

AN INQUIRY UNDER THE FATAL ACCIDENTS AND INQUIRIES (SCOTLAND) ACT 1976 INTO THE SUDDEN DEATH OF ERIK FUNCK PETERSEN

SHERIFFDOM OF GRAMPIAN, HIGHLAND AND ISLANDS AT ABERDEEN

DETERMINATION

by

SHERIFF ANNELLA M. COWAN, Advocate

in

FATAL ACCIDENT INQUIRY

into the death of

ERIK FUNCK PETERSEN

The sheriff, on resuming consideration of the evidence and submissions in the Fatal Accident Inquiry, Finds in terms of Section 6(1)(a) of the Fatal Accident and Sudden Death Deaths Inquiry (Scotland) Act 1976 as amended that the death of Erik Funck Peterson, born 13th February 1967 of 24D Menzies Road, Torry, Aberdeen occurred on 21st January 2002 at approximately 12.45 at 411/2 Union Street, Aberdeen. In terms of Section 6(1)(b) the cause of death was "crush asphyxia" consequent on a fall of masonry.

The following witnesses gave evidence

Christopher Luke, Alan Mellis, Allan Yule, and Derek Cryle, labourers with Riverside Construction (Aberdeen) Limited. Alan McConkey, loss adjuster with Cunningham Lindsey who visited the locus after the fire in 1998. William Rout and Frank Clayton, Grampian Fire Brigade who attended after the collapse on 21st January 2002. Gordon Pratt and Scott Gormley of J & G Fowlies Limited, demolishing experts who also attended after the collapse. Alexander Smith, Michael Crowe and Paul Pillath of Aberdeen City Council who spoke to various aspects of the planning legislation relating to the building of 411/2 Union Street. Colin Goff and Alan Grant of Langstane Housing Association. Stuart McMichael of Messrs Ramsay McMichael, consulting engineers, Glasgow who acted as experts for the loss adjusters after the collapse in January 2002. Angus Shepherd, antique furniture restorer and Steven Savage, cabinet maker, both of Awakening Restorations. James Wilson, plant hirer and operator. Brian Russell and Douglas Gilbert, directors of Riverside Construction (Aberdeen) Limited. Lawrence McLeod, former director of Riverside Construction (Aberdeen) Limited. Niall Miller, Doctor Claire Brough and Chris Weston of the Health and Safety Executive. Neil Rothnie of Messrs Cumming & Rothnie, architects

and of Designcheck, design supervisors. Peter Fraser, structural engineer of Messrs Ramsay & Chalmers, consulting structural engineers.

At the outset of this determination, I acknowledged the assistance I received from all parties. The Crown restricted the evidence led to matter directly relevant to the death of Mr Petersen and resisted the temptation to canvas at large aspects of practice within the building trade and related professions which did not impinge directly on what happened on 21st January 2002 at 411/2 Union Street. Other parties likewise restricted their questions, consistent with proper representation of their various interests, to directly relevant matter. This approach allowed me during the inquiry and in reaching my final decision to focus on precisely what happened without the distraction of irrelevant information. I also record that I found some of the witnesses to be particularly helpful. Messrs Gormley and Pratt of Fowlies; Platt and Rout of Grampian Fire Brigade and Mr Woodward of Messrs Atkins were impressive in their professionalism and in the clarity of their evidence. The remaining witnesses I found generally credible and reliable although Douglas Gilbert of Riverside Construction tended, in my view, to be less than reliable in his recall of events, in particular in relation to whether, and if so when, certain documents had been received by Riverside Construction.

411/2 Union Street, Aberdeen

The building was erected in the very early years of the 20th century. It was a granite construction and rose six storeys. The entrance to the upper floors was in the middle of the frontage. The ground and basement levels were occupied by shops.

Mr Woodward of Messrs Atkins, structural engineer, described the construction as follows.

The central staircase/lift core is in granite blocks with some brick masonry.

The 1st floor on the front and rear sections is made of insitu concrete with integral steel beams at 1.0/1.2 metre centres spanning on to a series of main beams supported on cast iron columns taking loads down to basement level.

The floors 2nd to 5th are formed from timber joists 12 inches deep x 21/2 inches wide (nominal) at 18 inch cross centres approximately (300 mm x 63 mm at 450 mm centres) stretching from the front wall to the staircase/lift core in the front section; and from the staircase/lift core to a steel beam across the building at a point where the floor plan reduces in width; and then a new set from this beam to the rear wall. Because these joists are approximately 40 feet long (12 m) in the front and the first rear section of the building they require additional support near to their centres of length, the support at the centre of these joists is by twin timber framed partitions which also form the corridors across the building at the front and the rear of the building.

These load bearing partitions therefore repeat at each floor down to the 1st floor to carry the loads from the floor joists at each level down to the 1st floor and then the steel beams and cast iron columns take these loads down to the foundations. It can therefore be seen that these twin partitions take increasing loads as they go down

the building, as each floor adds its load to the partition. Other timber framed partitions divided the floors into rooms and corridors. These, however, did not take loads from the floors and are therefore non load bearing. All the partitions had plaster and lath facing and some partitions had windows within them.

The floor joists then generally had timber floor boarding and a plaster and lath ceiling fixed to the bottom of the joists. For about the top half of the joists "deafening" was placed in between the joists and sitting on timber slats which are supported by battens fitted to the sides of the joists at mid depth. Deafening is a fairly light fine grain substance placed to absorb sound. The exception to this build up of flooring was in the corridors which ran back from the staircase/lift core and forward to the front from the staircase/lift core. Here the floor boards and "deafening" was replaced with an unreinforced concrete finish with a tile floor finish.

The sixth floor was within the roof space but most of this was destroyed in the fire in 1998. After the fire, with no roof, the building was left open to the elements until to date. This allowed deterioration of the internal timber floors such that in a report by E Surv. Surveyor to the Langstane Housing Association Ltd dated 15 March 2001, they considered it was too dangerous to carry out a physical inspection. Ramsay and Chalmers report of 7 March 2001 stated that retention of the existing internal timber walls and floors could only be confirmed after a detailed inspection which would likely require the removal of a proportion of finishes to allow accurate assessment.

Development of 411/2 Union Street

The building was potentially suited to use by Langstane Housing Association (Langstane) and in 2001 Langstane was approached by Mr Bone of Granite Developments with a view to Langstane participating in re-development of the building. The initial proposal was that Langstane should be lead tenants. Later, however, Langstane bought the whole building but as at 21st January 2002 Langstane owned from the first floor up. The ground and basement floors were in separate ownership.

By the time Langstane bought the upper floors of the building a development team consisting of Riverside Construction (Riverside); Cumming & Rothnie Architects (C & R); Design Check (Design Supervisors); Ramsay & Chalmers (R & C Engineers) was in place. Reports, plans and designs had been prepared for the restoration of 411/2 and its development into flats. The works were to be divided into two phases, the first of which was the clearing of the site including taking down internal finishes and some internal partitions. It was understandably convenient to all parties involved in the development that Langstane did not change any of the personnel. Hence Riverside were accepted by Langstane as main contractors for phase one. Langstane had used Riverside before although not for work of the magnitude of 411/2. Indeed, Riverside had not previously undertaken work of that magnitude at all and did not, in fact, have the experience required.

Events leading up to 21st January 2002

The risk of structural collapse within 411/2 had been identified by R & C. The engineer's architects and design consultants were aware of the risk well before Riverside went on site in November 2001.

According to the documentary evidence, the dangerous condition of the building was brought to the attention of Riverside in the pre-tender Health & Safety plan (Crown production 27, appendix C12 [Volume II, page 646]). Riverside should have addressed this aspect in the method statements required under the CDM Regulations. As at the site meeting of 10th December 2001 at which Riverside notified other parties that they had started to dewatering work only initial method statements had been produced by Riverside. There remained outstanding, among other things, provision for the risk of internal collapse. This was highlighted to Riverside by Design Check. Nevertheless, Riverside remained on site and continued with the dewaterings involved in phase one. Part of their dewatering work was undertaken by James Wilson, a self employed contractor, using a mini-digger.

It is inevitable that, four and a half years after the incident, witnesses are not able to be precise about dates except where these are recorded in documents. Neither Brian Russell of Riverside nor James Wilson was able to say precisely when they had agreed that Mr Wilson would bring a mini-digger onto the site and use it to remove lath and plaster and non load bearing partitions. It was probably in late November 2001 although the minutes of the site meeting of 10th December 2001 record that Riverside was "still confirming sub-contractors" (Crown production 56 [Volume VI, page 1384]). The use of the mini-digger had probably been suggested by Mr Wilson but neither Brian Russell nor James Wilson could be precise about that.

The mini-digger was brought onto site and placed into 411/2 by using a crane which was subsequently used to move it down through the building as work on each level was completed. James Wilson started on the top floor and by 12th January 2002 had reached the second floor. At that point Brian Russell stopped James Wilson's work to allow Riverside's employees to clear the debris resulting from James Wilson's dewatering works. Riverside's employees started clearing the site on 7th January 2002. They started on the north side of the building on the fourth floor and at the time of Mr Petersen's death were working at the rear of the fourth floor. The method adopted to clear areas of debris consisted of dropping it down the lightwell or holes in the floor. Some of the holes used were the result of fire damage and some were cut by Riverside employees between the joists. This method of working was sloppy, untidy and dangerous. Although the overall weight of the debris (mainly lath and plaster and some wooden framing) did not increase as the result of its being removed from the walls and ceilings, the stresses on the all ready dangerous structure were altered by the piling up of debris during the clearing-up operation.

James Wilson and Brian Russell were satisfied at the time that the use of the mini-digger was not inappropriate. That was not the view of R & C or the engineers who have prepared reports on the collapse. Although I accept Mr Wilson's evidence that a digger can be accurately manipulated in skilled hands, I cannot avoid the conclusion that its use at 411/2 was not appropriate. I cannot go so far as to say it contributed to the collapse but it was not acceptable working practice.

Despite a clear warning at the site meeting of 10th December 2001 by R & C that propping should be used where downtakings were being stored, it was clear that if any propping was installed by Riverside it was both minimal and ineffective. It was also clear that insufficient consideration was given to the unusual features of the construction method at 411/2, in particular areas of floor suspected to contain unusual features such as concrete had not been thoroughly investigated and assessed. It appeared in the building at 411/2 that some of the deadening, normally ash, had been replaced with concrete. This may have been an additional fire precaution inserted during earlier modernisations. It appeared to me that the engineers expected to be able to inspect during downtakings and had thought that not a great deal of work would take place at 411/2 over the Christmas period 2001 - 2002. That, together with the fact that as at 10th December 2001 no final method statement had been sent to them from Riverside, caused the engineers not to realise how much actual progress had been made by 12th January 2001.

Extent of downtakings prior to 21st January 2002

Designed lines had been prepared by the architects and engineers detailing which internal partitions were to be removed and which were to be stripped of lath and plaster. Riverside was provided with these. There may have been room for some confusion over the interpretation of the drawings because the legends on some of them appeared to instruct that all internal non load bearing partitions were to be removed while, according to others, only those marked with hatched lines were to be removed. If there was any such confusion it was up to Riverside to clarify the matter with the architect. James Wilson accepted in evidence that he had removed some partitions or parts thereof, to facilitate manoeuvring his mini-digger. His recollection was that he had replaced any he had removed. There was not sufficient evidence available to me to decide whether he did or did not replace them. At all event, it was clear that the downtakings carried out prior to 21st January 2002 left the structure in an even more unstable state than it had been. That was the result both of the removal of internal partitions which, even if non load bearing *per se*, contributed to the stability of the building by providing cross bracing for load bearing walls and of the failure to prop in any effective way those parts of the structure on which increased stresses were placed by the use of the mini-digger and the piling of debris awaiting removal.

Erik Petersen's presence at 411/2 Union Street on 21st January 2002

There was understandable vagueness in the recall of Brian Russell and Angus Shepherd, whose business involves architectural salvage and to whom Mr Petersen was accustomed to supply items such as door and window facings from buildings which were being demolished or refurbished. In any event, Mr Russell and Mr Shepherd agreed that there were items within 411/2 which would be worth salvaging. Consequently, Mr Petersen attended at 411/2 on a number of occasions to retrieve suitable items. He had a key, which Mr Shepherd had obtained from Brian Russell which allowed him access to the site whenever was convenient to him. He was not under the control of Riverside nor, as a self employed person, was he under the control of Mr Shepherd. His safety on site was, however, the responsibility of Riverside. Riverside's workmen were generally aware of Erik Petersen's presence when he came on site and generally told him where they were working. He worked in

different areas and did not work with Riverside's men. There was an obvious misunderstanding over precisely what Mr Russell thought Erik Petersen was going to do on site. Mr Russell was clear in his evidence that Erik Petersen would only take from the site what had already been taken down and piled up for him to collect. However, it was clear from Riverside's men that Erik Petersen engaged in removing items of interest to him which had not been previously taken down from the walls by Riverside. Erik Petersen was engaged in removing facings on the second floor of the building on 21st January 2002 when the collapse happened. He was working alone. The Riverside employees on the site were aware that he was on site.

21st January 2002

On 21st January 2002, Riverside's employees, Christopher Luke, Alan Mellis, Allan Yule and Derek Cryle were working on the fourth floor of the building at the rear, in the area most affected by fire damage. They were aware that Erik Petersen was on site. They were working within sight of one another when, at about noon, a beam, sometimes called a flitch or fletch beam, which formed part of load bearing corridor partition fell from the fourth floor ceiling. Riverside's employees were sufficiently alarmed by the fall to leave the site and tried to contact Brian Russell. As they left, two of them saw and spoke to Erik Petersen who was working on the second floor. Neither of them told Mr Petersen to leave or what had happened. They did tell him not to work in the area to the rear of the building. The Riverside employees dispersed with only Allan Yule remaining in that part of the site used as a bothy. At about 12.45, Mr Yule heard "a rumble" and saw a cloud of dust. He went into the building and saw that there had been a major collapse. He thought the situation was dangerous and left. When Derek Cryle returned he and Mr Yule again entered the building to see if they could locate Erik Petersen. They were not sure whether he was, in fact, on site at the time of the collapse or precisely where he had been working if he was on site.

Brian Russell was contacted and came to the site. There was confusion over whether Erik Petersen was on site and that confusion persisted even after the fire brigade attended at approximately 1800 hours. Thermal imaging techniques used by the fire brigade did not locate Mr Petersen. Owing to the dangerous condition of the building and the need to protect the lives of fire fighters, J & G Fowlie, demolishing experts, were instructed to attend. Time was required for Messrs Fowlies to assess the situation and prepare a safe system of work for gaining access to the area of the collapse where it was thought Mr Petersen might be found. Erik Petersen was eventually found at about 2000 hours on 23rd January 2002. From the position in which he was found, it appeared that he had been working at the junction of the two corridors on the second floor.

Mechanism of the collapse

It appears from the expert evidence that the collapse happened in one of two ways. Either the beam which fell from the fourth floor ceiling led to a progressive collapse by increasing the loadings on the already weakened joists, load bearing cross beams and partitions causing them to give way progressively down through the building; or the supporting structure in the immediate vicinity of the area in which Erik Petersen was working having been weakened by removal of cross bracing element and the

beam at the junction of the two corridors having been disturbed during the removal of corridor partitions, the joists were overloaded and when Erik Petersen tried to remove the architrave at the corridor junction the movement involved was sufficient to dislodge the beam causing the joists to crack; the partition to buckle, and the whole structure to fall from the second floor upwards. It is not worthy that by the time of the collapse it had not been realised by Riverside or anyone else that the cross corridor beam on the second floor was of an unusual shape and may have been less securely seated than would normally be the case. It was not possible to point definitively to one cause or the other. Mr Woodward of Messrs Atkins preferred the second scenario because, in his view, the position in which Mr Petersen was found suggested that he had had time to step back from the architrave on which he was working as the partition next to him began to buckle. Mr Woodward's view was that had the collapse started at the top of the building, Erik Petersen might have had time to move further away from the collapse or even escape the falling debris altogether (Crown production 27 [Volume III, page 477/478]).

On a matter such as this I cannot speculate on which scenario is the more likely and accordingly I have to accept the uncontroverted evidence of the expert witness that the more likely mechanism was that the collapse started immediately beside and above Mr Petersen and progressed upwards as the supports for the upper floors came away.

Causes of the death of Erik Petersen

The collapse which killed Erik Petersen was foreseeable from the outset of the refurbishment work because the building was in a dangerous condition following the fire in 1998 and as a result of having been open to the elements since then. Its dangerous condition was identified by the structural engineers and the design supervisors. It was also recognised by Riverside. However, the method of working employed by Riverside involving the use of the mini-digger and piling up debris without propping and without detailed inspection of the structure on an ongoing basis, made the collapse almost inevitable.

Riverside's inexperience in projects of this type led, in my view, to confusion on their part as to the extent of their responsibility for checking with, and taking advice from, the other professionals working on the project. Brian Russell was clearly of the view in his evidence that it was up to the other professionals to advise him. In fact he almost seemed to expect particularly the engineer to supervise Riverside's work without the engineer being told what was being done or how and despite a contract term requiring Riverside to carry out an in-depth survey. On the other hand, the other professionals involved bear some responsibility in that Riverside was allowed to start on site on 19th November 2001 without providing a detailed and suitable method statement. Site meetings did not involve actually going to the site even in January 2002 by which time Riverside had been on site for over a month. Even having heard at the January site meeting the extent of the work done, the engineer, Peter Fraser, did not visit the site because, he said, he had not received a copy of the message statement. In my view, that was an example of a general laxness amongst parties borne mainly of a lack of communication and understanding of their respective roles and responsibilities. The major misunderstanding was on the part of Riverside. The predominant cause of Mr Petersen's death was Riverside's lack of skill and

experience and their failure to plan and institute safe systems of working and adequate supervision. They failed to understand or undertake their responsibility for a detailed survey. They failed to institute an adequate propping plan to support the structure as dewatering progressed.

Role of Aberdeen City Council

There was evidence from Alexander Smith; Michael Crowe, and Paul Pillath on the involvement of Aberdeen City Council with the building of 411/2 under the Buildings (Scotland) Act 1959 and the Planning (Listed Buildings Etc) (Scotland) Act 1997 and as the authority dealing with applications for planning permission and building warrants. The evidence was useful in setting the scene and explaining the role of the local authority in such matters but, in my view, no act of Aberdeen City Council contributed to Mr Petersen's death. Nor did Aberdeen City Council omit to do anything which would have prevented his death. Accordingly, I do not rehearse the evidence of Aberdeen City Council's witnesses.

Lack of on site recording procedure

There was no system for recording the presence on site of any particular individual. The result was that no one could be sure whether Erik Petersen was still on site at the time of the collapse. Such a system would have been a good working practice although its absence did not, in the very particular circumstances of this incident, contribute to Erik Petersen's death which followed almost immediately on the collapse.

Lack of on site hierarchy/supervision

Brian Russell of Riverside took the decision at the outset of the works that it was not necessary to have a foreman on site. Derek Cryle was the most experienced of the Riverside workforce but was not a foreman. Brian Russell visited the site daily but there was no clear hierarchy of responsibility or control on site in his absence. Consequently, when the first beam fell and Riverside's workforce left the site, no one took responsibility for clearing the site and telling Erik Petersen that he must also leave.

Conclusion

The causes of this accident were manifold and inter-related. Correct implementation of existing codes of practice would have significantly reduced, if not eliminated, the risk of a fatal accident. Riverside Construction Limited have acknowledged their responsibility by pleading guilty to criminal charges in respect of Mr Petersen's death.

I have already noted that the consensus of opinion was that the use of the mini-digger by Mr Wilson on the instructions of Riverside Construction was not good working practice.

Having carefully considered the evidence and the submissions made on behalf of all parties, including Mr Petersen's family, I am of the view that there are no useful

recommendations which I can make. Although building sites are inherently dangerous work places, had the existing regulations been complied with and existing good practice followed, the likelihood of Mr Petersen's death occurring would have been greatly reduced if not eliminated.