

2011 FAI

SHERIFFDOM OF TAYSIDE, CENTRAL AND FIFE AT DUNFERMLINE

DETERMINATION

OF

**IAN DUNCAN DUNBAR, SHERIFF OF TAYSIDE, CENTRAL AND FIFE AT
DUNFERMLINE**

IN TERMS OF

**THE FATAL ACCIDENTS AND SUDDEN DEATHS INQUIRY (SCOTLAND) ACT
1976**

INTO THE DEATH OF

**ROBERT CRAIG MACDONALD (BORN 24 AUGUST 1957) AND WHO DIED
ON 27 JANUARY 2010 AT THE FORTH RAIL BRIDGE**

Dunfermline.

25 January 2012.

The Sheriff, having resumed consideration of the matter, makes the following findings.

In terms of Section 6(1)(a) that Robert Craig MacDonald, born 24 August 1957 who resided at 97 Baillie Avenue, Harthill died on the west side of the Inchgarvie Cantilever or Tower of the Forth Rail Bridge on 27 January 2010 at approximately 19.15 hours.

In terms of Section 6(1) (b) that the causes of death were 1(a) multiple injuries; (b) blunt force trauma and (c) fall from height on the Forth Rail Bridge.

In terms of Section 6(1) (c) The death and the accident resulting in the death might have been avoided:-

1. If the deceased, Charles (Joe) McGinlay and Michael Muir had followed only authorised walking routes to get to their place of work.
2. If the deceased, Charles (Joe) McGinlay and Michael Muir not crossed a fixed barrier at the top of the Inchgarvie Tower in order to gain access to an unauthorised walking route.
3. If the deceased, Charles (Joe) McGinlay and Michael Muir not used an unauthorised route to go from the Inchgarvie Tower towards Bay 3 of the Inchgarvie Cantilever.
4. If, having identified that there were missing grates in bay 2 on the unauthorised walkway at the top of the Inchgarvie Cantilever, Charles (Joe) McGinlay had called a warning to the deceased and Michael Muir.

In terms of Section 6(1) (d) there was no defect in any system of working which contributed to the accident resulting in the death.

Note

1. In this Inquiry the Crown was represented by Ms Carrie MacFarlane, Procurator Fiscal Depute; Balfour Beattie Civil Engineering Limited (BB) by Ms Claire Bone, Solicitor; Thyssenkrupp Palmers Limited (TKP) by Peter Gray, Queens Counsel; Network Rail (NR) by Craig Turnbull, Solicitor; and the family by Peter Cooks, Solicitor.
2. I would wish to record my thanks to all the representatives for their presentation of the evidence to the Inquiry and for their very helpful submissions at the conclusion. Copies of the submissions are available with the Inquiry papers and I have not summarised them in this Note. The Inquiry heard evidence on 26, 27 and 28 September and 13, 14, 15, 16 and 19 December 2011 and, written submissions having been lodged there was a brief hearing on submissions on 22 December 2011. The witnesses gave who gave evidence were:-
 1. Charles Joseph McGinlay (Joe), Charge hand shot blaster and spray painter, formerly of TKP.
 2. Michael Muir, blaster/painter, formerly of TKP.
 3. Andrew Dowie, painter, TKP.
 4. Archibald Neilston, painter, TKP.
 5. Robert Muir, supervisor, TKP.
 6. George Lowe, foreman, BB.
 7. Andrew Anderson, Route Asset Manager, Structures, NR.
 8. Grant Cathcart, Detective Sergeant, British Transport Police.
 9. David Strang, former project manager, BB.
 10. John Corrigan, project manager, TKP.
 11. Christopher Davies, HM Inspector of Railways, Office of Rail Regulation.
 12. Stuart Walker, Health and Safety Consultant.
 13. George Michie, Structures Examiner, Amey Rail.

3. I would also wish to once again express my sympathy to the family of Mr MacDonald. They sat through the Inquiry and listened with great dignity while the evidence relating to the circumstances of Mr MacDonald's death was led before the court. It was clear that Mr MacDonald was a very well liked and respected gentleman who will be sadly missed by both his family and friends. His death was tragic and affected the lives of many people. The impact that his death had on some of his workmates who gave evidence was obvious to all who were in the court at the time.
4. The purpose of a Fatal Accident Inquiry in terms of the 1976 Act is for the sheriff to make a determination and findings under the headings laid out in section 6(1) of the Act. The powers of a sheriff do not go beyond making a determination in relation to the circumstances established to his satisfaction by evidence following upon investigation by the Procurator Fiscal and by any other party. The main purpose of such an Inquiry is to enlighten and inform those persons who have an interest in the circumstances of the death and to ensure so far as possible that members of the deceased person's family might have in their possession the full facts surrounding the death. An Inquiry ensures that the circumstances are examined and disclosed in a forum which is in the public domain and it will seek to establish whether there were any reasonable precautions which might have prevented the death and examined whether any defects in any system of working were identified which may have contributed to the death. It is not an exercise in which it is generally appropriate to attribute fault.
5. Unfortunately the main conclusion which must be reached from the evidence led before the Inquiry is that Mr MacDonald need not have died. Had he and his companions not taken an unauthorised walking route, he would not have fallen where he did. However, the evidence raised a number of issues which require to be examined. These include authorised and unauthorised walking routes, health and safety training and certain work practices.

6. Mr MacDonald and many of the other witnesses were employed on the contract to repaint the Forth Rail Bridge. This contract, which had been ongoing for about 10 years, was being undertaken by BB and TKP were, in effect, sub-contractors for part of the contract. BB had overall responsibility for the contract and all matters relating to work methods, health and safety were ultimately their responsibility. All sub-contractors including TKP had to satisfy BB's requirements. It is fair to say that these requirements were high as they needed to be on such a contract. The work involved blasting at high pressure with grit to remove all paint, dirt and other detritus, then re-spraying the metal work with new paint. Mr MacDonald and his colleagues were all shot blasters and spray painters and they all had reasonable experience in that trade. They had all worked on the Forth Rail Bridge contract for some time before this accident happened. The work was work at height and carried many inherent dangers. The evidence showed that those workmen who gave evidence were all well aware of the dangers and of the policies and procedures in place to minimise risk to themselves and to others. I think it is fair to assume that Mr MacDonald had a similar level of knowledge.
7. The Forth Rail Bridge comprises three Towers or Cantilevers, the Fife Tower, the Inchgarvie Tower and the Queensferry Tower. This incident relates to work which took place on the Inchgarvie Tower and Cantilever which is the central portion of the bridge. For the purposes of this Note I intend to refer to the "Inchgarvie Tower" as the topmost point accessed by the Alimak hoist and the "Inchgarvie Cantilever" as the whole span between the Inchgarvie Tower on the Fife side and the first tower of the Fife Cantilever. The men working on this occasion all gathered on the north or Fife side of the bridge where they would use the changing hut to put on safety footwear, high visibility jackets, hard hat, gloves and glasses before seeking to access the bridge itself. They would there be allocated the tasks for that shift. When they were undertaking shot blasting their special safety helmets were left at the site of the job or, on this occasion, the site where they had been working the previous night which was at the top of the Inchgarvie Tower.

8. The men then accessed the bridge using authorised routes. I will have more to say about authorised routes shortly. This involved taking an Alimak lift from ground level up to track level. There was then an authorised walking route at approximately track level which was taken to another Alimak hoist or lift at the Inchgarvie Tower. They then proceeded in the hoist to the top of the Tower where they picked up their equipment which would be needed for the work they were undertaking on that particular evening.
9. The work areas for shot blasting/painting were all enclosed or contained in what was described by various witnesses as “encapsulated areas”. This was done essentially to contain the waste which was being blasted from the bridge within an enclosed area. Part of the duties of the squad was to clean up and bag the waste that had been blasted in the previous shift. Access to these encapsulation areas was generally from an authorised walking or access route then by a series of ladders leading from the authorised walkway. In this case the men should have descended from the equipment store at the top of the Inchgarvie Tower using the Alimak hoist, then walked back along the access way and thereafter climbed a series of ladders to the work site at Bay 3 on the Inchgarvie Cantilever. That was the only authorised route to get to the work site and every witness in the case was aware that was the only authorised route.
10. On 27 January 2010 the charge hand was Charles McGinlay (known as Joe) and the squad comprised Mr MacDonald, Robert Muir and Michael Muir. Archibald Neilston and Andrew Dowie were also part of the squad but were tasked to do something else and not the shot blasting to be done at the work site in Bay 3 that particular night. Mr MacDonald, Mr McGinlay and Michael Muir were to go up into the encapsulation area to carry out the shot blasting with Robert Muir remaining on the ground to feed grit into the equipment. The previous evening they had been at the top of the Inchgarvie Tower and the helmets had been left there as they expected to be working there again on 27 January. The three who were to be

undertaking the blasting therefore had to go to the Inchgarvie Tower to fetch their helmets before making their way to Bay 3 to start work. Messrs Neilston and Dowie were to be working at the top of the Inchgarvie Tower collecting and bagging the waste from the area where blasting had been done on the last shift.

11. Those who were working on the bridge gave evidence that the nightshift was operating 12 hours from 7 pm, although this came as something of a surprise to witnesses from BB who thought that it was only from 9 pm for 10 hours. The result was that there was no-one from BB in a supervisory capacity on the bridge from 7 pm until 9 pm. It is, however, unlikely that if there had been such a person in place that this particular accident would have been prevented.

12. The various members of the team arrived and assembled at the Fife end of the bridge and having obtained their safety equipment they obtained instructions from Bob Muir, the foreman. That was when they were told they were to go to Bay 3 at Inchgarvie. They had thought they would be going back to the top of the Inchgarvie Tower which was why they had left their safety gear there the previous night. They left the hut area and took the Alimak up onto the bridge. They were walking along the authorised route towards Inchgarvie which was about half way across the Forth. At that point Mr McGinlay said that he suggested taking a shortcut from the top of Inchgarvie Tower to their work place and Michael Muir and Mr MacDonald both agreed. That shortcut was along a walkway at the top of the bridge. The walkway was an unauthorised walking route and all three of them knew that. No-one who gave evidence had been on this particular part of Inchgarvie Cantilever before although Mr McGinlay said he had been on the same part of the Fife Cantilever. He did not say if that was an authorised or unauthorised route. There was no suggestion that anyone was put under any pressure to take this particular short cut. There was no suggestion that Mr McGinlay, as charge hand, issued some form of instruction to do so. It simply seems that this was something that all three agreed to do. They all did it in the full knowledge that it was an

unauthorised walking route. No one seems to have given any thought to what lay beyond the barrier which was supposed to bar access.

13. From the top of Inchgarvie Tower, to access the unauthorised walkway along the top of Inchgarvie Cantilever, a number of physical barriers had to be overcome. There were a number of scaffolding poles in place and the evidence was that everyone knew full well this meant that they were not to be crossed. They were a fixed barrier. In other words they were there to prevent access and those who gave evidence knew that was their purpose. Beyond that barrier was a hazard hence the barrier was not to be crossed. However, to get access to the unauthorised walkway at the top of the bridge the three men clambered over or through the various scaffolding poles and, using the poles and handrails on the walkway itself, got themselves down to the walkway. A later witness, George Michie, suggested it was 12 to 15 feet from the Tower down to the walkway. Photographs produced show that getting through and over the barrier was not a simple exercise. Equipment was passed over one to another. Mr McGinlay went first, Mr MacDonald second and Mr Michael Muir third. Once Mr McGinlay was over he picked up his helmet, carrying it by a canvas handle and walked along the walkway which he described as similar to other walkways on the bridge with two rails, one on either side at about waist height. The walkway part comprised metal gratings or grilles and it sloped relatively sharply downhill from the Tower. He proceeded along the walkway until he came to what was described as a spar or a node or a bulkhead which was in fact the end of one of the main steel supports of the bridge. It created a solid barrier or obstacle between bays 1 and 2 which would require to be overcome before carrying on along the unauthorised walkway in bay 2. There did not appear to be any ladders or other means of climbing up, over and down again although there were various pieces of metal or bolts which gave hand and foot holds. Mr McGinlay climbed over it to the other side and felt that this did not cause him any anxiety. Once on the other side he carried on down the next part of the walkway and then came to a part where he saw gratings were missing. He says he became aware that they were missing about ten or

twelve feet away from them. At that point there is a reasonable slope on the walkway and he had to slow himself down as he approached. He paused to consider his position. He realised he was quite close to the job and was not keen on going back along the walkway over the node and along the walkway again to the Inchgarvie Tower with a view to going down the Alimak, along the authorised walkway, and up the stepladders. On the unauthorised walkway there were handrails and there were angle irons at the bottom which would normally have held the gratings in place. He decided to put his feet on these angle irons and shuffle along sideways while holding on to the handrails. He said he was not particularly anxious about it and chose to do it because he was close to the job and wanted to get there. He then climbed up and over and on to the top of the encapsulated area. He could not get into the encapsulation area so he put his foot through in order to get access via a ladder.

14. When asked closely about the gap in the gratings he said that he thought that if he could see it anyone could see it. He did not see anyone behind him on the walkway and therefore did not say anything. He did not shout a warning. He did not seem to think it was necessary to shout a warning.

15. Mr MacDonald was next to go along the unauthorised walkway. He had a black bin bag containing his helmet and was carrying it to the front. Michael Muir, on reaching the bulkhead or node between Bays 1 and 2, held Mr MacDonald's bag until he climbed up, whereupon he took his bag and Mr Muir's helmet and went over the top and Mr Muir then did the same. Mr Muir described himself as hesitant and said that he knew that this was not right. They then started to walk along the next part of the walkway, Mr MacDonald being thirty to forty feet in front of Mr Muir. They were walking down a slope. Each of them was using one of the handrails and Mr MacDonald was still carrying the bag with the helmet rather to the front or to the side. All of a sudden Mr Muir saw the bag go up in the air and he knew that Mr MacDonald had fallen. He immediately shouted that Rab had fallen. Mr McGinlay seems to have heard this but ignored it as he did not believe it. Mr Muir began to make his way back towards the top of

Inchgarvie Tower where he met Andrew Dowie. He kept saying that Mr MacDonald had fallen and he was extremely distressed. Mr Dowie took him down in the Alimak and made to go off the bridge by walking back to the Fife side. Mr Muir was extremely distressed and could hardly walk. Due to his distressed state his memory of the precise events at this time was not very good. In the meantime Mr Neilston made communication by telephone with Mr McGinlay who began to make his way down the ladders and at track level met Messrs Dowie and Muir. Mr McGinlay had heard Mr Muir shouting that Rab had fallen but had not taken it seriously describing it as a “wind-up”. Similarly, when he initially got the telephone call from Mr Neilston his reaction was that it was not serious but he very soon realised that something serious had happened. He left the encapsulated area and made his way down the ladders to the authorised walkway. He met Mr Muir and Mr Dowie.

16. Eventually the three of them (Messrs McGinlay, Muir and Dowie) got off the bridge and were in the tea hut. Mr McGinlay and Mr Muir were panicking about what they should say to the authorities when asked about the incident. They were afraid of the fact that they had taken a route they should not have done and that was the reason there had been a fall. Their initial reaction was to try to distance themselves from Mr MacDonald and, when initially spoken to by the police, they told them lies. They said that Mr MacDonald had taken that route on his own and that the others had taken the correct route. Within a very short time both Mr McGinlay and Mr Muir independently became ridden with guilt over the fact that they had lied about their friend's death and they realised that they could not live with having given the police false statements. They contacted their employers and the authorities and gave accurate statements to the police. It was then that the true facts about what had happened on the bridge came to light.

17. Mr MacDonald's body was found at a level beneath the tracks and was eventually removed from the bridge. It was thought that he had died instantly as a result of his fall which was at about 19.15 or shortly thereafter. It took some time for emergency services to access the bridge

but there is no suggestion that any delay contributed in any way to Mr MacDonald's death. He was dead when seen on the bridge by a paramedic who pronounced life extinct at 2247 hours.

18. It was clear from the evidence that every employee of any company going onto the Forth Rail Bridge contract was given a full safety induction before being allowed access to the site. For BB that safety induction took the form of a PowerPoint presentation and stills from that presentation form BB production No 1. This emphasises the fact that the whole bridge should be regarded as a hazard where men were working at height and everyone should be wary of slips, trips and falls. Other issues include the fact that it was a railway line and could be subject to extremes of weather. There was a specific part dealing with safe walking at height and the need to use ladders and how to use them safely. The presentation specifically said that barriers should never be crossed without authorised permission. It was recognised that barriers could be rails such as scaffolding poles put across and fixed in place to prevent access to a particular area. It was clear that the use of scaffolding poles in this way was a widely recognised and acceptable means of designating forbidden access areas. There was also considerable emphasis on what constituted a safe access route and the need to only use such routes. All of this was clearly and well known to the men who gave evidence and there is no reason to believe that Mr MacDonald's knowledge was not similar.

19. The men were also given what were termed "toolbox talks" which were either a talk or a paper placed in the hut which they had to read and sign. This would deal with a specific aspect of health and safety such as barriers, slips, walkways, etc. One dealt with access and stressed shortcuts should not be taken and the access provided should be the only route taken. Shortcuts referred to both work practices and using non-authorised routes which may be a shorter distance. There was another emphasising the dangers of hurrying whether that was hurrying on site or hurrying the job. These were intended to reinforce aspects of the safety requirements as laid out in the induction. The men who gave evidence understood this and

seemed to grasp the importance of such talks. They all signed acknowledging when they had received a toolbox talk.

20. At the start of the shift the foreman would instruct what was to be done by the men on that shift and thereafter there was what was called a 'Take Five' procedure where there was an assessment of the work to be done and the way to go about it. It was, in effect, a risk assessment of the work to be done and the area in which it was to be done. That was supposed to be done once the men had reached the actual work site but appears to have been commonly carried out in the hut or at the tea hut on the bridge where breaks were taken. The 'Take Five' forms for 27 January were signed by the four men who went out onto the bridge to do the work including Mr MacDonald. This was the opportunity for them to specify if there was anything which concerned them about the job to be done. No such concerns were raised. The form was undoubtedly signed by them all before they went up the Inchgarvie Tower and, as they never reached the work site, could not have been completed there. While that is a breach of the rules and procedures, the "Take Five" dealt with the job itself and not access to it. The breach was perpetrated by the signatories. It could not have had any bearing on the death or the accident leading to the death. While BB or TKP collected and filed these forms they would have to rely on the men being honest about completion. A supervisor could not reasonably have been expected to be at all work sites to oversee the Take Five procedure. He would presumably have been satisfied if he saw the forms completed and they were either at the work site or in the tea hut on the bridge.

21. Many of the witnesses were asked time and again about the use of walkways or accesses. Authorised walkways were fully and properly designated and every witness was aware that only authorised walkways should be used. They were all aware that barriers meant "don't cross the barrier". It was mandatory. To breach it was a disciplinary matter. I asked one witness about this and the response was that the use of authorised walkways and not crossing barriers was "drilled into them". On the bridge

itself the safe access route usually consisted of a metal walkway with handrails. This walkway was just below track level. There were also walkways made up by blue scaffold board and handrails which were also below track level. The authorised walkways were lit and signposted. There are numerous photographs amongst the Crown productions of the safe access routes or "green routes" as they were sometimes called. Access from walkways to individual work sites was generally via the use of authorised ladders. There was a platform between each ladder which would allow employees to stop or rest during ascent or descent.

22. It was clear from the evidence that none of the workmen who were witnesses had, prior to 27 January 2010, used an unauthorised route to gain access to or egress from their work site while on the Forth Rail Bridge. No one said he was ever on an unauthorised route. That would seem to suggest that the message was understood. On that particular night, while the suggestion to use the unauthorised route came from Mr McGinlay, the decision to actually use it was a joint one and each person who gave evidence knew that the crossing of a barrier to reach that route was something specifically forbidden by their employers. There was no suggestion that anyone was under any pressure of time to get to work. There was no suggestion that there was any pressure put on anyone or any form of intimidation to use the unauthorised route. There was no suggestion Mr McGinlay issued any form of instruction. The fact that there was no supervision from BB on the site between 7 pm and 9 pm had no effect whatsoever on the decision taken by the employees. No-one was able to say why they took the decision other than it was a shortcut.

23. In addition to the induction and other on-site safety education each employee undertakes an annual refresher training course. On such a course the fundamental rules are reinforced including the rule about never crossing the barrier. Mr MacDonald and his colleagues received a refresher course training on 7 May 2009 and this took the form of the PowerPoint presentation earlier referred to. I am, therefore, perfectly satisfied that all the employees who gave evidence and who worked on

that evening was fully aware of the health and safety requirements with regard to access to their work place. The actions of Mr McGinlay, Mr Muir and Mr MacDonald in crossing a barrier and going on to unauthorised walkways were clearly in breach of all their employers' very clear rules with regard to access. Mr MacDonald paid for that breach with his life and the other two with their jobs.

24. It is appropriate, however, that I consider if the guidance, training and general instruction given to employees was sufficient and fit for purpose. To do that I have to rely in the main on the evidence of the two project managers and the independent inspector.

25. The inquiry heard from David Strang of BB and John Corrigan of TKP about the risk assessment procedures in place on the site. David Strang is currently the operations manager with Cape Industrial Services plc but he was with BB for ten years. In January 2010 he was the project manager for the Forth Bridge contract and he spent about five years on that project. He described the nature of the contract and said the client was Network Rail with the main contractor BB and sub-contractors TKP who were responsible for shot blasting and painting on the north part of the bridge. As project manager he was responsible for all safety, quality and planning in respect of the work and as far as BB was concerned he was the main employee on the project. Beneath him, Colin Hardie was the construction manager, and there were several supervisors, a planning team and a commercial team.

26. The main issue in the contract was working at height so the company had to develop a construction phase plan and identify risks, etc. This was highlighted in the production of a hierarchy of documentation beginning with the Programme Management, Health, Safety and Quality Plan which was a BB document described as a "high level document". This document was reviewed every four weeks by the project manager and some of the team and part of the purpose was to pick up the requirements of NR or any

other party. The overall plan was, therefore, kept under constant review and was adapted as necessary.

27. Beneath that plan were individual and task specific method statements known as work package plans. Alongside the work package plans were risk assessments for each and every activity carried out. An activity could have one method statement together with several risk assessments. Blasting, for example, would have its own risk assessments and there would be other activities under blasting which would also have risk assessments. Risk assessments were generated by the contractor and held by BB as document controller. BB would review and improve them as necessary.

28. The next level was referred to as "task briefings" which listed pertinent parts from the risk assessments and applied them to the particular sections of work which were to be carried out. These were delivered verbally to operatives by the charge hand or the foreman and each employee had to acknowledge he had received the task briefing. While they were oral there were also hard copies for the men to sign as evidence of that acknowledgement.

29. There were a number of examples in the Crown productions of task briefing documents and it is clear they covered a wide area including access, emergency controls and general safety. The sheets indicate who gave the briefing and all those receiving the briefing signed to acknowledge that it had been received. Mr MacDonald's signature appears on a number of such documents.

30. Below the task briefing were work place risk assessments or work face assessments which were also called "Take Five" within TKP. This assessment was to be done by the men at the work place when they arrived at the work site. It should have been at the work place and not anywhere else. Once again it required to be signed by those on the job and there are many examples in the productions of this being done. The

evidence that it had been done should have been at the work place and not anywhere else. Therefore if these men were working in the encapsulation area in Bay 3 the work face assessment should have been completed following an inspection of that work area. It should have included access to and egress from the work area. If that assessment was not carried out at the work face then, in Mr Strang's view, it became irrelevant. It was clear from the evidence of some of the work force that the "Take Five" documentation was regularly prepared before they reached the work face and was left, for example, in the tea area on the bridge. In relation to this current incident all documentation was prepared before the men went anywhere near the encapsulation area. That fact had no bearing on the accident which led to Mr MacDonald's death. All these forms were kept, filed and retained by BB.

31. Mr Strang stressed that all workers or prospective workers on the bridge received training. Those who were new received induction training which was necessary to get an authority or permit or tag to obtain access to the bridge. That training dealt with all risks on the bridge. It was provided by BB and mainly through their Health and Safety advisors. It was a PowerPoint presentation and was given to all their employees or sub-contractors. The presentation contained a number of "dos" and "don'ts" and dealt with, amongst other things, safe access routes, the use of tagged scaffold and non-tagged scaffold and what was authorised and what was not authorised. BB production No 1 was a printout of that induction training and it is clear that there is emphasis given to access and egress to the work areas, safe working at height, never crossing barriers and generally taking care. Within BB as a company in general the ethos was "Conscious Actions Reduce Errors" or "CARE" and that was constantly fed through presentations and briefings. There was a group initiative on zero harm and that looked at every activity across the business with the ultimate goal of having zero accidents or fatalities.

32. Mr Strang said that in his time on the bridge the accident rate was extremely good. For example in 2007 there were two million man hours

and no “lost time accidents” with lost time being defined as accidents reportable to Health and Safety where a man was off for three or more days as a result of the incident at work. The nature of the work meant that slips, trips and back injuries were relatively easy to come by. In the period from 2007 up to January 2010 there were two lost time accidents; one broken leg and one dislocated shoulder. This particular incident resulted in the operations being closed for four to five days.

33. All members of staff did an annual refresher course and management made sure no-one was missed. This was a full rebriefing on all the dos and don'ts and involved the same presentation as the induction with any additions or modifications.

34. Part of the training relates to safe walking routes which are generally scaffold walkways at rail level and these are used for all general access or evacuations. These are generally designated by green boards and signage and are lit with festoon lighting at intervals of two to three metres for the full length of the walkway. From these access walkways access to other parts of the bridge would be scaffolded and would indicate a safe access route. If this required workmen to go up or down this would be by ladders contained within the scaffold and with platforms at each flight of a ladder. There was an Alimak hoist at each of the main towers for personnel use. There was no other practical method of access to work areas and this was something that was stressed to all staff on a regular basis. The issue of safe access routes was dealt with at induction, at task briefings and at risk assessments. Management was not aware of other routes being used and there were no reported incidences of other routes being used.

35. John Corrigan was the project manager with TKP and he too gave evidence about the education and training given to staff members. TKP also included “tool box talks” which dealt with training and health monitoring. Two of the talks in 2009 dealt with what were termed the “hurry” trap and not taking shortcuts, i.e. not doing as instructed, both in

relation to a route and in relation to work. He had no experience or knowledge of workers taking shortcuts on the Forth Rail Bridge. He had no information about workers using shortcut routes. Crown production 5 related to accesses and that was signed by the workers who attended. He described the use of scaffolding poles as a fixed barrier to prevent access as being the industry norm and it was also the rule that if these were crossed it was a disciplinary matter. As far as he was concerned there had been no detailed assessment on the risk of the top or unauthorised walkway which was used by the men as a shortcut as there had been no work done on it. He did not think there had been any work on that area for about ten years and a full risk assessment would not be done until work was planned.

36. In connection with Health and Safety management, BB carried out frequent audits on their systems. These were both internal and external audits and were intended to ensure compliance. The evidence indicated that the general level of compliance was good. George Michie who had carried out inspections on the bridge said at various parts of his evidence that the Health and Safety regime was “excellent” or “very good”. The Office of Rail Regulation had conducted a preventative inspection just a week before the accident and Mr Strang indicated that he received good feedback from that inspection in relation to the systems in place at the time.

37. After the accident happened there was a two pronged investigation carried out. The first was by British Transport Police who were looking to see there was any criminality on the part of any organisation or individual. The second was by the Office of Rail Regulation (ORR) who focussed on compliance with duties under the statutory regime to ascertain whether there were any breaches of the relevant Health and Safety legislation and if there was any need to take enforcement action.

38. The statutory Health and Safety framework is laid out in the Health and Safety at Work Act 1974 which imposes general duties on employers to employees and others. It also imposes duties on individual employees to

comply with arrangements made for their safety and the safety of others. Underneath that principal statute there are a number of regulations which were relevant to the bridge contract. The Work at Height Regulations 2005 dealt with the specification of precautions to reduce the risk of falls from height. The Management of Health and Safety at Work Regulations 1999 imposed general duties of risk assessment and what companies had to do to control risk. The Construction (Design and Management) Regulations 2007 impose requirements on a number of duty holders who are managing a project. There were specific requirements for safety on constructions sites including requirements in relation to access.

39. The British Transport Police inquiry was led by Detective Sergeant Grant Cathcart who came into the inquiry in April 2010 once a good deal of the initial investigation had been undertaken. Statements had been taken from witnesses, photographs of the locus had been taken and productions had been secured. He familiarised himself with the matter by studying all statements, transcripts and productions. Thereafter he was party to a series of tape recorded interviews. He also familiarised himself with the locus, looked at the work place and the whole Health and Safety regime. He made a few observations resulting from his investigations. He commented that there did not appear to be any BB supervision on the bridge between 7 pm and 9 pm. He noted the possible unauthorised use of the Alimak hoist by workers not trained in its use. He also noted the failure to complete properly the "Take Five" documentation in respect that it was completed before the workers got to the work place. He did not, however, think that the spot check nature of supervision on the nightshift made it any more or less likely that the men in this case would not have taken the route. He did not consider the supervision to be of any relevance in relation to the incident. He felt the basic message in relation to unauthorised routes was well understood. Having heard the evidence at the Inquiry I agree with that position. There was no recommendation from British Transport Police in relation to criminal proceedings or enforcement action against any party in relation to this matter.

40. The independent evidence on all matters relating to Health and Safety and compliance came from two principal sources. Christopher Davies is one of HM Inspectors of Railways employed by the Office of Rail Regulation. He was called by the Crown and gave useful and informative evidence in relation to the health and safety regime and practices on the Forth Rail Bridge.
41. Stuart Walker is a Health and Safety consultant who was instructed by the family. I am reluctant to criticise an expert witness but I feel I must consider Mr Walker's evidence with some caution. He produced a report after the first tranche of evidence had been concluded and just before the second tranche of evidence was commenced. He conceded in evidence that in the preparation of his report he had not attended the Forth Rail Bridge. He had not seen the route taken by the deceased and his colleagues, nor had he spoken to any individual witnesses. It goes without saying he had not been in court when earlier evidence had been given, nor had he seen any transcripts of that evidence. Indeed, it may be that his direct witness evidence might be limited to transcripts of police interviews with Messrs McGinlay and Muir and a police statement of Mr Michie. In giving his evidence, at times he seemed reluctant to accept matters which had been laid out by other witnesses including Mr Davies. In short, a good deal of his evidence was speculation which was not always based on evidence. Where there is any difference of view between the evidence of Mr Davies and that of Mr Walker, I prefer Mr Davies.
42. The ORR, in effect, regulates NR to ensure it is complying with duties imposed on it under Health and Safety Law. It also regulates contractors working for NR and railway operating companies where there are accidents, incidents or complaints and conducts inspections to check compliance. The ORR role in an incident such as this would be to identify the cause and any action which required to be taken to prevent a repeat either on this site or elsewhere. It would seek to identify any breaches of relevant legislation and bring cases against any duty holder who has not complied with the duty imposed.

43. Another task of the ORR is to carry out inspections including what was termed as “preventative inspections” and the most recent inspection of the Forth Rail Bridge had taken place in January 2010. This was, in effect, an audit of the safety arrangements on the bridge although it was not a “hands on” detailed inspection of every aspect of the bridge. While the inspection was not carried out by Mr Davies he had access to its findings and said that there were no major issues ongoing at the time of the accident. The January inspection showed that there were no issues with access or egress on the bridge.

44. Mr Davies was taken through the various steps taken to educate workers on the bridge including inductions and briefings. He was also taken through the question of safe routes, barriers and signage and concluded that the safe routes were properly marked out. The system of barriers using scaffold poles was a common arrangement on construction sites. He felt it was clear from the instruction given that no-one should pass a barrier. His conclusion was that what was done was sufficient although there needed to be ongoing management to make sure that any failures were dealt with and to reinforce the message. He was not able to identify any previous incidents of workers taking unauthorised routes. The purpose of a barrier needed to be explained and that was done at the induction where it was made clear that what was beyond was unknown. The focus was to make people stick to authorised routes and that was an appropriate way to manage the use of such routes. In practice both BB and TKP did reinforce the message with their regular briefings etc for staff.

45. He touched briefly on the question of supervision on the bridge, the role of the charge hand and, in particular, nightshift supervision by BB. The night supervisor should be travelling round the bridge visiting work groups to ascertain that they are doing what they are supposed to be doing and there were no problems. It was a supervisory role. At the time of the accident, because of either a misunderstanding or a miscommunication between BB and TKP about the nightshift times, there was no supervision by BB

between 7 pm and 9 pm. It was unlikely, however, in his opinion, that the presence of a supervisor would have influenced the decision made by the three men on the night to take a short cut.

46. In relation to risk assessment of access he regarded that as both suitable and sufficient as the risk had been identified and suitable measures put in place. The designation of authorised routes was clear and appropriate and everyone knew what was meant. The workers were clear what the site rules were.

47. He was aware that the Alimak was, from time, to time operated by personnel who did not have an appropriate ticket. That was an example of rule breaking as, indeed, was decision leading to the accident itself, but his general impression was that the management was not aware of a culture of rule breaking although there were occasional instances where rules were broken. For example the "Take Five" forms were often filled in before arrival at the work face. This meant that it did not fulfil its intended role in the safety of the workers on the actual site. There was, however, no evidence that the management were aware of this. There was certainly no evidence that this had led to any significant problem.

48. A risk gap analysis is used to compare what was done by the company to manage risk with where the company ought to have been in relation to its procedures. It was not always possible to eliminate all risk but the requirement was for the company to take all steps that were reasonably practicable. In looking at the circumstances relating to Mr MacDonald's death he concluded that the duty holders had done what had been expected of them, namely provided a suitable means of access and barred other means of access. There was therefore no risk gap. The ORR had no recommendation for charges against any of the companies involved. It also looked at individuals involved, particularly Mr McGinlay, and there was no recommendation for any charges against him. He had not given an instruction to the other two and it appeared to have been a mutual decision. The level of training and information given to someone at

his level was minimal; therefore it was a very low level supervisory responsibility or duty.

49. NR carried out its own investigation and made a number of recommendations and these were identical to those which would have been made by the ORR. The ORR felt it therefore unnecessary to produce a separate list of recommendations. They simply told duty holders to implement the recommendations of NR. These included review of supervisory arrangements on the Forth Rail Bridge; the review of the training and competency in management arrangements for individuals at charge hand level, including making sure that duties were properly defined; improving the standard of supervision, especially at higher level; reinforcing arrangements for safe access or egress; enforcing the proper operation of the "Take Five" process; ensuring the Alimak was operated by competent individuals only and that there were sufficient individuals trained to operate it.

50. As Mr Davies stated, there was either a misunderstanding or some miscommunication in relation to supervision of the early part of the nightshift by BB. BB was under the impression that the TKP nightshift started at 9 pm and worked until 7 am. Mr Strang seemed genuinely surprised to hear that in fact TKP nightshift started at 7 pm and he was not exactly sure why this should be. It meant there was no BB supervisor on the bridge between the hours of 7 pm and 9 pm. The supervisor's duties would depend on the activity going on, but he would tend to go to the work areas to make sure everyone was working at what they were supposed to be doing. He would visit work places and would catch up with men during meal breaks. There was a lot of radio communication. No-one seemed to be aware of any problems in the past with the nightshift. While it may at first blush seem surprising that the main contractor with ultimate responsibility for Health and Safety on the bridge did not know when the TKP night shift actually started, unless a problem arose or there was some specific communication about working hours they might never have known. It would be easy to criticise BB for lack of supervision during this period but that

would be unfair in the absence of evidence from TKP or anyone else about why or when the practice developed and why BB might have been in the dark about it.

51. As far as this incident is concerned, unless the supervisor happened to be on the top of Inchgarvie Tower at the time that the men decided to take the unauthorised walking route, he would not have been aware of their intention to do so. The lack of supervision between 7 pm and 9 pm, on any view of the evidence, played no part in the decision taken by the men and it is highly unlikely that the lack of supervision would have prevented them carrying out their intention.

52. Mr Macdonald fell to his death from the unauthorised walkway along the top of the bridge when he fell through a space in the walkway where gratings or grilles were missing. Some of the evidence relating to that particular area was slightly confusing in respect that I was not one hundred per cent clear if BB or TKP had ever carried out a detailed risk assessment of the area. It does not seem to have been specifically assessed as there had been no work carried out on it. It was also not clear who, if anyone, might have known that the grilles were missing and when that might have been known. If they had been removed by anyone no one knows when or by whom that was done. What can be said is that it is highly unlikely that they would have moved on their own as a result of, for example, high winds. Their weight should have kept them in place even if securing clips were missing.

53. In looking again at the evidence it may well be that the top walkway had been included in the original overall assessment of the risks on the bridge, but, as there had been no work carried out on bays one and two of the Inchgarvie Cantilever, there had been no detailed risk assessment of that area. If there had been a detailed risk assessment it would, or should, have identified any missing gratings, but there is no reference to missing gratings in that area in any of the documentation. There was evidence from some witnesses that there were missing gratings on various walkways

on parts of the bridge. The inspections carried out and spoken to by Mr Michie did not identify missing gratings in the relevant area. There was no suggestion in the evidence that either BB or TKP was, in any way, negligent in not having carried out a risk assessment on the unauthorised walkway at a time before work had been done or planned in that area. Mr Walker expressed views on risk management and assessment but I did not find much support for his views in the evidence in general.

54. It was suggested that the contractors ought to have known that there were missing gratings and once they knew there were missing gratings there ought to have been specific barriers and specific warnings about gaps in the walkway. It was fairly clear from the management evidence and the expert evidence that it was not common practice to designate the nature of the risk at a barrier. The existence of the barrier was seen to be enough to be prevent access. What was beyond such a barrier was described as “unknown”. Nor was it common practice further along an unauthorised or barriered walkway for there to be a second barrier with an explanation of why that barrier was necessary such was the level of knowledge amongst the workforce about why the barrier was in place to begin with. It cannot be said that further barriers or warnings were necessary. Everyone knew that a barrier was not to be crossed. There was good reason for it but it was not necessary to specify that reason. Significantly, Mr Davies did not criticise the lack of further barriers or explanation of why a barrier was necessary.

55. To consider when and how gratings might have been missing, it is necessary to look in particular at the evidence of George Michie. He is a structures examiner employed by Amey Rail and, as his title suggests, he examines structures to protect the safety and integrity of passenger trains. In carrying out certain of his tasks, including those on bridges, he requires to be able to abseil and he is a level three supervisor in abseiling. In 2005 there was a detailed part examination of the Forth Rail Bridge with the Inchgarvie Cantilever and Tower in particular being the subject of examination. That implies hands on to every part of the structure looking

for faults. On that occasion the examination identified matters such as paint loss, parts missing, loss of sections and the like. This was all placed into the data base and registered and it is then for NR to decide if any work was needed. His company's function was to report not recommend. He recalled that the 2005 examination took about six months and access was, at times, difficult and parts could not be properly accessed. There was an in-depth site induction for all those taking part and the broad message was "don't go outside boundaries, off walkways or green scaffold". They had rope access outside these areas but they had to get permission and provide a method statement before they went outwith these areas using ropes. They had to make sure that either BB or TKP knew exactly where they were going and where they were working.

56. He recalled in 2005 examining the top gangway on the west side (the gangway in question in this Inquiry) and described using a rope access and straps or harness in order to get into bay one. It was twelve to fifteen down on the scaffold from the Tower platform to bay one. He was tied on at all times and part of the rule is that there are two points of contact at all times (i.e. using hands and feet, two had always to be in contact). He described the descent from the Tower to bay one as "difficult". The ladder had been condemned some time before and, indeed, they were told at induction not to use ladders unless they had been put in place by the scaffolders.

57. He was able to walk along bay one using the walkway until he came to the node or bulkhead which he said was about eight feet high with a grab-rail at the top. Without rope access he would have found it terrifying and said that one would need a head for heights. He was abseiling and roped on and still found it somewhat scary. At the other side he tied on and abseiled down, not relying on ladders. In bay two the walkways were generally very good and they would not report unless they were corroded or missing.

58. He recalls the walkway being intact, although a few clips were missing.

This would not cause the gratings to move as their weight would hold them in place. He saw missing grates on other walkways and these were recorded. None of these walkways (at the top of the Tower) was authorised for access.

59. There was a visual examination in 2009 but not by Mr Michie. The examiners had the same access at trackway or walkway level and the higher parts were examined with binoculars. The report of that examination shows that in bay two there were a few grid clips missing and there were areas which they were unable to examine. There was, however, no mention of missing walkway panels or gratings. The only difficulty seeing these walkways would be those parts contained within encapsulation areas. The area of walkway in question could not have been in an encapsulation area as there had been no work done on that part of the bridge. It is not clear if an encapsulation area (or anything else) obstructed any part of the view to the walkway in question.

60. In general he found health and safety on the Forth Rail Bridge was excellent.

61. There was no witness who gave evidence who was aware of missing gratings on the walkway in question. There was no evidence as to how, when or by whom they might have been removed. There was no criticism of the fact (other than from Mr Crooks) that there was no specific warning of missing gratings and indeed no criticism of the fact that no-one seemed to be aware that gratings were missing. It would be sheer speculation to say how they came to be missing or indeed when they came to be missing. The last time that there was any comment that they were definitely in place was probably when Mr Michie saw them in 2005. He was able to speak of missing grates elsewhere on similar walkways (which were unauthorised). The question was asked should the contractors have anticipated that workmen would use that upper walkway as a shortcut? In my view they could not. BB and TKP were doing all that they could to make sure that

their workforce was aware of authorised and unauthorised routes. There was no evidence that there was any culture of using unauthorised routes. It was not, in my view, reasonably foreseeable that any workman would take this particular route to get from the Inchgarvie Tower to bay three.

62. The conclusion that I have reached in relation to this matter is that there is very little that any of the companies involved could have done by way of precaution to prevent the accident which resulted in death. I think there are two reasonable precautions which might have been taken and which might well have resulted in the death being avoided. The first reasonable precaution would have been for Mr MacDonald along with Mr McGinlay and Mr Muir to adhere to the site rules and use only authorised access routes. They should not have crossed a fixed barrier to access an unauthorised walkway. The second reasonable precaution which might have been taken was that once Charles Joseph McGinlay became aware of the gap on the walkway he should have issued a verbal warning to Mr MacDonald and Mr Muir. Mr McGinlay was clearly affected by this accident. He was at times quite distraught when giving evidence. He was not pressed as to why he did not think to give a warning to the others.

63. The solicitor for the family has invited a number of other findings under subsection (c) but I am not prepared to make any such findings. There is nothing in the evidence and, in particular, the expert evidence which in my view supports any of these proposals. There was some evidence that men sometimes did not adhere to the rules. There was unauthorised use of the Alimak hoist by untrained personnel. There was the failure to complete the work place risk assessment at the work place. Mr McGinlay suggested that he quite regularly did not read the Task Briefing but simply signed it. He explained that he was dyslexic. None of this amounts to a culture of ignoring rules. Had there been such a culture it is unlikely that Mr Strang could have spoken of so many man hours and so few reportable incidents. Some of it would have been very difficult for management to identify. Not much if any of it came to management's attention. The companies were not expected to achieve perfection. They had to have rigorous systems which

were well known to employees and they had to take all reasonably practicable steps to make sure that they were enforced. To me the evidence indicates that BB and TKP did just that.

64. I am further not prepared to make any recommendations under sub-section (d). The role of the charge hand was not particularly well defined but it seemed largely to relate to making sure that the squad of men were aware of the duties they were to perform and to make sure that the workplace assessment was properly completed. It was described as a low level of supervision and that is evidenced by the relatively small increase in hourly pay rate between the charge hand and the other men. There is no suggestion that Mr McGinlay issued any form of instruction in his capacity as charge hand to use this unauthorised walkway.

65. I do not consider that there is any evidence to suggest that there was inadequate risk assessment or there was any obligation on the companies to specifically mention even the possibility of missing metal panels on a walkway surface which was an unauthorised route properly barriered. Had there been evidence that either BB or TKP knew about missing gratings then that might have been different. There was no such evidence.

66. Why the grilles were missing on this walkway is a mystery and will, it seems, remain a mystery. The fact remains that the men knew they should not be on the walkway. They knew they should not have crossed the fairly significant barrier at the Inchgarvie Tower. In particular they should not have gone on to an unlit unauthorised walkway some time after 7 pm on a January night. I consider that there were no reasonable precautions which could have been taken by TKP or BB to have prevented the accident taking place. There was no evidence that there was any defect in any system of working which contributed to the accident resulting in Mr MacDonald's death.

67. The conclusion, therefore, is that the reason why Mr MacDonald had an accident which resulted in his death was the decision taken by Messrs

McGinlay, Muir and MacDonald to disobey all the rules and use an unauthorised route. They knew it was unauthorised and therefore that there might be a hazard but they had no idea what that hazard might have been. Had they gone to their place of work by the approved and authorised route they would not have been on the top unauthorised walkway of the Inchgarvie Cantilever and thus exposing themselves to risk.