any event the claim comes too late because the six-year limitation period has already expired.
- Epsilon Plus argues that it has acted with reasonable care and skill and that it should not be directly liable to Megathon in any event, having no contract with the client.

#### *The hearing*

The Utopian courts, being part of a very young legal system, frequently have to make new law. They do not accept foreign precedents as having any authority. They routinely listen to

arguments as to what the law should be and hear evidence and expert opinion as to the practical effects of adopting particular legal outcomes.

On this occasion, the court has to decide what the law of Utopia should in future be on the following points:

- Should a design-and-build contractor be responsible to the client if the design fails despite the fact that it has used a competent professional engineer?
- Should a professional engineer be held strictly liable for the failure of his/her design even though that design was in accordance with accepted current practice?
- Should a client be able to claim directly against a consultant employed by a design-and-build contractor?
- Should it be possible to claim more than six years after the completion of the project if that is the limitation period?

In addition, the court will be asked to express a view on whether, in principle, the workmen of Megathon can claim for the discomfort caused them during work and lost overtime during the remedial works against contractor or engineer or both.

## **The design – technical evidence**

### *The design problem*

The element of the design for which Technocrat especially needed Epsilon Plus was the upper floors, where containers of chemicals would be stored prior to distribution in Utopia and in the region generally. The containers would be moved and stacked within the upper floors of the warehousing by motorised forklift trucks, each of which would weigh approximately 3000 kg when fully loaded. It was therefore apparent to all, client, contractor and designer, that the floors which were to be composite constructions of structural steel and concrete should be capable of bearing the imposed load and this had been discussed between all parties.

When the concrete members of a floor like the one in the Megathon building are struck by a blow, the impact sets up vibrations. All structures have a natural frequency, which for the building and material types in question is about 5 or 6 cycles per second. The amount of vibration from any impact is referred to as 'amplitude'. Whereas the footsteps of Megathon's workmen might cause vibration of low amplitude, the effect of a machine might be vibration of a much higher amplitude. In theory, a moving wheel of perfect shape on a perfect floor surface would cause no vibration beyond the static weight of a stationary object. However, neither wheel nor surface will be perfect, so some vibration is to be anticipated. It is therefore incumbent upon the design to refer to a relevant Code of Practice, as the Utopian designer is required to do by the Regulations of the Paradiso Municipality. Utopia has no Codes of Practice of its own and its designers habitually refer to those of other countries, including the UK and Australia. Mr. Plus, of Epsilon Plus, referred to the British Code of practice CP 117 on composite construction in structural steel and concrete and actually stated on his drawings that his design of the upper floors of the warehouse met its requirements.

Mr. Plus referred specifically to Paragraph 8 of CP117, which stated that "The designer should satisfy himself that no undesirable vibrations can be caused by the imposed loading. Serious vibrations may result when dynamic forces are applied at a frequency near to one of the natural frequencies of the members." The technical experts are in agreement that most, although not all, of the designers then active in Utopia regarded Paragraph 8 as a warning against rhythmic

repeated patterns of impulse from fixed machinery. They generally regarded it is unrelated to unsystematic, random impulses such as would be caused by changes of direction, acceleration or braking by a forklift truck.

Mr. Plus shared that view and produced a design, which required the sub-contractor to supply concrete slab units to a loading specification of 350 kg per square metre with a roving point load of 3000 kg, being based on the weight of a loaded forklift truck.

Since the failure of the Megathon warehouse, the Institute of Utopian Engineers has issued its first Professional Guidance Note on design of composite construction: "Designers should take into account the possible occurrence of undesirable vibrations created by forklift trucks".

The technical experts are agreed that the design by Epsilon Plus was not capable of bearing prolonged heavy usage by forklift trucks loaded with drums of chemicals and that the cracking which occurred was caused by design inadequacy and not by defective workmanship or faulty materials.

#### *The background – contractual and project issues*

The contract between Megathon Chemicals, an international corporation, and Technocrat Contractors of Utopia was agreed in January 1994. It was a design-and-build contract for the design and construction of warehouses and an office on an industrial estate on the outskirts of Paradiso, the capital city of Utopia. The contract sum was US\$10 million.

The contract obliged Technocrat to "both complete the design for the building and carry out and complete the construction of the building". The contractor's design obligation was stated to be "To design the building to the same standard as could be expected of a professional engineer or other professional advisor qualified in the relevant discipline".

Technocrat also entered into an agreement, in February 1994, with Epsilon Plus, Consultant Engineers, of Paradiso, for the design of the warehouse structure. No formal Conditions of Engagement were used in the appointment of Epsilon Plus. The agreement merely comprised an exchange of e-mail messages (of which printed copies survive) to the effect that Epsilon Plus would supply its "usual professional design services" to assist Technocrat in meeting "its design obligations on the Megathon project; specifically the upper floors of the warehouse structure".

The plans submitted by Technocrat to the Paradiso Municipality as the Building Control Authority contained the formal statement that "the design of the structure will be in accordance with any relevant Codes of Practice." Mr. Plus, a partner in Epsilon Plus, was shown Megathon's specification and the contract between Megathon and Technocrat.

#### **More information**

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