

COM6655 Professional Issues Autumn 2021

Tutorial for week 6 (1st November): Liability for Defective Software

Scenario

A group of civil engineers are involved in a major construction project, and have duties that include liaison with architects and builders, to whom they recommend appropriate structural materials for different parts of the building. The major tool they use to provide this advice is a program that calculates stress analysis using plans from a computer-aided design (CAD) package, and a small expert system which contains expertise on the physical properties of building materials such as different kinds of steel, ducting, concrete and insulation.

The stress analysis system has a bug that produces arithmetic errors in some calculations. The engineers do not notice the odd values produced by the system and these values are used as a basis for the new building. In any case, the calculations cannot be checked by other means because they are too complex, too numerous and the project deadlines are pressing.

The expert system used in the package also contains incorrect information. Specifically, the steel used in parts of the building is an alloy that has very good corrosion properties at the cost of a slightly diminished strength. The expert who provided the rules for the expert system did not fully understand the difference in strength with this particular alloy, and hence this factor is not taken into account when calculating the stresses to which the building will be subjected. In selling the package to engineers and architects, the developers of the system have promoted it as being the safest and most reliable system in the world.

Half-way through the construction process, the building is unable to support the loads being placed upon it and a crane on the uppermost floor crashes through the lower floors killing two workmen.

An analysis of the disaster shows that the arithmetic bug and the misunderstanding of the strength of the steel essentially interacted to bring about the failure. That is, had more conventional materials been used then the errors in the calculations would not have been of any consequence, but when combined with the weaker structural properties of the steel used, the calculations were totally inappropriate.

Question 1

Who has the greatest moral and ethical responsibility for the accident? The engineers who failed to recognise stress values that were incorrect? The developers and commercial backers who demanded such a tight schedule that the stress calculations could not be checked? The software developers who supplied a faulty product? The expert whose knowledge of the properties of building materials was inadequate?

Question 2

Two parties could consider suing for damages here; the property developer whose building has collapsed, and the families of the dead workmen. Under what conditions could these two parties sue, and who would be liable? What would be the defences of the accused parties? You should consider potential liability under the following: (i) contract law (ii) negligence (iii) negligent misstatement (iv) product liability.

You should divide your group into teams representing (i) the civil engineers (ii) the software developer (iii) the developers of the expert system, including the expert (iv) the legal representative for the dead workmen. Each group should also have a chairperson who conducts the inquiry, and will have responsibility for reporting back at the end of the breakout session.