2010 FAI 19

SHERIFFDOM OF SOUTH STRATHCLYDE DUMFRIES & GALLOWAY AT LANARK

DETERMINATION

by

NIKOLA CAROLINE STEWART

Advocate, Sheriff

In Inquiry into the circumstances of the death of

ANDREW ANDREWS

In terms of section 6 of the Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976

LANARK, 30 April 2010

The Sheriff, having resumed consideration of the Inquiry, DETERMINES as follows:

1. In terms of section 6(1) (a) of the Act that Andrew Andrews, who was born on 14 August 1946, died at 14.30 hours on 29 November 2007 at Wishaw General Hospital as a result of injuries sustained in an accident which occurred at or about 12.41 hours on the same day at Sandyholm Garden Centre, Crossford.

2. In terms of section 6(1) (b) of the Act, that the cause of death was blunt chest and abdominopelvic injuries sustained as a result of an accident involving a

the detachment of a bucket from the boom of a JCB excavator which struck the deceased as it fell from height. The detachment occurred as a result of a loss in hydraulic pressure in the quick coupler which retained the bucket in place when power to the excavator was switched off. That loss in hydraulic pressure resulted from the leakage of hydraulic oil due to a missing "O" ring in a check valve within the quick coupler. The safety pin which would have prevented the bucket detaching and falling had not been inserted by the operator who had not grounded the bucket prior to the engine of the excavator being switched off. Mr Andrews entered the exclusion area of the excavator when the bucket was raised and it remained unsafe to do so. As a result of this combination of causal factors Mr Andrews was positioned under the elevated bucket when the locking jaw holding it in place opened, allowing it to fall and strike the deceased.

3. In terms of Section 6(1) (c) of the Act, that the accident and the death resulting therefrom might have been avoided had the site operator and JCB owner, Mr Turkington, and its operator, Mr McDowall, taken steps to demarcate and enforce the exclusion area around the JCB, had its operator inserted the quick hitch safety pin prior to using the JCB with the bucket attached and grounded the bucket of the machine prior to switching off the engine of the JCB and allowing the deceased to enter the exclusion area. The operator should have noted anomalies in the operation of the locking jaw of the quick coupler mechanism which indicated a problem with hydraulic pressure within it and reported them to the excavator owner for immediate repair.

4. In terms of Section 6 (1) (d) of the Act, that defects existed in the system of working which contributed to the death and to the accident resulting in the death. The failure on the part of the site operator and the plant operator to demarcate and maintain an exclusion zone around the JCB as it was in operation and of the site operator to provide a trained banksman throughout allowed the deceased to enter within the exclusion zone without impediment.

INTRODUCTION

This Inquiry relates to the death of architect and retired fireman Andrew Andrews on 29 November 2007. The inquiry took place at Lanark Sheriff Court and evidence was heard on 9 days between 8 and 12 February, 15, 19 and 22 February and 1 March 2010 with submissions being heard on 12 March 2010. Evidence for the Crown was led by Procurator Fiscal Depute, Mr G Dow. Mr David Warnock, owner of Sandyholm Garden Centre, was represented by Ms Wright, Solicitor. Kyle Turkington, the site operator, owner of the JCB in question, and employer of Shaun McDowall, was represented by Ms Watt, Solicitor. Mr R Fyfe, Solicitor, represented the Health and Safety Executive and Mr R Dunlop, Advocate, represented the Scottish Ambulance Service.

<u>The following witnesses gave evidence</u>:

- Mark Andrews, the deceased's son and Crew Commander, Strathclyde Fire and Rescue.

- David Warnock, former owner of Sandyholm Garden Centre.
- Graham McMinn, Inspector, Health and Safety Executive.
- Kyle Turkington, Contractor
- Colin Martin, Inspector, Health and Safety Executive.
- Shaun McDowall, Plant Operator.
- William Moutrie, Health and Safety Executive, chartered mechanical engineer.
- David Kennedy, Labourer employed by Kyle Turkington.
- Dr Robert Ainsworth, Forensic Pathologist, University of Glasgow.
- Steven McGurk, Watch Commander, Strathclyde Fire and Rescue.
- Gordon Tavendale, Inspector (retired) Strathclyde Police.
- Tracy Reilly, Paramedic, Scottish Ambulance Service.
- Steven Graham, Ambulance Technician, Scottish Ambulance Service
- Professor Colin Robertson, Consultant, Edinburgh Royal Infirmary
- Marcus O'Connor, Health and Safety Executive.
- Gary Wood, Paramedic, Scottish Ambulance Service.
- Russell Chandler, Training Development Manager, Scottish Ambulance Service
- Derek Shearman, Manager, Scottish Ambulance Service.
- Mr Tullett, Consultant, Accident and Emergency Department, Western Royal Infirmary, Glasgow
- Thomas Hagan, Scottish Ambulance Service

NOTE

1. Andrew Andrews (hereinafter referred to as "the deceased") died on 29 November 2007 having sustained an accident in the course of his employment as a self-employed architect at Sandyholm Garden Centre, Crossford.

2. On that day he attended at the site adjacent to the Garden Centre where new septic tanks were being installed as part of extensive renovation work being carried out to the Garden Centre. The work, involving the upgrading of services, was being carried out by a contracting firm owned and run by Kyle Turkington and had commenced on or about 20 November 2007. Mr Turkington was responsible for the overall operation and management of the site and attended on site most days albeit a hospital appointment delayed his attendance on that day. Shaun McDowall, a self-employed JCB operator, had been hired by Mr Turkington to carry out the excavation work on site. Mr McDowall had been a JCB operator for approximately 25 years, was certified by CITB as qualified to operate specified plant and had approximately 10 years experience in operating excavators of the type he was using on the day of the accident.

3. The excavator in question was a type JS130. It had been bought second hand by Mr Turkington approximately 8 months previously, had a current thorough examination certificate and had been appropriately maintained since. It had been retrofitted with a Hill Engineering Limited "quick coupler" to allow the

semi-automated changing of buckets and other attachments to the excavator. A moveable jaw on the quick coupler provides retention for the bucket. It is powered by a hydraulic ram which is supplied with pressurised hydraulic oil from the excavator's hydraulic pump. Mounted on the hydraulic cylinder is a hydraulic check valve which prevents the hydraulic cylinder from opening the jaw in the event of a hydraulic hose bursting. Later inspection of the hydraulic system revealed that the check valve had a missing "O" valve and as a result hydraulic oil was allowed to bypass the check valve causing a diminution in hydraulic pressure in the hydraulic cylinder and the resultant opening of the locking jaw.

4. The failure in this check valve would not be revealed by routine servicing and maintenance. The resultant loss of hydraulic pressure would however be apparent to an experienced operator using the machine. As a result of that loss of pressure the hydraulic cylinder powering the quick hitches' moving jaw would retract when power to the engine was switched off, allowing the bucket freedom to move and preventing insertion of the safety pin. On starting the excavator's engine, the moving jaw extends once again to secure the bucket. This relaxation of the jaw, and the resultant gapping between the locking jaw and the bucket, should have been obvious to an experienced operator as would the renewal of the hydraulic pressure when the engine was switched back on. This re-engagement would have been accompanied by a noticeable noise as well as a noticeable judder in the equipment and these signs would further alert the operator to a problem in the system. This disengagement and re-engagement would not occur if the hydraulic system was functioning properly.

5. Mr McDowall had been working on site for a number of days. He had been using the machine that morning, albeit for about only one hour. It is unclear how often he had used the machine in the preceding days albeit he must have used it in the installation of the other septic tanks.

6. The deceased was an architect and therefore was familiar with the generality of safety rules on a construction site. He also had experience as a fireman. He was on site specifically to check on work progress, albeit he had no direct supervisory responsibility for it. Although there had been no measures taken by Mr Turkington or others to warn or prevent the public from entering the site, any such measures would not have prevented the deceased from coming onto the site and approaching the ongoing work in the vicinity of the septic tanks. No steps had been taken, however, to physically mark out the exclusion zone which exists within the circle described by the extending arm of the JCB. Responsibility for doing so rested on both Mr Turkington, who accepted responsibility for controlling all risks on site, and on Mr McDowall as plant operator. Whilst the deceased should have been familiar with and aware of the risks involved in approaching a JCB under operation, such a physical sign would have reinforced the dangers associated with entering the area described by the arc of the extending arm and is likely to have caused the deceased to pause until invited in. There is some dubiety in the evidence as to where the deceased was when he was first spotted by Mr McDowall. Mr McDowall maintains that he did not see him until he was approximately 10 feet away from the machine whilst Mr Kennedy, the young labourer who was operating

as an untrained banksman at the time, thought they had both seen him at the same time some greater distance away and that Mr McDowall had acknowledged his presence with a wave. The point is of importance because it is Mr McDowall's position that he was taken by surprise by the deceased's sudden appearance from his blind side and as a result uncharacteristically failed to bring the bucket to earth before shutting off power to the JCB. Whilst I cannot resolve the conflict in the evidence between two witnesses having different vantage points and engaged in different operations, the existence of a physical demarcation is likely to have been respected by the deceased, giving Mr McDowall longer to respond to his arrival on site and follow the standard procedure, of which he was well aware, and lower the bucket to the ground before allowing him to proceed further. In any event, better training of Mr Kennedy, who it seems saw the deceased when he was still a safe distance away, would have resulted in him performing the duties of a banksman and preventing the deceased's approach until he was entirely satisfied that the JCB operator had seen and responded to his presence in an appropriate manner. Mr Turkington, Mr Kennedy's employer had provided him with neither training nor instructions in relation to this aspect of a banksman's job. No steps were taken by Mr Kennedy to stop Mr Andrews from advancing further or to specifically alert Mr McDowall. The deceased approached the JCB cab to speak to Mr McDowall without significant delay and whilst the arm of the JCB was stopped by Mr McDowall in the raised position.

7. Whilst these failures, of demarcation of the exclusion zone and of training to exclude intruders from entering it until permitted to do so, contributed to the

accident, the prime cause of the accident was the failure on the part of the operator, Mr McDowall to insert the safety pin provided into the quick hitch coupler. The pin, once inserted, prevents the opening of the locking jaw and the release of the bucket, even if the hydraulic system fails. It is a final fail safe which requires to be fitted at all times. In failing to fit it that morning, Mr McDowall ignored the manufacturer's warning posted on the wall of the cab to "never operate coupler without the safety pin installed". He did so having not noticed during his pre-use checks of the machine and whilst using it the warning signs described above which should have alerted him to a hydraulic failure in the system. He did so in ignorance of recent deaths which had occurred as a result of failures to install safety pins while using similar quick hitches. He claims to have done so only that morning because of the task he was performing which required the repeated repositioning of the bucket and therefore would have involved his repeated dismounting from his cab to remove and re-insert the pin prior to and after each bucket shift in quagmire conditions. Mr Turkington confirms that he had seen him use the safety pin in the past and had never had to pull him up for not using it. There is, however, real doubt, given firstly Mr Kennedy's evidence that he had at no time seen him insert a safety pin and, secondly, the location and condition of the pin out of easy reach under other items in the tool box, that Mr McDowall routinely used the pin on that job. Mr McDowall pled guilty to a contravention of S 3 and 33(1)(A) of the Health and Safety at Work Act 1974 by failing to insert the safety pin at Lanark Sheriff Court on 10 February 2010 and was fined £3,500 discounted to reflect an early plea.

8. Mr Turkington has since taken advice from the Health and Safety Executive in respect of safety procedures and has changed his work practices as a result. How this change manifests itself was not explored to any extent. I would expect it to include the following: the provision of suitable training to employees before asking them to undertake the duties of banksman; the consideration, creation and maintenance of appropriate exclusion zones to restrict access of members of the public and other visitors to work sites under his control and to control their movements once permitted onto them; the regular updating of information in respect of safety issues relevant to operations carried out on construction sites under his control.

9. Mr Andrews's death was not the only fatality associated with a failure to insert a safety pin when using semi-automatic quick hitches. A further three had occurred in the year prior to this accident. Closer enquiry by the Health and Safety Executive, in conjunction with major contractor groups, have revealed many incidents involving this piece of equipment albeit non-fatal and sometimes fortuitously resulting in no injury. Whilst investigation established that semi-automatic quick hitches are safe when used correctly, the evidence was that many operators were failing to lock the device by inserting the safety pin giving rise to incidents such as the present. No such problems exist with automatic quick hitches which incorporate an automatic locking system.

10. Alerted to problems associated with the safe use of semi-automatic quick hitches in early January 2007, the Health and Safety Executive have worked since to publicise the dangers associated with them, to amend EU regulations

in relation to their use and to eliminate the sale of new semi-automatic quick hitches within the UK. In March 2007 a Section Information Minute (SIM) on the safe use of quick hitch devices on excavators was issued to Health and Safety Inspectors, with a version 2 being issued in June 2007. All versions were placed on the Health and Safety Executive website. In December 2007 the Executive issued a safety alert on quick hitches. At the same time attempts were made to bring about amendment to the requirements of the Machinery Directive providing guidance to manufacturers in this field. Safeguard action was taken in March 2008 by the UK government registering an opinion as a member state that the requirements of the harmonized standard for quick hitches, Annex B of EN 474-1, did not meet the requirements of the Machinery Directive enacted in the UK as the Supply of Machinery (Safety) Regulations. In the meantime, the HSE, together with the construction industry and manufacturers have worked to achieve the voluntary withdrawal from sale of new semi-automatic quick hitches in the UK which took effect from 1 October 2008. Work is ongoing to secure the amendment of the European Standard on quick hitches later this year and the preparation of a new International Standard on quick hitches is hoped to be completed by 2011. The Strategic Forum for Construction Best Practice Guide for the Safe Use of Quick Hitches on Excavators was published on 4 February 2010. Whilst the Executive do not have the authority at present to ban the use of existing semi-automatic quick hitches, the steps taken by them, and by the industry generally, to publicise the issue and to influence the content of the training and testing of excavator drivers will have assisted to minimise the opportunities for further incidents involving the unsafe use of quick hitches.

For all of this the Health and Safety Executive are to be congratulated. There is only one aspect of their endeavours which is susceptible to criticism.

11. It was clear from the evidence of Mr Turkington, who owns and operates a number of excavators, and Mr McDowall that they were unaware of the publicity surrounding the deaths associated with failures to use safety pins in conjunction with quick hitches prior to Mr Andrew's death. Both were primarily engaged in construction work in the agricultural sector. They operated in isolation from larger enterprises and other plant operators who would be likely to receive up-to-date input in relation to industry concerns, did not follow the construction press and were unused to accessing information via the internet. Albeit Mr McDowall was regularly tested in order to retain his operators licence, his last testing had been carried out in or about 2004, did not involve any input in relation to semi-automatic quick hitches and he was not next due for testing until 2009. There was no system in place, it seems, for the notification of such isolated, self-contained workers in relation to safety concerns within the industry. Whilst steps were taken by the Health and Safety Executive both to issue the SIM and give interviews in the Construction press as to their concerns and whilst Mr O'Connor passed on information in this regard to his opposite number in the agricultural sector of the Health and Safety Executive, no action was taken to specifically target JCB owners and operators within this sector. Whilst no evidence was provided to the Inquiry by anyone associated with the Agricultural Sector of the HSE, I was told by Mr O'Connor that the decision was taken by those responsible for it to "piggyback" on the steps taken by the construction side of the HSE in the

belief that the agricultural side was limited in size and therefore potential for incident and that those engaged in it would in any event pick up the alerts issued more generally. The fact that neither Mr Turkington nor Mr McDowall was aware of the concerns gives the lie to that assumption.

12. I regret I was not impressed by the assertion that nothing else could be done. Whilst I appreciate that the HSE has constraints upon its ability to reach all those who might be involved in the use of semi-automatic quick hitches in the course of their employment, not least in terms of its budget and data protection issues, it is difficult to avoid the conclusion, having heard the evidence of Mr O'Connor, that their failure to reach such outworkers as Turkington and McDowall resulted from their lack of appreciation of the scope and nature of the use of excavators in the agricultural sector. The focus on the few farmers who own an excavator allowed them to fail to recognise the role played by owner-operators, small contractors and self-employed operators in hiring out their services to farmers requiring small scale excavation work to be carried out. Once there is an appreciation that there are a substantial number of such operators operating mainly within the agricultural sector and that it is these very operators who, by the nature of the jobs they carry out, are less likely than those operating in larger sectors such as construction and rail to come into contact with regular Health and Safety Executive updates and enforcement, the understanding follows that they therefore require additional effort to be reached.

13. Both Mr Turkington and Mr McDowall read the agricultural press on a regular basis. If the media coverage provided by the construction press had been encouraged in the agricultural press, with interviews being specifically directed to that sector, then it is likely that, either directly or by association, the message would have reached these men that there were problems associated with the locking mechanism in semi- automatic quick hitches and the failure to use the safety pin. Mr McDowall was clear that had he been aware of these problems, he would have used the safety pin. His evidence was that he employed a risk analysis before determining it was safer not to employ the safety pin. If this is so he would have factored this information into that matrix with only one possible conclusion – failure to use a safety pin costs lives.

14. Mr O'Connor spoke of the difficulties in identifying JCB users and of therefore communicating directly with them. Given the absence of any universal data base associated with ownership or usage of such machines and of the perhaps insurmountable difficulties in acquiring one, his point is readily accepted. However, a more imaginative use of the resources already available may have resulted in increased awareness of the problem identified as sufficiently serious to require an amendment to European directives and the cessation within the UK of the supply of semi automatic quick hitches. Many, perhaps most, JCB operators hold cards certifying their ability to operate certain JCBs to an appropriate standard. Mr McDowall did. Whilst the HSE have no direct control over the various independent organisations who provide training, testing and certification of such skills, it seems, from the evidence of

Mr Moutrie and Mr O'Connor, that they have an awareness of their activities and that discussions have taken place with one training organisation about including a section on the safe use of quick hitches in the training and testing for renewal of cards as well as for the initial provision of them. There may have been many difficulties associated with initiating discussions at an earlier stage with such training groups with a view to exploring the possibility of them using their data bases of accredited operators to publicise the concerns of the HSE in this area. I don't know if this is so or what they might have been since this course seems not to have been considered or explored by the Health and Safety Executive. I regret I was unimpressed with Mr O'Connor's submission that no attempt should have been made because not all operators hold certification and could therefore have been contacted in this manner and in any event it was unnecessary to do so. It clearly was not unnecessary to publicise the dangers of using a semi-automatic quick hitch without a safety pin as widely as possible in order to try to avoid further fatalities or injuries. The Health and Safety Executive clearly worked hard and long to publicise the issue and to take steps to prevent further incidents. It is justifiably satisfied with the endeavours of its employees, as far as they went. It is however difficult to avoid arriving at the conclusion that had it correctly identified the full extent of the constituency affected by the problem, it could have directed its efforts more productively and imaginatively in an attempt to include men such as Mr Turkington and Mr McDowall, albeit I fully recognise that there can be no guarantee that such efforts would have necessarily borne fruit in the sense of reaching their targets and in altering their risky behaviour. Given the somewhat defensive nature of the evidence of some of those witnesses best

placed to assist the Inquiry as to how this could be achieved within the remit of the Health and Safety Executive, I am not in a position to make any specific recommendations in this regard, but would expect and recommend that further consideration be given to the issues raised by the Health and Safety Executive.

15. Much evidence at the Inquiry was directed towards exploring the delay involved in getting Mr Andrews to hospital. The accident occurred at or around 12.41 hours. Mr Andrews arrived at the hospital at least one hour thirteen minutes after an ambulance had been summoned by which time he had suffered respiratory and cardiac arrest. Although he was pronounced dead at 14.30 hours the doctors who gave evidence were all agreed that all hope of saving his life had gone by the time he suffered cardiac arrest, approximately 8 minutes from arrival at Wishaw General Hospital. One of the most agonising aspects of this very distressing case is the concatenation of events which resulted in the delay experienced by Mr Andrews who so bravely endured pain and discomfort throughout.

16. At post mortem he was found to have sustained the following injuries: a right occipital laceration which did not penetrate the full thickness of the scalp; fractures of the right 5th to 12th ribs paraspinally and to the left 3rd to 8th ribs laterally and 9th to 12th ribs postero-laterally; a fracture dislocation through the T6/T7 intervertebral disc; both lungs had collapsed; a fracture of the right transverse processes; a fracture of the right sacroiliac joint; the symphysis pubis has been separated; the left hemidiaphragm was lacerated and a portion of the transverse colon was herniated into the left thoracic cavity. It was

concluded that he died as a result of the combination of blood loss from these internal injuries and impaired ability to breath as a result of the rib fractures and diaphragmatic rupture.

17. It took 28 minutes for the first ambulance to arrive at the scene (at approximately 13.10). Whilst the Scottish Ambulance Service currently has a response target of 8 to 14 minutes the incident took place in a rural location with associated access difficulties and these targets were not achievable. The ambulance dispatched was, according to the system utilised by SCA, the closest available, with an estimated 15 minute estimated time of arrival. There were initial difficulties encountered by the dispatcher in locating the scene of the incident, the satellite navigation system used by SCA being only as good as the information it contained. In this case, that information was out of date and Sandyholm Garden Centre did not appear on it, despite having been opened over a year under that name. The ambulance was therefore dispatched to the nearby Silverbirch Garden Centre. Whilst that mistake was quickly rectified and was responsible for negligible delay, the two centres being on the same road, it may have been responsible for the ambulance being assigned a route through Lanark. The evidence was that there was no means available of updating the navigation system mid journey to incorporate new information. Those of us who are familiar with the location from which the ambulance was dispatched and its destination were surprised at the route it was directed to take. Had it been directed along the M74 to junction 8 and from thence to Garrion bridge, it is likely to have arrived much closer to the 15 minute estimate initially provided. Evidence was provided by Mr Shearman, a

manager in charge of dispatch control for SAS, that the system for despatch was constantly under review and may have been altered. To meet targets and thus to maximise their effectiveness ambulance crew need to have the most accurate and up to date information available to them, including route directions. There will inevitably be a lag between the creation of new addresses and their input to the data base of the navigation system and there may be benefit in SCA exploring whether manual input can be achieved both between updates to the entire system and during a response to a call as better information becomes available. It may be, however, that such input during a call can now be achieved, the evidence not being clear on this point, and accordingly no recommendations can be made in this regard. In any event, in this case, the decision of what route to take would have had to be taken at the outset and any update would quickly come too late to successfully implement. Having embarked upon the route via Lanark alteration of that route would have cost more time.

18. The first ambulance to attend did not contain a qualified paramedic. The issue of whether or not this made any difference to the treatment received by Mr Andrews at the scene was carefully explored. A paramedic can provide treatment that technicians are not qualified to give, including establishing intravenous access, intubation and the administration of opiate pain relief. The latter would not have been available to the deceased because of the depressing effect it would have had on his already impaired .respiratory system. Intubation outwith hospital, it was agreed, should not be attempted until the patient becomes unconscious. By that time a paramedic was caring

for the deceased and attempted, albeit unsuccessfully, to intubate him. No blame attaches to him for that failure given the condition of the deceased at the time: in respiratory failure in the back of a moving ambulance negotiating difficult roads at speed. Since November 2007 the SCA has been successful in increasing the number of paramedics within the service and most crews today consist of at least one paramedic. It was concerning that the question and answer protocol utilised by SCA operators at the time did not apply a red dispatch code – that is the highest priority code - to Mr Andrews because the significant and life-endangering respiratory difficulties he was experiencing did not trigger such a response. It was reassuring to hear that the protocols involved were subject to regular review and that that situation would no longer arise. In any event, it would not have altered the nature or timing of the response to this call. The same ambulance and crew would have been dispatched. A paramedic was summoned within nineteen minutes of the arrival of the first ambulance and was in attendance approximately 12 minutes thereafter at 13.43 hours.

19. None of the doctors were able to speak confidently of Mr Andrew's chances of survival had he reached hospital earlier. At best, on the more optimistic view taken by Mr Tullett, his outcome might have been different had he got to hospital one half hour earlier, at or about the time he was producing stable readings at 1332 hours. In his view, the timely provision of intravenous fluids and blood clotting factors and the support of his blood pressure would have increased the window of opportunity to enable surgical intervention to take place. Mr Tullett has the greatest experience of all of the doctors in dealing

with field trauma situations such as this and his evidence as to the crucial importance of the administration of blood clotting factors was persuasive, but even he was unable to say on a balance of probabilities that the delay affected Mr Andrew's chances of survival. Attempts made by the paramedic, once the deceased had been transferred to his ambulance after his arrival at 13.43 and before departure at or about 13.58, to insert a cannula in order to commence fluid rehydration were unsuccessful. The deceased's system was it seems under considerable stress by this time increasing the difficulties in inserting a line. The window of opportunity was therefore extremely tight and it is not clear what effect the administration of fluids and anti-clotting agents in the small quantities available in the field would have made had they been commenced at or about 13.32 hours. Mr Tullett was clear that they would take a minimum of 30 minutes to take effect. As I understood his evidence the deceased's best chance involved him getting to hospital as quickly as possible after the accident, at a point when his pulse was strong and his blood well oxygenated in order that he could receive the specialist care available there. That opportunity was fast receding by the time the first ambulance arrived and had gone by the time he suffered cardiac arrest *en route*. Mr Tullett was also clear that transfer to hospital by itself would increase instability in his condition and might have brought about cardiac arrest in any event.

20. However, whilst recognising that the delay in getting Mr Andrews to hospital may have contributed to his death in the sense of rendering that death inevitable, no blame attaches to anyone for that delay and there are real difficulties in formulating recommendations which could reasonably have

prevented it occurring. The first ambulance became stuck in the mud at or around 13.35. Had it not, Mr Andrews would have arrived at the hospital at or around 13.45 and therefore prior to suffering respiratory and cardiac arrest. Whilst it was clear from the evidence that the driver had very little experience in ambulance driving and that he seemed to others to lack confidence in the manoeuvres carried out by him, he was operating in very poor conditions on an un-made-up road and the slightest deviation from the carriageway was sufficient to cause the ambulance to go off-road and become stuck. Having become stuck, he tried to extricate the machine by driving forward and back as a result of which the clutch was "burned out". There was no evidence to suggest his actions were unreasonable or contrary to training. It was clear from the evidence of Mr Hagan, the fleet supervisor, that it would not have taken many minutes of such manoeuvres to sustain the damage to the clutch. Whilst in retrospect it would have been possible to put something under the wheels to increase traction or to obtain a tow out of the mud, neither solution occurred to any of the many members of the emergency services in attendance at the time. The ambulance was routinely serviced, there was no indication that the clutch was faulty or that the ambulance itself should not have been in service. Evidence was led from Mr Chandler, Training Development Manager with the Scottish Ambulance Service, in relation to the training undergone by ambulance drivers. It was not explored in his evidence to what, if any, extent issues such as an ambulance becoming stuck in difficult road conditions are dealt with in that training. Given that ambulances are required at times to work in difficult weather conditions and, as we have seen, to negotiate bad roads, and given the potentially catastrophic results of clutch failure it may be that

further consideration could usefully be given to this topic by training providers.

21. Members of Mr Andrews' family were in attendance throughout the inquiry. I greatly appreciate the concentration, stamina and quiet dignity they maintained throughout often difficult evidence. I wish to convey my personal sympathy to them for the great loss they have suffered.