

SHERIFFDOM of TAYSIDE CENTRAL & FIFE

DETERMINATION

by

**ROBERT ALASTAIR DUNLOP, QUEEN'S
COUNSEL, Sheriff Principal of the
Sheriffdom of Tayside Central and Fife
following an INQUIRY held at Perth on
12th, 13th, 14th, 15th and 16th November 2001
into the death of**

BRUCE SCOTT THOMSON

PERTH, 30 November 2001. The Sheriff Principal, having considered all the evidence adduced, Determines:-

1. In terms of Section 6(1)(a) of the Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976, that Bruce Scott Thomson, who was born on 4th May 1956, died on 7th May 2001 at 1505 hours in Ninewells Hospital, Dundee as a result of injuries sustained in an accident which occurred on an unmanned level crossing at Moulinearn, Pitlochry, Perth and Kinross at approximately 1934 hours on 5th May 2001.
2. In terms of Section 6(1)(b) of the said Act, that Bruce Scott Thomson's death was caused by (a) multiple injuries and (b) blunt force trauma sustained in the said accident when the car in which he was travelling as a front seat passenger was driven across the said level crossing into the path of a northbound train, whereby the train collided with the said car.
3. In terms of Section 6(1)(e) of the said Act, that the following facts are relevant to the circumstances of the death:

- 3.1 Moulinearn is a small village situated a short distance to the west of the A9 Perth to Inverness road. The only access to the village is by means of a private road leading from the A9. There is nothing to indicate that the road is private nor are the public prevented from having access to it. The village is separated from the A9 by the railway line between Perth and Inverness and the private road crosses the railway line at the Moulinearn level crossing. The level crossing is situated approximately 10 miles north of Dunkeld and just under 3 miles south of Pitlochry.
- 3.2 The level crossing is a user worked crossing which, as its name suggests, is a level crossing that is operated by the road user. The railway line is protected by lifting barriers on both sides of the railway and at the side of each barrier there is a sign describing the correct method of operating the crossing. Above that sign there is another sign into which are set “miniature stop lights” (hereinafter referred to as the “msl”) which consist of red and green lights. The green light normally shows, but an approaching train automatically changes the light to red. The sign instructs users to check that the green light still shows after raising the barriers and then to cross quickly. Immediately adjacent to the signs is a pole onto which has been attached a klaxon, which gives an audible warning whenever the red msl is displayed. The klaxon is intended as a warning to pedestrians only. The appearance of the signs and the barrier on the east side of the crossing is depicted in photograph CC of crown production 2.
- 3.3 The barriers are raised and lowered electronically by the road user pushing and holding the appropriate control buttons. On each side of the level crossing there are three control stations. There are control buttons attached to the same pole as the klaxon. There are also control buttons attached to poles on either side of the road leading to the crossing and at about one car’s length distance from the barrier. These latter buttons (hereinafter referred to as “the low-level buttons”) were originally intended for use by disabled drivers, who could apply the controls without leaving their car. In practice most users of the level crossing use these controls.

- 3.4 The red msl and the klaxon are activated when a train passes over a treadle located on the track at a distance of just under one mile from the level crossing. At the maximum line speed of 80 miles per hour a train will take 40 seconds to travel from that point to the level crossing. Once the train has cleared the level crossing the red light is extinguished and in its place the green msl is illuminated. The audible warning ceases. Throughout the period when the red msl is illuminated and the klaxon is sounding it is still possible to raise and lower the barriers by application of the control buttons.
- 3.5 The layout of the level crossing was authorised by an Order made by the Secretary of State for Transport in the exercise of his powers under section 1 of the Level Crossings Act 1983. The Order came into force on 31st July 1997 (Crown production 15) and required Railtrack plc to "provide, operate and maintain the barriers and other protective equipment" specified in the Order, including a number of signs prescribed by the Private Crossings (Signs and Barriers) Regulations 1996 (SI 1996 / 1786). The Order was later varied by a variation order, which came into force on 1st March 1998.
- 3.6 The Order was the culmination of an approval process in which the essential features were a) a proposal by Railtrack plc to modify the crossing, b) discussions with and assessment by HM Railway Inspectorate and c) a statutory consultation process with other interested parties.
- 3.7 HM Railway Inspectorate provides advice to operators by publishing guidance on specific aspects of railway construction. Guidance in relation to level crossings is provided in "Railway Safety Principles and Guidance on level crossings" (hereinafter referred to as "RSPG") (Crown production 20). It provides examples of good practice acceptable to the Inspectorate and was guidance relevant to the approval process for the Moulinearn level crossing.
- 3.8 At the time of the accident, the level crossing complied in all material respects with the requirements of the Order as varied and the 1996 regulations. Provided the instructions for operating the crossing are seen, understood and obeyed by users, the level crossing can be used with safety.

- 3.9 There are approximately 4080 user worked crossings in the United Kingdom, of which 99 are vehicular crossings with miniature stop lights. The majority of user worked crossings with barriers are operated by the user raising the barriers by pump action. This requires the user to get out of the car to operate the pump. The level crossing at Moulinearn is unique in Great Britain in having electronically operated barriers that can be activated from low-level buttons at a point set back from the barriers and to which there is open access by the public.
- 3.10 In order to use the low-level buttons, drivers will tend to position their car on the right hand side of the approach road to the level crossing. On the approach from the A9 this results in the driver of a car operating the barriers from a position remote from the signs containing the instructions for use and the miniature stop lights. In such circumstances there is a risk that a driver will not notice either the instructions or the red msl, if activated. If drivers are unaware of the instructions for operating the crossing, there is a risk that they will associate the raising of the barrier with a signal that it is safe to proceed across the level crossing.
- 3.11 On 5th May 2001 Bruce Thomson was a front seat passenger in a car being driven by his partner Jane Rogerson. They had driven from Huntly in convoy with another car belonging to Mr & Mrs Clegg. At the material time Mr & Mrs Clegg's daughter, Sarah, was a rear seat passenger in the car. When Jane Rogerson turned into the private road leading to Moulinearn she pulled over to and stopped at the low-level buttons on the right-hand side of the road. The Cleggs pulled in almost alongside her. Both front windows of Jane Rogerson's car were lowered and thereafter remained lowered. Jane Rogerson activated the raise button. At that time the red msl was illuminated and the klaxon sounding, having both been activated by a northbound train approximately 24 seconds earlier. Jane Rogerson did not appreciate that it was necessary to press and continuously hold the raise button to raise the barrier and she required to press the button four times before the barrier was fully raised. Having raised the barrier, Jane Rogerson drove the car onto the level crossing and into the path of the northbound train a few seconds before it arrived at the

crossing. At that point the red msl was still illuminated and the klaxon still sounding. The train collided with the rear near side of the car at a speed of just less than 80 mph.

- 3.12 In response to the approach of the train, the automatic equipment at the level crossing operated correctly as it was designed to do.
- 3.13 As a result of the collision, Bruce Thomson and Sarah Clegg were seriously injured. Jane Rogerson sustained injuries to her arm and shoulder and a blow to her head. She has since suffered from post impact amnesia and post traumatic stress.
- 3.14 The emergency services arrived quickly at the scene of the accident. Bruce Thomson was taken to Ninewells Hospital, Dundee. On 7th May 2001 his condition rapidly deteriorated and he died at 1505 hours that day. A post-mortem examination was carried out on 9th May 2001 by Dr. Eleanor Adams and Professor Derrick Pounder. The examination revealed a small subdural haemorrhage overlying the back of the brain and patchy subarachnoid haemorrhage overlying the surface of the brain. There were fractures of the ribs and a tear of the muscle between two ribs associated with blood in the left chest cavity. There were signs of atherosclerotic coronary artery disease and pallor of the heart muscle suggestive of a recently established myocardial infarction, probably precipitated by the stress of the injuries and their subsequent treatment. Death was attributed to multiple injuries due to blunt force trauma received in the accident.

NOTE:

In this Inquiry evidence was presented by the Procurator Fiscal, Dr. Griffiths, in person. Jane Rogerson was represented by Mr C N McEachran QC, instructed by Peacock Johnston, Solicitors, Glasgow. Railtrack plc was represented by Mr J Peoples QC, instructed by Macroberts, Solicitors, Glasgow. The Health & Safety Executive was represented by Mr I Macleod, Solicitor, Shepherd & Wedderburn, Edinburgh.

1. Legal Framework

The Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976 provides that a public inquiry may be held into the death of any person where “it appears to the Lord Advocate to be expedient in the public interest ... that an inquiry under this Act should be held into the circumstances of the death on the ground that it was sudden, suspicious or unexplained, or has occurred in circumstances such as to give rise to serious public concern ...” (Section 1(1)(b)).

It is clear from the terms of the application of the Procurator Fiscal, in respect of which this Inquiry has taken place, and the evidence led by him that the Lord Advocate has taken the view that the death of Bruce Thomson occurred in circumstances such as to give rise to serious public concern.

Section 6(1) of the Act provides:-

“At the conclusion of the evidence and any submissions thereon, or as soon as possible thereafter, the sheriff shall make a determination setting out the following circumstances of the death so far as they have been established to his satisfaction -

- (a) where and when the death and any accident resulting in the death took place;
- (b) the cause or causes of such death and any accident resulting in the death;
- (c) the reasonable precautions, if any, whereby the death and any accident resulting in the death might have been avoided;
- (d) the defects, if any, in any system of working which contributed to the death or any accident resulting in the death; and
- (e) any other facts which are relevant to the circumstances of the death.”

In terms of the Act the Procurator Fiscal has the responsibility in the public interest of investigating the circumstances of the death and placing before the court evidence bearing upon those circumstances. This procedure accordingly allows the circumstances surrounding a death to be brought under judicial and public scrutiny. It should be emphasised however that the Sheriff shall make a determination in relation to each of the matters in section 6(1) only so far as the circumstances have been established to his satisfaction. While issues may be raised and examined, with great benefit in enlightening the relatives of the deceased and the public, the evidence may not be sufficient to satisfy the court that there is a clear

conclusion that can be reached on those matters to which the various paragraphs of section 6(1) are directed. This is particularly relevant in this Inquiry to the question of whether I can make any determination in terms of section 6(1)(c). I shall return to this issue in more detail at a later stage, but it is with these general considerations in mind that I have made my determination.

2. Factual Circumstances of the Accident

There was little controversy regarding the factual circumstances of the accident. There is no suggestion whatever that the train was not being driven otherwise than in an appropriate manner. It is clear that the level crossing operated correctly and as it was designed to do. The illumination of the red msl and the sounding of the audible alarm were activated timeously and remained activated until the moment of the accident. Despite this, Jane Rogerson drove her car into the path of the train with the tragic consequences that have now been made known. A central question in this Inquiry is how that could have come about.

In considering this question, I attach particular importance to the evidence of Michael Gray, the head of the Ergonomics Section at the Health and Safety Laboratory in Sheffield. Following the accident he was commissioned by HM Railway Inspectorate to review the arrangements at the Moulinearn level crossing from the human factors point of view. His report on that review was produced as Crown production 22 and there are a number of factors identified in that report which may explain why Jane Rogerson proceeded onto the crossing.

Firstly, Mr Gray points out that, while drivers can get out of the car and operate the buttons at the barrier, there is no incentive to do so. The evidence that users of this level crossing almost invariably used the low-level buttons amply supports that observation. Secondly, he points out that, in order to use the low-level buttons, drivers will tend to position their car on the right-hand side of the road. This maximises the distance of the driver from the miniature stop lights and instructions (at least on the approach from the A9 side). In that position the msl will be approximately 45 degrees to the left of the driver's forward line of sight, whereas a zone extending only to 15 degrees to the side is recommended for the most important displays. He also points out that discrimination of colour is poor in the periphery of vision and that the colour red in particular is best seen towards the centre of the line of sight. Thirdly, he points out that the arrangement of the low-level buttons requires the driver to turn

away from the msl and instructions in order to operate them. Having operated the button the driver's focus of attention will be the effect of the operation of the button, namely the upward movement of the barrier. Fourthly, he points out that a raised barrier at a conventional level crossing leads to an expectation that it is safe to cross. A lack of familiarity with the user worked crossing may lead individuals into making the incorrect assumption that if the barrier is able to be raised it is safe to proceed.

Mr Gray's conclusion that a driver at the right-hand low-level buttons may not notice the red msl has some support in the evidence of Mr Hallam, a witness led on behalf of Jane Rogerson. He visits Moulinearn four or five times each year and has always operated the barriers with the low-level buttons. According to his evidence he had never read the sign and did not appreciate the significance of the msl. He had been familiar with the previous arrangements for the crossing, which had been operated by a keeper, and he assumed that if the barrier could be raised it was safe to cross. Councillor Howie, a resident of Moulinearn, spoke to several visitors to her house having made that same assumption. Mr Tilly of HM Railway Inspectorate accepted that such an assumption might possibly be made. I have no reason to question the credibility of Mr Hallam and, however unlikely it may seem, I accept that he was unaware of the signs to the left of the barrier and accordingly was unaware of the instructions for the proper operation of the crossing. In such circumstances the evidence would seem to support the view that a user might make the assumption that a raised barrier meant that it was safe to proceed.

On the other hand it seems clear that the level crossing must have been operated successfully by many users since its installation in 1997 and it cannot therefore be assumed that Mr Hallam's experience is one shared by everyone. In cross examination by Mr Peoples, Mr Gray accepted that a first time user would naturally look around for some instructions and that it was not difficult when looking around generally to see that there are instructions and lights. In such circumstances one might expect that there would be many people who would see the sign and read the instructions. I am satisfied that anyone who has seen, understood and obeyed the instructions can use the level crossing safely. It is no doubt in recognition of this that Mr Gray states in his report that "it is someone with a little familiarity who mistakenly thinks that they understand the arrangements who is most at risk of making an error."

Having said this, I found Mr Gray's evidence on the four matters that I have referred to persuasive and I am prepared to accept that there is a risk that some drivers will not notice the instructions or the red msl, if activated, and that, if they are unaware of the instructions, there is a risk that they will view the raising of the barrier as a signal that it is safe to cross. I have reflected this conclusion in my finding in fact 3.10.

Jane Rogerson stated in evidence that she did not see either the signs to the left of the barrier or the red msl. She stated that she did not hear the audible warning from the klaxon. All the legal representatives at the inquiry were at one in accepting that she genuinely believed that she did not see the red msl or hear the audible warning. Mr McEachran submitted that I should make a positive finding in fact that she neither saw the red light nor heard the warning. On the other hand, Mr Peoples submitted that the circumstances did not warrant such a positive finding and that there could be perfectly understandable reasons why she might not wish to recall these details.

I find it difficult to accept that the audible alarm could not have been heard, at least as the car was driven on to the crossing. It is certainly the case that this alarm was not intended as a warning for the occupants of cars. There was also evidence that it could not always be heard in a car if the windows were closed or the radio was on or if there was particularly noisy traffic on the A9. On the other hand, Mr Michie, a resident of Moulinearn, heard the klaxon sounding from a distance of approximately 55m. He described it as having quite a loud noise, a description that seemed to me to accord with what appeared from a video recording of the location at the time of a train passing. While I quite accept that I may have derived a false impression from the video, nevertheless I find it hard to imagine that an alarm that could be heard at a distance of 55m could not be heard by the occupants of a car that passes within feet of the klaxon with the windows open and the radio off.

I got no impression from the evidence of Jane Rogerson that she did not genuinely believe that she had not heard the audible warning. The reasons why that may be so are unclear. Whatever the explanation however, I do not consider that, in the state of the evidence to which I have referred, I can make a positive finding in fact that she did not hear the alarm. My conclusion in this regard cannot help but affect my view in relation to her assertion that she did not see the red msl, although the evidence of Mr Gray has demonstrated that that may well be so. Looking to the whole evidence on this issue however I do not think that it is

sufficient to satisfy me that I should make the positive finding in fact advocated by Mr McEachran.

It was argued that had Jane Rogerson heard the audible warning she would not have driven onto the level crossing, since she would have appreciated that it was dangerous to do so. She herself said that if she had heard the audible warning she would probably have stopped. While that might seem a logical conclusion to the lay person, according to the evidence of Mr Gray, if the road user is unclear about the instructions and hears an audible alarm, it does not necessarily follow that the alarm will be associated with danger. In the same way Mr Hallam did not seem to associate the red light with an instruction that he should not cross the level crossing. Given the evidence of Mr Gray, which I accept, there is no necessary inconsistency therefore between Jane Rogerson hearing the audible alarm or seeing the red msl, if she did, and any lack of appreciation of the dangerous position into which she put herself.

In the state of the evidence that I have been able to accept, the reason for Jane Rogerson proceeding on to the level crossing in face of the warning signals remains a matter of speculation. Having regard to the evidence of Mr Gray however, it is a distinct possibility that she did so because she did not properly understand the manner in which the level crossing could be safely operated and in particular did not appreciate that the raising of the barrier did not mean that it was safe to proceed.

3. The Layout and Operation of the Level Crossing

3.1 The Railtrack Moulinearn Level Crossing Order 1997

In terms of paragraph 10 of Schedule 2 of the Order it is provided that the barriers shall be raised by the operation of buttons “on each side of each road approach and adjacent to the traffic sign mentioned in Paragraph 12 below.” The sign that is referred to in that paragraph is the sign that contains the msl. A question arose regarding the proper interpretation of this provision. On the one hand it was argued that that sign had to be adjacent to all control points and on the other that it meant that there should be buttons on either side of the road and at the sign.

In my view the paragraph could have been better expressed and is capable of bearing both interpretations. Had I required to do so I would have preferred the latter interpretation. This issue however does not have any material importance since the layout was accepted by HM Railway Inspectorate at the time of its commissioning and their interpretation of the provision was that the layout did accord with its terms. Accordingly I am satisfied that it is proper to conclude that in all material respects the level crossing complied with the order as varied.

3.2 User Worked Crossings

There are many user worked crossings in Great Britain. According to RSPG (para.129), this type of crossing is only applicable where the railway crosses a private road. The railway is normally protected by gates but may be protected by barriers if authorised by HM Railway Inspectorate. Paragraph 10 of Table 1 in RSPG sets out the conditions in which a user worked crossing is suitable. The Moulinearn crossing was a location in which this type of crossing was appropriate. In the vast majority of cases the operation of a user worked crossing requires the road user to get out of his or her car and physically open the gates or barriers. In such cases the instruction signs relevant to the operation of the crossing will be clearly evident to the user. There is no requirement that the gates or barriers cannot be opened when a train is approaching.

RSPG identifies the signs which should be used with a user worked crossing and these signs are authorised by the Private Crossings (Signs & Barriers) Regulations 1996. The instruction sign to the left of the barrier at the Moulinearn crossing is shown at page 60 of RSPG as Diagram 110 (hereinafter referred to as the “110 sign”). HM Railway Inspectorate have taken the view that they should not approve any new level crossing in the future, but I did not understand any party to the Inquiry to suggest either that it was not appropriate to allow existing level crossings to continue in existence or that the generic standards for such crossings set out in RSPG were not appropriate, albeit some suggestions for improvement in the signage could be made.

3.3 Criticisms of the Layout at Moulinearn

In his closing submission, the Procurator Fiscal identified what in my view is the critical failing of this level crossing, namely that the arrangements do not ensure that the instructions

for its safe operation are clearly brought home to all users. Although much has been said about the fact that the barriers can be raised when a train is approaching, that is a state of affairs which applies to all user worked crossings (whether protected by gates or barriers) and is not in itself likely to give rise to danger if the instructions are properly brought home to all users and obeyed. I agree with the Procurator Fiscal in his submission that the level crossing is safe if the instructions are followed and this was a point of view that was accepted by almost all those witnesses who were asked about it.

The evidence of Mr Gray to which I have referred however shows that the layout, specifically the open access to the low-level buttons, does give rise to the risk that some drivers may not see the instructions and accordingly will not fully understand how the crossing should be operated. A principal issue in this Inquiry has been how best to address this critical failing. The approach of the Procurator Fiscal was to suggest ways in which the instructions might be brought to the attention of users more effectively. That approach was broadly supported by Mr Peoples and Mr Macleod. Mr McEachran on the other hand submitted that reliance on a notice giving instructions, even if read and obeyed, was not enough for this particular level crossing.

I now turn to consider these issues in discussing the improvements that could be made to the layout of this crossing as a means of addressing the risk that has been identified.

3.4 Possible Improvements to the Layout

I have had the benefit of hearing the evidence of a number of witnesses who have expertise in the field of level crossing design and operation. Mr Tilly of HM Railway Inspectorate, Mr Douglas, Production Manager of Railtrack, Mr Hall, an expert witness led on behalf of Jane Rogerson, and Mr Gray were all asked to give a view on certain improvements that were suggested to them. Railtrack plc have undertaken to consider all suggestions made in the course of the Inquiry. Mr Peoples submitted however that some suggestions were “deceptively attractive” and that I should accordingly exercise caution in making any recommendation that certain suggestions should be acted upon. Both he and Mr Macleod submitted that I should confine myself to identifying those suggestions, which appeared to me to be worthy of consideration. The Procurator Fiscal adopted a similar approach.

In my view these submissions are well founded. Any alteration to the layout at this level crossing will require to be submitted to the statutory approval process. It was clear to me that that process involves consideration of many competing factors. The adoption of one apparently simple and attractive measure may have other adverse effects and may not in fact be so simple as first appears. It is also important to have regard to the national picture, since there is an objective to ensure consistency at user worked crossings so far as possible. I have dealt with the matters in this section of my note accordingly.

a) Removal of the low level buttons

The original proposal, so far as concerns the low-level buttons, was to restrict access to authorised key holders. That restriction appears to have been removed in response to representations by Councillor Howie that in this day and age the crossing should be freely available to disabled drivers. All of the legal representatives submitted that the single most important factor relevant to the accident was the decision to allow open access to the low-level buttons, since that gave rise to the risk that users would not see the instructions. One obvious way to avoid that risk is to remove the open access low-level buttons altogether, thus forcing users to go to the buttons at the barrier, where they will be confronted by the 110 sign. That was a solution advocated by Mr Macleod and it has the merit of removing the characteristic which makes this crossing unique among user worked crossings.

This was not a solution favoured by Councillor Howie. Apart from her desire to make the crossing available for disabled use, she considered that it was more dangerous to get out of the car and use the buttons at the barrier than to use the low-level buttons. The reasoning behind that point of view was that, by using the low-level buttons, the user had more time to cross the level crossing once the barriers had been raised. I quite accept that there will be a longer period between the raising of the barrier and the user crossing the level crossing, since it will be necessary for the user to return to the car. On the other hand, if, having raised the barrier, a train strikes in and the automatic signals are activated, there is no reason why the user should not be aware of the signals. The instructions make it clear that the user should check that the green light is still showing and the purpose of removing the low-level buttons is to bring the user to a position where he or she is confronted by those instructions. The user who is returning to the car will also have no difficulty in hearing the audible warning. Accordingly I doubt that Councillor Howie's concern in this regard is well founded.

There is however in my view one negative consequence of removing the low-level buttons altogether and that is that there will be an increased likelihood of user indiscipline in lowering the barriers once the user has crossed the level crossing. One possible solution to that problem is to provide a low-level button on the exit side of the crossing that enables users to lower the barrier from their car.

I am sympathetic to Councillor Howie's point of view with regard to disabled access generally, but one should not overlook the fact that this crossing relates to a private road. Furthermore the evidence does not suggest any extensive use by the disabled. If it was thought desirable to pursue a solution that required the able bodied to use the buttons at the barrier, there could also be a restricted provision of low level buttons for those authorised disabled users, although it should be noted that this was not recommended as a form of mitigation in the risk assessment carried out as part of Railtrack's formal inquiry into the accident. There is no doubt that the removal of the low-level buttons would make the operation of the level crossing less convenient and that may be a disadvantage which has to be borne in the interests of safety. I see nothing wrong however in making a provision that is convenient for users, provided that there is no material adverse effect on safety.

b) Additional signs and msl

As I understood the various closing submissions, the question of additional signs only arises on the hypothesis that there is to be continued open access to the low-level buttons. In that event it was suggested i) that the sign containing the msl should be replicated on the right hand side of the barrier (approaching from the A9), ii) that the 110 sign should be replicated at the low-level buttons, and iii) that there should also be an audible warning at the low-level buttons.

So far as the first of these suggestions is concerned, there was considerable support for such an alteration. The evidence of Mr Gray, that the most important signs should be in the direct line of sight of the user, would suggest that this proposal is worthy of serious consideration. According to the evidence of Mr Tilly however, it would be important that the arrangements should be the same on each side of the level crossing and he had some doubt about whether there was room for the msl at the left of the barrier on the Moulinearn side. There was no evidence before me that would settle that doubt conclusively.

So far as concerns the second suggestion, that is one which was made in the report of Railtrack's formal inquiry (crown production 25 page 28). Although it appears from the report that Railtrack has accepted this recommendation, there was some doubt cast upon it by Mr Douglas. It is not entirely clear to me, on the evidence that I have heard, that such a proposal would be effective. Figure 4 in Mr Gray's report (crown production 22) shows a view of the low-level buttons from inside a car and on the strength of that figure it is questionable whether the detail of a 110 sign could be fully communicated to the driver while still in the car. It is not uncommon to get a false impression from a photograph, but if the impression is correct it seems to me to have material importance to the determination of the best solution to adopt. Mr Hall emphasised the general principle that the msl, the instructions and the control buttons should be kept together and Mr Gray was of the view that the instructions should be located by the buttons. If that cannot be done effectively it would in my view strengthen the case for removal of the low-level buttons. On the other hand, if the instructions were at the point of the low-level control and could be seen clearly that would put the user in effectively the same position as he or she would be if it were necessary to use the buttons at the barrier itself.

I would view the third suggestion of locating an audible warning at the low-level buttons as an additional measure worthy of consideration. The first two suggestions however are of more importance and I am inclined to think that it would be necessary for both to proceed together if there was to be effective mitigation of the risk that has been identified. Although this solution is worthy of serious consideration, it seems to me that there is a risk of sign clutter at the location of the crossing when viewed as a whole and I would question whether this proposal would be as effective as a solution that removed the low-level buttons altogether.

c) Isolation of the barrier controls

There was some discussion in the evidence about "interlocking" the barrier. That term was used rather loosely to describe a situation in which it is not possible to raise the barrier once a train strikes in. According to Mr Tilly, the correct use of the word is to describe a situation in which i) a signaller cannot give a green signal to a train unless the barriers are proved to be lowered correctly and ii) a signaller cannot raise the barriers if he has already given the train a green signal. In this latter sense, the evidence suggests that a proposal to interlock the

barriers could not be achieved without the installation of new signalling, unless one were to revert to the situation that prevailed before the crossing was modernised. Under the previous arrangements it was possible that road users could wait for up to 35 minutes before being able to cross the crossing. I did not hear anything which suggested to me that interlocking was likely to be a reasonable solution.

On the other hand there did seem to me to be some merit in considering whether the raise button of the controls could be isolated once a train has struck in, thus preventing the barriers from being raised. In the circumstances of this accident that would undoubtedly have prevented Jane Rogerson from raising the barriers and proceeding on to the crossing. Consideration of this issue is also relevant in the context of Mr McEachran's submission that reliance on a notice giving instructions was not an adequate safety measure. The foundation for that submission was the evidence of Mr Hallam, whose work experience extended to the investigation of industrial accidents and who advocated an arrangement which prevented people putting themselves in a position of danger however disobedient to or careless of the instructions given to them. He suggested that a similar approach to that taken in relation to the guarding of machinery should be taken in relation to this crossing.

Discussion on this proposal was rather confused by the notion that in such circumstances the barriers would automatically close if they had already started to be raised when the train struck in. Various witnesses spoke to the dangers of a car becoming stuck between the barriers and in my view it seems desirable to avoid any such risk. I was not impressed at all by Mr Hall's idea that one could create some sort of refuge for a car that did become stuck in that way. What I have in mind however does not involve any automatic lowering of the barrier, but rather the isolation of the raise button only. On the other hand I recognise that this would give to this crossing another characteristic not shared by other crossings of its type and this may be an indication that such a proposal would not provide the most effective solution. It certainly seems to me that Mr Macleod was well founded in his suggestion that if a barrier has been half raised a driver may attempt to cross and that this could bring its own dangers. In the same way, Mr Hallam's suggested approach would not accord with the approach to a wide range of other controls that are applied to the use of the road, such as traffic lights. The adoption of the sort of principle advocated by him would accordingly have implications for many activities beyond the alteration of the layout at this crossing. It is not an argument that I find compelling. Nevertheless it is a possibility that would perhaps merit consideration if an

evaluation of the other improvements that I have discussed led to the conclusion that there was still a material risk that users would fail to read and understand the instructions.

For the sake of completeness I should say that there was some examination of witnesses regarding the possibility of installing either a full barrier interlocked crossing or an automatic half barrier crossing. The evidence of Mr Tilly was to the effect that neither was reasonably practicable at this site because of its physical characteristics and location and no party to the Inquiry suggested otherwise.

d) Flashing lights

Mr McEachran suggested that flashing red lights should be installed to warn that a train is approaching. The rationale for such an approach is that it would more closely relate to the level crossing that road users are likely to encounter on the public highway. On balance I am inclined to think that that would be an unsatisfactory development, since it would remove the consistency that is sought to be achieved among crossings of this type. Furthermore, if the instructions for the operation of the crossing have been effectively brought home to the user it does not seem to me that there would be any necessity for these additional measures, even less so if additional instructions were given. On the other hand there is nothing to distinguish the road into Moulinearn as anything other than a public road and accordingly it is a suggestion that at least merits consideration, given the evidence of user misunderstanding of a raised barrier.

e) Additional instructions

There was considerable support from witnesses for the suggestion that the 110 sign should contain an explicit warning that the user should not cross if the red light is showing. In my view that would represent a significant improvement and is worthy of serious consideration.

f) Strike in distance

At the maximum line speed of 80 miles per hour a train will take 40 seconds to travel from the strike in point to the level crossing. The Procurator Fiscal, adopting the view of Mr Hall, suggested that that period should be increased to 1 minute. This proposal first emerged

during cross-examination of Mr Hall and I do not have the benefit of the comments on it from other witnesses. I am bound to say that I do not see the logic of the suggestion if one assumes that the instructions for crossing are seen, understood and obeyed. The evidence clearly shows that typically a car can cross in 5 seconds and I agree with Mr Macleod that the existing time is more than adequate in those circumstances, even if the user has to return to his or her car after raising the barrier. Mr Hall postulated a slow moving agricultural machine taking longer, but special provision is made for such traffic by requiring them to first telephone to obtain permission to cross.

g) Responsibility of residents

The Procurator Fiscal suggested in his closing submission that the residents had some responsibility for explaining to their invitees the proper operating procedures for the crossing. I consider that to be a counsel of perfection. While it may reinforce the effectiveness of the safety arrangements, I do not think that it adds anything and certainly cannot be seen in any way as a substitute for other safety measures. Furthermore I have already referred to the fact that there is nothing to show that this is a private road or that the public do not have access to it. The arrangements at the crossing should accordingly take account of the fact that in reality the public may have access along the road.

4. Reasonable Precautions – section 6(1)(c)

Section 6(1)(c) of the Act does not require me to go further than to consider whether a precaution might have avoided the death. It seems clear that the adoption of many of the improvements that I have discussed in the previous section might have had that effect. It is not enough to say however that there was a precaution that might have had that effect – it is also necessary to consider whether that precaution was reasonable.

In my view the evidence does not go far enough to enable me to answer that question and accordingly I am unable to make any finding under section 6(1)(c). The foundation of many of the suggested improvements that have been discussed is the report of Mr Gray. His report however makes it clear that there requires to be an evaluation of his factual findings. In his oral evidence he emphasised that he has only raised a number of issues and has not expressed a concluded view in advance of a consideration of the wider issues. That process has not yet

been completed and there was no attempt to mirror it in the evidence led at the Inquiry. In these circumstances I do not consider that I can presently go further than I have gone in section 3.4.

Mr McEachran pointed to the fact that there had been no assessment in 1997 of the risk posed by the new layout with open access to the low-level buttons. He submitted that had there been such an assessment either at that time or, in accordance with Railtrack's procedures, after three near misses had been recorded, the failings of this crossing that have now been identified by Mr Gray would have come to light. He invited me to make a finding in terms of section 6(1)(c) that had a risk assessment been carried out the accident might have been avoided. On the other hand, Mr Peoples pointed to the fact that even after the accident the risk assessment carried out by the Railtrack formal inquiry concluded that the crossing was fit for purpose and suitable for the level and type of use. Furthermore, the very fact that there had been an accident put those carrying out such an assessment in a better position to evaluate risk than those who would have carried out the assessment without such an experience.

I have some sympathy for the position advanced by Mr McEachran, but on balance I have concluded that there is an insufficient basis for me to be satisfied that I should make such a finding. Not only would the assessment have had to identify the risk that in fact emerged, but it would also be necessary to know what would have been the precaution taken to address that risk and whether it might have been effective to prevent this accident. It would also have been necessary to know what the results of the statutory consent process would have been. In my view the answers to these questions are too speculative to enable me to make the determination requested.

5. Conclusion

All parties were agreed that, in the event that I found myself unable to make any determination in terms of section 6(1)(c), I should nevertheless draw attention to such precautions that were in my view worthy of consideration by Railtrack and HM Railway Inspectorate. I have done that in section 3.4 of this note and I recommend that consideration be given to those improvements that I have identified as worthy of such consideration.

No party to the Inquiry suggested that I could make any determination in terms of section 6(1)(d) and in my view none is appropriate.

I have attached hereunder a list of those witnesses who gave evidence to the Inquiry and the order in which they did so.

List of Witnesses who gave evidence in the Inquiry

1. Derrick John Pounder, Department of Forensic Medicine, University of Dundee, Dundee [by Affidavit]
2. Roger Gilroy, Constable, Tayside Police
3. Jane Kathryn Rogerson, 5 Dowanside Road, Glasgow
4. Brian Raymond Scott, 24 Woodlands Court, Inshes, Inverness
5. Calum Murdoch McLean, 18 Denny Street, Inverness
6. James Menzies Clegg, 30 Stamperland Drive, Clarkston, Glasgow
7. Douglas Jardin Michie, Clunie Cottage, Moulinearn, Pitlochry
8. Andrew Herbertson, Atholl Cottage, Moulinearn, Pitlochry
9. Lorna Clegg, 30 Stamperland Drive, Clarkston, Glasgow
10. Steven Whittet, Constable, Tayside Police
11. Alexander Shaw, First Engineering, Salkeld Street, Glasgow
12. Timothy Paul Bernard Hallam, Consulting Mechanical Engineer, Quarry House, Fell Beck, Pately Bridge, North Yorkshire
13. John Tilly, HM Principal Inspector of Railways, 2nd Floor SW, Rose Court, 2 Southwark Bridge, London
14. Michael L Gray, Head of Ergonomics Section, Health and Safety Laboratory, Broad Lane, Sheffield
15. James Douglas, Production Manager, Railtrack (PLC), Buchanan House, 58 Port Dundas Road, Glasgow
16. Stanley Hall, 26 Brackenley Drive, Embsay, Skipton, North Yorkshire
17. Eleanor Jane Howie, Moulinearn, Pitlochry.