

**SHERIFFDOM OF SOUTH STRATHCLYDE, DUMFRIES AND GALLOWAY
AT DUMFRIES**

[2024] FAI 50

DUM-B241-22

DETERMINATION

BY

SHERIFF SCOTT PATTISON

UNDER THE INQUIRIES INTO FATAL ACCIDENTS AND SUDDEN DEATHS ETC
(SCOTLAND) ACT 2016

into the death of

ANTONIO JOAO DA SILVA LINARES

DUMFRIES, 4 December 2024

Table of contents

Introduction	4
The inquiry	4
The statutory framework	5
Participants and representation	6
The witnesses to the inquiry	7
Findings in fact	9
The circumstances	23
The wind turbine	24
Background to the construction project	25
The incident	26
The Health and Safety Executive's investigation	28
What happened after the fall: the rescue mission	30
Transfer of Mr Linares to the ground	32
Death of Mr Linares	36
Cause of death/post-mortem examination	37
Issues for discussion	38
Delay and alleged communication failures	39
The issue of availability of stretchers/spine boards	42
The issue of horizontal evacuation	44
The issue of drills	45
Section 26(2)(g) and wind turbine design	47

Health and Safety Executive recommendations	50
Looking to the future and the use of technology	52
Findings	55
Recommendations	57
Conclusion	58
Postscript	58

Introduction

1. Mr Antonio Linares died on 15 March 2017 after he fell at the top of a wind turbine in the course of his work as a wind technician. His death was tragic and he is sadly missed by his wife Ana and their 3 year old daughter. He was a careful worker and a well-respected colleague. There is a memorial cairn at the turbine where he died and colleagues gather to pay their respects on the anniversary of his death. The inquiry visited the turbine and observed a moment's silence at the cairn. All parties asked me to convey their condolences to his family and colleagues and I do so now together with the condolences of the inquiry. He was diligent and committed to health and safety at work and tragically, as will be seen, the evidence leads the inquiry to conclude that it is more probable than not that the accident occurred as a mistake he made at work that day for reasons that will remain unknown. The evidence also suggested he had made very few, if any of these in the past and our hearts go out to his family and friends.

The inquiry

2. This determination follows an inquiry into the death of Antonio Linares who died on 15 March 2017 at Wind Turbine A8 at the Kilgallioch Wind Farm, close to Barrhill, South Ayrshire, Scotland.

The statutory framework

3. Fatal accident inquiries and the procedures to be followed therein are governed by the provisions of the Inquiries into Fatal Accidents and Sudden Deaths etc. (Scotland) Act 2016 and the Act of Sederunt (Fatal Accident Inquiry Rules) 2017.

4. Mr Antonio Linares died following an accident at work and therefore was subject to a mandatory inquiry in terms of section 2(3) of the Act.

5. The purpose of the inquiry in terms of section 1(3) of the Act was to establish the circumstances of the death of Mr Linares and to consider what steps might be taken to prevent other deaths in similar circumstances.

6. An inquiry under the Act does not establish either civil or criminal liability. There is no restriction on the manner in which evidence might be presented.

7. The relevant rules of evidence are as near to the ordinary cause rules as possible. The standard of proof is the balance of probabilities and there is no requirement for corroboration.

8. The accident at work which prompted the inquiry was a fall by Mr Linares while working at the top of a wind turbine which was still in construction. This led to a serious head injury which led to his death.

9. The Procurator Fiscal represents the public interest in the inquiry's inquisitorial process. The Procurator Fiscal may lead evidence as may other parties and the court proceeds on the basis of that evidence. The determination must be based on the evidence presented at the inquiry and is limited to the matters defined in section 26 of the Act.

10. The scope of the inquiry extends beyond fact finding. It looks to the future and to the prevention of deaths occurring in similar circumstances.
11. Section 26 of the Act requires the sheriff to make a determination which in terms of section 26(2) is to set out the following five factors relevant to the circumstances of the death, in so far as they have been established to their satisfaction.
12. These are:
 - (i) when and where the death occurred;
 - (ii) the cause or causes of such death;
 - (iii) any precautions that could have reasonably been taken, and if so might realistically have avoided the death;
 - (iv) any defects in any system of working which contributed to the death;
 - (v) any other facts which are relevant to the circumstances of the death

Participants and representation

13. The parties (and their representatives) to this inquiry were as follows:

Gillespie, procurator fiscal depute for the Crown;

Smith, KC, for Siemens Gamesa Renewables

MacLeod, KC, for Scottish Power Renewables;

Anderson, solicitor-advocate, for Northstone Ltd, Energy Wind Ltd;

Bonomy, solicitor, for Anywind Energias Renovaveis;

Black, solicitor, for the Scottish Fire and Rescue Service;

Brownlee, advocate, for the Scottish Ambulance Service; and

Olson, advocate, for the Health and Safety Executive.

14. I am grateful to all parties for their professional, thorough and compassionate approach. The agreement of evidence and appropriate use of affidavits greatly assisted the inquiry. I also benefited from a visit to the windfarm site and the turbine in question and together with others observed a moment's silence in memory of Mr Linares at a memorial cairn constructed in his memory and covered in football scarves of the team he followed. I am grateful to Scottish Power Renewables and their legal team for arranging this visit which was of great assistance.

The witnesses to the inquiry

15. I heard evidence from the following witnesses:

Daniel Ferrier, Scottish Power Renewables

Mitchell Rankin, Scottish Power Renewables

Douglas Campbell, Scottish Power Renewables

Ian Madden, Scottish Power Renewables

David Wilson, Scottish Power Renewables

Patrick Murray, Northstone

Neil Sturdy, Northstone

Richard Guy, Northstone

Andrew Linton, Northstone

Robert McVitty, Northstone

Ross Taylor, Siemens Gamesa

Martin Wham, Siemens Gamesa

Sam Currie, Siemens Gamesa

Darren Robbins, Siemens Gamesa

James Currie, Siemens Gamesa

Norman Potts, Siemens Gamesa

Dennis McGinn, Scottish Ambulance Service

David McCreadie, Scottish Fire and Rescue

Jacqui McDonald, Scottish Fire and Rescue

Dr Samuel Ley, medical

Beth Rawson, Health and Safety Executive

16. In addition parties had agreed that I should accept the statements of the following witnesses as their evidence to the inquiry:

Pablo Fernandez Alvarez, Siemens Gamesa

Anton Bilbao Uribarri, Siemens Gamesa

Raul Tajés Cernadas, Siemens Gamesa

Pablo Vazquez Sabquirdo, Siemens Gamesa

Lourdes Lopez Moreno, Siemens Gamesa

Pedro Estevez, Siemens Gamesa

David Lima, Siemens Gamesa

Nelson Fernandez, Siemens Gamesa

Antonio Carvalho, Siemens Gamesa

Evidence was led in Dumfries Sheriff Court in September 2023 and January 2024.

Submissions were heard in June 2024 and I made avizandum on 10 June 2024. An issue arose during avizandum on which I required and received further submissions and I deal with this as a postscript.

Findings in fact

1. Mr Linares was a Portuguese citizen, born on 8 December 1979, and resided in Portugal with his wife Ana and 3 year old daughter. He had been employed by Anywind *AER* since September 2015 as a wind technician and had been working at the site since March 2016. He was a calm, respectful and quiet employee and work colleague. He was a conscientious worker who had an excellent attitude towards health and safety practice.

2. Mr Linares had a site induction by *Gamesa* on 21 March 2016 which included Working at Height (CP 5 Site Induction Record Sheet). He held all the necessary qualifications and was fully trained in respect of the work he was there to undertake Scottish Power Renewables (UK) Ltd (*SPR*) Company number N1028425 Registered Office, The Soloist, 1 Lanyon Place, Belfast, NI BT1 3LP incorporated 28 April 1994. Its principal activity is the development, construction and operation of on shore wind-powered electricity generation.

3. Northstone Ltd/FARRANS (*NI*) Company number NI004078 Registered Office 99 Kingsway, Dunmurry, Belfast BT17 9NU incorporated 19 May 1958 previously

known as Farrans Ltd 5.1.99 to 12.11.2004. The company is engaged in building and civil engineering, trading as Farrans Construction.

4. Siemens Gamesa Renewable Energy Wind Ltd (**SGREW**) company number 0736888 Registered Office Blade Factory Sir William Siemens Way, Alexandra Dock, Hull HU9 1TA incorporated on 8 September 2010. SGREW manufacture, construct, install, commission and service Wind Turbine Generators (**WTGs**) for renewable electricity generation. The company was previously known as Gamesa Wind UK Limited (**Gamesa**), between 8 September 2010 and 11 August 2017 and at the date of the accident on 15 March 2017. Its name was changed to SGREW on 11 August 2017 following the global merger of Gamesa Corporación Tecnológica S.A. and Siemens AG's wind turbine manufacturing business on 3 April 2017.

5. Anywind Energias Renovaveis (**AER**) is a Portuguese company Parque Industrial do Tortosendo, Rua D, Lote 94 6200- 823 Tortosendo. At the time of the accident Anywind had 15 years' experience in working in the energy industry. They were contracted by SGREW to unload, erect and electrically install a number of turbines on the Kilgallioch Windfarm site.

6. At the time of the accident, Kilgallioch Windfarm site was a construction site within Great Britain and fell under the Construction (Design and Management) Regulations 2015 (CDM). It now operates as a fully operational wind farm. The windfarm owner, operator and CDM client is Scottish Power Renewables (UK) Ltd (**SPR**).

7. SPR appointed *NI* as CDM Principal Contractor. The principal works to be carried out by *NI* were civils work and included the design, supply, construction and commissioning of all civil, electrical and SCADA infrastructure works associated with the installation of 96 WTGs, sub-station section and control building, construction of roads, replacement of a bridge, construction of substations, environmental, cabling, foundations for WTG, work compounds.
8. *SPR* also appointed *Gamesa* as the WTG provider and erector, a Contractor under CDM. *Gamesa* then appointed a number of sub-contractors to erect the wind turbines, one of which was *AER*, which employed Mr Linares. Frater Prevencion were subcontracted by *Gamesa* as the health and safety function for site. Avanti Wind Systems were subcontracted to *Gamesa* to install the lifts within the WTGs.
9. Construction on the site commenced around 1 June 2015. The project was known as Kilgallioch Wind Farm. It was under construction at the time of the incident. The completed project has 96 wind turbines. The site is located south of Barrhill within Ayrshire, and North East of New Luce within Dumfries and Galloway. The core of the site lies at elevations of between 150m and 320m above sea level. The site is centred at National Grid Reference NX220730.
10. The site entrance is approximately 5.57 miles to the main site compound. From the site compound to WTG A08 it is approximately 5.76 miles. From the site compound there are further tracks to all of the WTGs, spread across the 39 km² site. The total distance from the site entrance to WTG A08 is approximately 11.33 miles. At the time of the incident most WTGs were fully constructed with 10 to 15 still to be finished.

11. The WTG where the incident occurred is known as WTG A08 and is a G114 2.5MW model and 140 metres in height. Each G114 WTG has a tower, separated into four sections by metal platforms:

- From the base of the tower platform one (T1) is at 14m height
- Platform 2 (T2) is at 35m height
- Platform 3 (T3) is at 58m in height and
- Platform 4 (T4) is at 84m in height.

12. Within the top section of the tower there are a further two sections:

- a) The elevator deck. Known as this due to the elevator stopping at this platform, which is approximately 120 metres from the ground.
- b) The yaw deck – this sits 5 metres above the elevator deck and approximately 2 metres above it is the nacelle. It is believed the deceased fell approximately 5 metres from the yaw deck to the elevator deck.

13. Mr Linares fell approximately 5 metres from the yaw deck to the elevator deck. Once a WTG is complete, there is an elevator which can carry two people to the elevator deck, near the top of the tower. The lift is installed at some stage during the construction process. WTG A08, when the incident occurred, had not yet had a lift installed. There is also a ladder running from the base of the tower to the yaw deck, which passes through the platforms via trap doors which are spring loaded and automatically close as people pass through them. The floors of each tower section (T) are solid and so it is impossible to see anything which may be happening above or below. Each floor has an access hatch, which opens but must be closed behind the

person going through it. There is a Latchways fall arrest system in place for ascending and descending the ladder, with a steel wire running continuously from the base of the tower to the yaw deck, which includes the section where Mr Linares fell.

14. Anyone ascending the tower is required to wear a harness with a Latchways device which can connect to the steel wire, meaning they are connected to the fall arrest system whenever they are climbing up or down. The harness has two lanyards with large hooks which are used to transfer from the ladder to a platform, and can also be used as a back-up if the Latchways fails. The Latchways device will only slide down the wire if it is in the downward position, going from harness at chest height, down to the wire, and as soon as a person falls it will lock on to the wire.

15. At the time of the incident there were two emergency plans in place on site. One titled Pro 55 "Emergency Procedure - Kilgallioch Windfarm" was produced by NNI Ltd/Farrans, and the other titled Pro 35 Emergency and Evacuation Plan - Kilgallioch Wind Farm (United Kingdom) was produced by *Gamesa*.

16. On 15 March 2017, Mr Linares and his colleagues commenced duty on site at around 08.00 hours. They attended the daily briefing conducted by the health and safety representative from *Gamesa*. Meetings were carried out by *Gamesa* every morning at 08.00 hours. Thereafter, the supervisor for *AER* Pedro Beirão would carry out a further health and safety briefing whereby each individual was allocated their specific task for the day.

17. Mr Linares was under the supervision of his employer, *AER*, and took instructions from his supervisor.

18. A team was assigned to the task of installing an electrical cable at WTG A08. The team were Crown witnesses Pedro Esteves, designated team leader, David Lima, Nelson Fernandes, Antonio Carvalho and Mr Linares.

19. The task had been subject to a Risk Assessment and Method Statement - Electrical Installing (Cabling)(CP 53) which was carried out by AER and approved by *Gamesa* which Mr Linares became aware of on 21 March 2016 (CP 59) during his site induction.

20. During the morning, the team were on separate jobs on other turbines. After lunch, at approximately 13.15 hours they teamed up to attend at WTG A08 to install the electrical cable which ran the entire height of the WTG, from ground to the nacelle.

21. Mr Linares went to the nacelle, at the top to receive the cable. He had the control for the hook, which lifted the cable up the turbine. Nelson Fernandes believed that Mr Linares was wearing the Latchways fall arrest system to climb the ladder to reach the top. The other men were at different levels throughout the tower to guide the cable up the centre or remained outside to handle the cable reel.

22. Once the cable was installed, the team then began to tidy up. Mr Linares was within the nacelle. Nelson Fernandes was on the elevator deck. Pedro Esteves and David Lima were located in T3 of the turbine.

23. Nelson Fernandes had climbed down from the nacelle via the yaw deck, onto the elevator deck and the trap door had closed behind him. "At or shortly before 17.00hrs," Nelson Fernandes was tidying the elevator deck when he suddenly heard what he described as a boom and as looked around he noted Mr Linares lying on the floor

behind him, partially on the trap door of the elevator deck he was on. It was not clear how Mr Linares had fallen.

24. Nelson Fernandes (35) immediately saw that Mr Linares had a serious head injury and shouted out for help which was heard by David Lima and Pedro Esteves who both climbed back up the tower to the elevator deck to help. Pedro Esteves (40) made a radio transmission on a *Gamesa* radio in Portuguese for help which was overheard by Vasco Penedo who had already arrived at the base of WTG A08 to assist Antonio Carvalho with the cable, and Taigo Riblio.

25. When Mr Linares landed from his fall he was wearing his harness and had all the required kit to descend the tower safely via the ladder and Latchways system.

Nelson Fernandes was the only person present initially and he does not recall Mr Linares being attached to the fall arrest system. Pedro Esteves and David Lima were within the tower and next to arrive on the elevator deck. They saw that Mr Linares was wearing his harness and that they did not remove any attachment to the fall arrest system when they arrived. Nelson Fernandes and David Lima noted that Mr Linares landed with his helmet on, which was later found to be cracked with the hearing protection and head torch broken off. Vasco Penedo climbed up WTG A08 to assist and Antonio Carvalho remained at the base.

26. It was apparent that Mr Linares had not attached his harness to the fall arrest system, as he had been trained to do. Nelson Fernandes, Pedro Esteves, David Lima and Vasco Penedo attempted first aid and tried to stem the bleeding from Mr Linares' head with their shirts. Pedro Esteves was with Mr Linares and was trying to talk to him to

keep him awake. He noted that initially he was making some noises and was moving slightly, but that his eyes had turned. At this time, he was still breathing.

27. Pedro Beirao, *AER* Supervisor, was approximately 5km away when he heard the radio transmission to say there had been a fall and an ambulance was needed. He immediately made his way to WTGA-08, arriving there approximately 10-15 minutes later. When he arrived he put on his harness and took a first aid kit from his vehicle and went to Mr Linares. The other men were with him and he noted that Mr Linares was bleeding heavily and that some of his teeth were broken. He noted at that time that Mr Linares was unconscious and breathing rapidly. He relayed this to Gamesa on the radio. He was advised not to move Mr Linares. He remained there until the arrival of the emergency services. At around 5.00pm, Tiago Rebelo, *AER*, Site Manager, was already heading to WTGA08 to take a photograph of the completed job. Pedro Beirao and Tiago Rebelo arrived on scene within moments of one another. Pedro Beirao put his harness on and took a first aid kit with him, with Tiago Rebelo staying on the ground to coordinate as there were already four persons within the tower and he was of the view there were already too many people there. The bottom of the turbine was cleared so that the ambulance could have space. He also marked off an area on the ground for the medical helicopter to land.

28. The Scottish Ambulance Service (SAS) were first contacted at 17.10. An ambulance (GIR4870) containing Paramedics Sally Howatson and Dennis McGinn was allocated at 17.13 and dispatched at 17.14. The SAS call handler was told that

Mr Linares had fallen 10 metres, was still at the top of the tower, blood was flowing from his head and was alert albeit, dizzy.

29. Based on the information given to the SAS call handler, instructions were given to the caller in the following terms:

- 1) Do not move Mr Linares unless he was in danger.
- 2) Do not splint any injuries.
- 3) Reassure him that help has been arranged.
- 4) Do not give him anything to eat or drink.
- 5) Watch him very closely.
- 6) Get a clean, dry cloth or towel, any material will do so long as it is dry and clean. Place it right on the wound, press down firmly and do not lift it up to look. If it keeps bleeding, they are not pressing hard enough. Keep firm and steady pressure on the wound until the crew are right with the patient.
- 7) If anything else changes before the crew get to the patient, call SAS back immediately for further instructions.

30. These are standard instructions always given by SAS to a caller after a reported fall from height in the circumstances described.

31. The ambulance arrived at the entrance to Kilgallioch Wind Farm at approximately 17.29. The ambulance was escorted to WTG A08 by individuals already on site at Kilgallioch Wind Farm. They arrived at WTG A08 at approximately 17.55.

Mr Allan Marshall, SAS Area Service Manager for Dumfries and Galloway West, arrived at the locus at approximately the same time as the ambulance crew.

32. At approximately 17.56 Helimed5 and an emergency response team arrived at WTG A08. The Helimed5 crew contained Dr Sam Ley and Dr Richard Price.

33. After discussion with Consultant Dr Richard Price, it was agreed that Paramedic Dennis McGinn would ascend the tower and assess Mr Linares. He did so at approximately 18.10.

34. Dr Sam Ley from the Helimed5 crew volunteered to help Dennis McGinn and ascend the tower. He did so at approximately 18.20. During Dr Ley's ascent up the tower Dr Price set up a resuscitation area at the base of WTG A08 in anticipation of Mr Linares' extraction from the tower.

35. At approximately 18.27 Allan Marshall received an update from Dennis McGinn that Mr Linares had a significant head injury with blood loss and a Glasgow Coma Scale (GCS) of 5 (unresponsive but flexing to painful stimuli). Mr Marshall then received a further update that employees within the tower were starting to dismantle the escape hatches on the landings to allow Mr Linares to be extracted.

36. At approximately 18.31 Mr McGinn updated Mr Marshall that Mr Linares had become unresponsive with a GCS of 3 (no longer responding to painful stimuli).

37. Additional rescue equipment, including a spinal board and stretcher, had been brought from a nearby windfarm to assist, if required, in the extraction of Mr Linares from the tower.

38. At approximately 18.53 Dr Ley provided an update to confirm that Mr Linares had suffered a head injury, a pelvic issue, had lost radial pulse, and required a pelvic binder with more fluid. This was sourced by Dr Price and taken up to Dr Ley.

39. Mr Linares' harness was removed by Dr Ley to allow treatment and then re fitted to allow extraction down the tower. Whilst securing Mr Linares to the board, Dr Ley stressed that he should be kept flat (horizontally) so that his blood pressure and airway would not be compromised on his descent.

40. It became clear that this would not be possible due to the size of the board, when compared to the hatches the board had to pass through. Mr Linares' extraction would require the board to be tilted at an angle as he passed through the elevator openings (lift shaft).

41. On lifting Mr Linares by his harness for the first time, he went into respiratory arrest. Dr Ley therefore intubated him whilst still up the tower.

42. Mr Linares was then descended from the tower floor by floor, with ventilation provided regularly by Dr Ley using a bag and mask.

43. Mr Linares was brought from WTG A08 at approximately 19.30 hours and full resuscitation efforts began under the direction of Crown witness, Consultant Dr Richard Price. Mr Linares had been intubated by Crown witness Dr Ley in the WTG and had also been given 150mls of saline there. There were continuous chest compressions carried out and an intra osseous needle was inserted into Mr Linares' right tibia.

Dr Price also carried out a bilateral finger thoracotomy (opening the chest wall to check for a punctured lung). Mr Linares was given 3 x 1ml of adrenaline, 500mls of saline and 1 gram of tranexamic acid. Mr Linares remained asystolic, there remaining no response to any treatment administered. Efforts at resuscitation were then ceased.

44. Life was pronounced extinct at approximately 19.51 hours, 15 March 2017, by Crown witnesses Consultant Doctor Richard Price and Paramedic Dennis McGinn at the site.

45. A post-mortem examination, as detailed in Pro 173 Post Mortem Report, was conducted on Mr Linares within the mortuary at Dumfries and Galloway Royal Infirmary at 11.15 hours, 20 March 2017, by Crown witness, Consultant Pathologist Dr Kirsty Nale.

46. The cause of death was noted as follows: 1(a) severe head and chest injuries; (b) consistent with fall from a height.

47. Said pathologist commented as follows:

“The crucial feature of skull fractures is that they are a marker for the application of severe force to the head. The autopsy findings showed a contra coup type injury to the brain due to movement of the brain within the skull. The major force was deceleration and in this situation the injuries to the brain are found on the opposite side of the skull to the scalp injury. There was an extensive subarachnoid haemorrhage with underlying cortical contusion in the occipital region of the brain. The multiple fractures of the ribs with lacerations of the underlying lung were contributing factors”

48. Dr Nale was also of the opinion that the severe head injuries and chest injuries sustained by Mr Linares were both life threatening. When asked by police if the injuries were survivable she opined although she could not answer this question fully, she was able to say that there was a strong chance he would not have survived, even with immediate medical attention. Dr Nale was also unable to state if the length of time the deceased Mr Antonio Linares was in the turbine has impacted on his cause of death as he may well have died from the injury sustained in the fall.

49. Crown production 56 is a print out from the Scottish Ambulance Service Control relating to the incident.

50. The Health and Safety Executive (HSE) during their investigation have confirmed there were no issues identified with Mr Linares' equipment. There was damage found to one of his fall arrest lanyards but it had not been fully deployed and there was no evidence that it had been attached to any anchor point in the tower structure.

51. There were no injuries to Mr Linares' lower body. The injuries he sustained were consistent with him falling and landing head first, with his helmet on.

52. Crown witness Paul McCann, B Eng, Principal Engineer in the Engineering and Material Science Team of the HSE, prepared a report dated 31 July 2017 in relation to the items of Personal Fall Arrest Equipment worn by Mr Linares at the time of the incident. He examined the items at the HSE Science Division Laboratory in Buxton and also attended at the site on 20 April 2017 where he arranged for photographs to be taken and also examined the permanently installed work at height equipment there. Crown production 57 is said report with photographs contained within. From his investigation he concluded the following:

- Mr Linares had fallen from the vicinity of the yaw deck to the lift deck;
- Mr Linares' Latchways slider (used as a safety measure when climbing the ladder) was not connected to the anchor line;

- One leg of the twin tailed lanyard was extended indicating that it had been loaded. However, the lanyard had not separated and should have supported the user in the event of a fall;
- The harness and lanyard were in a generally acceptable condition (excluding the damage from deployment of one leg);
- The Latchways fall arrest system was fully functional without significant defect and
- There was no evidence that the lanyard had been incorrectly connected at the yaw deck.

53. In the opinion of Mr McCann, it was likely that Mr Linares fell while unattached and his lanyard became snagged during his fall, subjecting it to a dynamic load and causing partial deployment.

54. Had Mr Linares' harness been attached to the fall arrest system, the accident would not have occurred as it did and the death would likely have been avoided.

55. Following the accident, the circumstances were fully investigated by HSE with the cooperation of the duty holders, including *SPR, NI, Gamesa / SGREW* and *AER*. Separately, the duty holders carried out their own investigations. Safety documentation and procedures were reviewed and updated. In particular, the ERP for the site was revised and updated in cooperation with the Health & Safety Executive in August 2017 and further training and equipment was provided. Notwithstanding these positive changes, any serious accident on a remote site such as Kilgallioch will unavoidably bring challenges.

56. More widely, in the onshore renewable energy industry, positive improvements have been made since this accident. In September 2020, industry body “SafetyOn” published “SafetyOn Onshore Emergency Response – Good practice guidelines for onshore wind energy developments.” The guidelines were developed through industry collaboration and aim to provide a process that allow the duty holder to develop site-specific plans and procedures (ERPs) to mitigate the consequences of incidents and help protect casualties until they can be taken to a place of safety.

57. There was no spinal board or stretcher on the windfarm and one had to be brought from the neighbouring windfarm. In the circumstances where Mr Linares’s injuries were probably not survivable this was not causally connected to his death.

58. It was not possible to bring Mr Linares down from the site of the accident in a horizontal position consistent with the medical advice given by Dr Ley. In the circumstances where Mr Linares’s injuries were probably not survivable this was not causally connected to his death.

59. There had been no joint drills on this site focused on a rescue from height within a turbine, this may have led in part to an unhelpful atmosphere of chaos in the early stages of the rescue before the team ascended the turbine.

The circumstances

[1] This was a highly unusual and tragic accident. The circumstances were the subject of internal reviews and investigations by the companies involved and by the

Health and Safety Executive. The facts have previously been fully ventilated. This meant that very little of the facts of what happened were in dispute before me.

[2] On 15 March 2017, Mr Antonio Joao Da Silva Linares (Mr Linares) was employed by Any Wind Energias Renovaveis (Anywind). Anywind had been engaged by Siemens Gamesa to carry out work on the project at the Kilgallioch Wind Farm. Anywind is a Portuguese company, a specialist contractor which provides services in the erection of wind turbines.

[3] Mr Linares had worked for Anywind since September 2015 as a wind technician. He was a Portuguese citizen, born on 8 December 1979, and lived in Portugal with his wife Ana Espadhinha and 3 year old daughter. He was a calm, respectful employee and colleague. His colleagues were devastated by his death.

[4] He held all necessary qualifications and was fully trained in respect of the work he was doing at the windfarm.

[5] The windfarm was under construction at the time and was and is located south of Barrhill.

[6] The site entrance was approximately 5 miles to the main site. At the time of the incident most turbines were fully constructed with 10-15 still to be finished.

The wind turbine

[7] The Wind Turbine Generator (“the turbine”) where the incident occurred was known as WTG 08 and is a model known as G114 2.5MWmodel. Each G114 WTG has a tower, separated into four sections by metal platforms:

- From the base of the tower platform one is at 14m height.
- Platform 2 is at 35m height.
- Platform 3 is at 58m in height and
- Platform 4 is at 84m in height.

Within the top section of the tower there are a further two sections:

- The elevator deck. The elevators stop at this platform, it is approximately 120 metres above ground.
- The yaw deck - this sits 5 metres above the elevator deck and approximately 2 metres above it is the nacelle.

Mr Linares fell approximately 5 metres from the yaw deck to the elevator deck.

Background to the construction project

[8] The Kilgallioch Windfarm site was a construction site which fell under the Construction (Design and Management) Regulations 2015 (“the CDM regulations”). The windfarm owner, operator and CDM client is Scottish Power Renewables (UK) Ltd.

[9] Scottish Power Renewables appointed Northstone as the CDM Principal Contractor. The principal works to be carried out by NI included the design, supply, construction and commissioning of all civil, electrical and infrastructure works associated with the installation of 96 Wind Turbine Generators.

[10] Siemens Gamesa was appointed as a contractor to provide and erect the turbines. Siemens Gamesa appointed a number of sub-contractors to erect the wind turbines, one

of which was Anywind. Avanti Wind Systems were subcontracted to install the lifts within the turbines.

The incident

[11] While there were no direct eyewitnesses to the incident which caused Mr Linares's tragic fall and death it is possible to infer with a degree of certainty what happened from the accounts of those who were there with him (with their evidence being presented by affidavit) and from the medical evidence.

[12] Mr Linares and his colleagues commenced duty on site at around 08.00 hours on 15 March 2017. They attended the daily briefing as usual and were allocated their specific tasks for the day. The team consisted of Pedro Estevez, the team leader, David Lima, Nelson Fernandez, Antonio Carvalho and Mr Linares.

[13] During the morning the team were on separate jobs on other turbines. After lunch, around 1.15pm they attended at turbine A8 to install the electrical cable which ran the entire height of the turbine, from ground to the nacelle.

[14] Mr Linares went to the nacelle, at the top to receive the cable and used the hoist to assist in raising it to the top. Nelson Fernandez believed that Mr Linares was wearing the Latchways fall arrest system to climb the ladder to reach the top. The other men were at different levels throughout the tower to guide the cable up the centre or remained outside to handle the cable reel. It was a four man job to fit the cable in the nacelle.

[15] The cable was successfully installed and the team then began to tidy up.

David Lima recalls being first to leave the nacelle. He said that Pedro was next and that he assumed Antonio was furthest up. When he last saw Mr Linares he had his harness on with helmet, gloves, boots and clothes. Nelson Fernandez spoke to seeing Mr Linares all that day using his harness, describing it as a routine task. Separately I note the evidence (by statement) of David Lima that Mr Linares was an “amazing worker and always very safe.” He stated that Mr Linares would pick him up for not paying sufficient attention to health and safety matters, for example not wearing safety glasses. Antonio Carvalho gave evidence of a similar nature saying that “Antonio was an example to all of us about health and safety.”

[16] Mr Linares was still within the nacelle and Nelson Fernandez was on the elevator platform with Pedro Estevez and David Lima being lower down the tower.

[17] Nelson Fernandez climbed down from the nacelle, via the yaw deck, onto the elevator deck and the trap door closed behind him. He was tidying the elevator platform when he suddenly heard what he described as a boom and when he looked around he saw Mr Linares lying on the floor behind him. He was lying partially on the trap door of the platform. No one saw Mr Linares fall. Mr Linares appears to have fallen around 17.00 hours.

[18] Mr Fernandez immediately saw that Mr Linares had a serious head injury and shouted for help. This was heard by David Lima and Pedro Estevez who both climbed back up the tower. Pedro Estevez made a radio transmission on a Siemen Gamesa radio

in Portuguese for help which was overheard by Vasco Penedo and Taigo Riblio who had already arrived at the base of the turbine to assist Antonio Carvalho with the cable.

[19] Mr Linares was wearing his and had all the necessary equipment to descend the tower via the ladder and Latchways system. Nelson Fernandez was the only person present initially and he did not recall whether Mr Linares was attached to the fall arrest system. Pedro Estevez and David Lima were within the tower and were next to arrive on the elevator deck. They saw that Mr Linares was wearing his harness and they did not remove any attachment to the fall arrest system when they arrived.

Nelson Fernandez and David Lima noted that Mr Linares landed with his helmet on, which was later found to be cracked with the hearing protection and head torch broken off. Vasco Penedo climbed up the turbine to assist and Antonio Carvalho remained at the base.

[20] It seems clear Mr Linares's harness was not attached to the fall arrest system. He was a man who was careful about health and safety and routinely used his harness. We cannot know why it was not used on this occasion. It can be inferred he had not attached himself as he normally would have done.

[21] Nelson Fernandez, Pedro Estevez, David Lima and Vasco Penedo attempted first aid and tried to stem the bleeding from Mr Linares' head with their shirts.

The Health and Safety Executive's investigation

[22] The Health and Safety Executive confirmed there were no issues identified with Mr Linares' equipment. There was damage found to one of his fall arrest lanyards but it

had not been fully deployed and there was no evidence that it had been attached to any anchor point in the tower structure.

[23] Paul McCann, Principal Engineer in the Engineering and Material Science Team of the HSE, prepared a report dated 31 July 2017 in relation to the items of Personal Fall Arrest Equipment worn by Mr Linares at the time of the incident. He examined the items at the HSE Science Division Laboratory in Buxton and also attended at the site on the 20 April 2017 where he arranged for photographs to be taken and also examined the permanently installed work at height equipment there.

[24] From his investigation he concluded (CP57) *inter alia* that:

- Mr Linares' Latchways slider (used as a safety measure when climbing the ladder) was not connected to the anchor line;
- one leg of the twin tailed lanyard was extended indicating that it had been loaded. However, the lanyard had not separated and should have supported the user in the event of a fall;
- the harness and lanyard were in a generally acceptable condition (excluding the damage from deployment of one leg);
- the Latchways fall arrest system was fully functional without significant defect and
- there was no evidence that the lanyard had been incorrectly connected at the yaw deck.

In his opinion, it was likely that Mr Linares fell while unattached (for an unknown reason) and that his lanyard became snagged during his fall, subjecting it to a dynamic load and causing partial deployment.

[25] Had Mr Linares' harness been attached to the fall arrest system, the accident would not have occurred as it did and the death would likely have been avoided.

The rescue mission and what happened after the fall

[26] All those who went into the turbine that dark winter's night, both technicians and medical professionals, were simply valiant. There was considerable compassion and bravery on display, as well as expertise and resilience. The situation was stressful and everyone was doing their best in difficult circumstances to save Mr Linares. Some of those who gave evidence about their own roles that night were clearly significantly affected by their experience. The cool, detached gaze of hindsight should not diminish the bravery, commitment and professionalism of those who were working in a very trying situation.

[27] First aid had been given immediately to Mr Linares by his Anywind colleagues who were all trained in evacuation procedures and would have been able to evacuate Mr Linares in the same way as other trained turbine technicians.

[28] There was no dispute that Mr Linares appeared to have fallen at around 17.00 hours. The incident was reported using the Siemens Gamesa and Northstone established procedures. In accordance with those procedures Northstone's Project Manager, Patrick Murray contacted emergency services via 999. The response by the

emergency services was prompt and an ambulance arrived at the entrance to the site at 17.29 hours. At 17.55 hours, the ambulance had moved through the site to the compound and by 18.10 approximately, arrived at the turbine.

[29] Those in the turbine with Mr Linares had been advised not to move him by Mr Murray who was passing on the advice given by the emergency services (who had been told by Murray that Mr Linares was still speaking at the time of the call - this was found later to have been erroneous information).

[30] Scottish Power Renewables' Daniel Ferrier essentially took command at the base of the turbine. There appears to have been a bit of a vacuum in terms of who should have been leading - in fact in terms of emergency plans it should have been Siemens Gamesa as it was an internal turbine incident. However Mr Ferrier reached out to his SPR colleague Ian Madden at the neighbouring windfarm at Arecleoch and asked him to bring help and spinal boards or whatever rescue equipment they had to hand. This "team" arrived at the site at about 18.00 hours and reached the turbine by 18.20 hours. By this time the fire services had arrived and had established an inner and outer cordon. There were no stretchers or spine boards on the Kilgallioch site despite this being highlighted as a requirement at least in the Siemens Gamesa emergency plan.

[31] By 18.20 hours Dennis McGinn, a Scottish Ambulance Service paramedic had gone up the tower to establish the condition of the casualty. Dr Ley followed shortly after having arrived by helicopter ambulance.

[32] On the evidence there was some confusion at the base of the turbine particularly as to who was intended to go up the turbine to rescue Mr Linares once it became clear

that he required to be brought down as soon as possible (once Dr Ley had examined him and reached this view).

[33] Five men had come from Arecleoch with Ian Madden of Scottish Power Renewables: James Currie, Martin Wham, Sam Currie and Darren Robbins, all from Siemens Gamesa. They thought they were coming to provide equipment and did not expect to be part of a rescue team. Upon arrival they were in fact asked if they were that team - and they ended up being tasked with ascending the turbine. They were called on and did not hesitate and are to be commended for their bravery.

[34] Mr Wham said he had never been asked to attend at Kilgallioch in the past and he remembered Mr Madden asking them to assist in taking any rescue equipment they had to Kilgallioch. It took them between 20 to 30 minutes to reach the turbine.

[35] The Health and Safety Inspector, Beth Rawson spoke to there being no apparent co-ordination of events at the turbine and no record of who was there and carrying out which roles. In her view the lack of a single point of contact added to unnecessary confusion.

Transfer of Mr Linares to the ground

[36] The emergency service advice was that Mr Linares was not to be moved. This was the advice pending medical assessment. Dr Ley provided that assessment once he ascended the turbine. He is an intensive care consultant and was an anaesthetics registrar at the time of the incident.

[37] He arrived by helicopter ambulance and described the ground area of the wind turbine as chaotic. He faced a deluge of people and of information. He said it was a very confusing situation with too many voices coming at him.

[38] He described Mr Linares' as being "completely entrapped" and he was told that it would take approximately 40 minutes for him to be extracted from the turbine. He discussed the "golden hour" post-accident; as in his experience the majority of avoidable deaths could be dealt with via relatively simple intervention in that first post-accident hour.

[39] Based on the advice that it would take 40 minutes to bring Mr Linares down he decided to ascend the turbine to administer medical treatment within the turbine.

[40] Fortunately, Dr Ley had a background as a rock-climbing instructor with the army and was content that he could keep himself safe. His intention in ascending was to make an initial assessment and administer such emergency treatment as was possible to preserve life and then to have Mr Linares brought down as soon as possible.

[41] He took only basic medical equipment with him given the climb required and difficulties in securing, for example a ventilator.

[42] Dr Ley advised that they had considered other ways of getting Mr Linares extracted such as using a helicopter to winch him out but this was not practical and natural light was diminishing due to the time of day. He was not sure if a formal request had been made to have a helicopter with a winch attend from Prestwick (the one they used does not have this facility) but he felt that the time it would take to arrive ruled this out as an option.

[43] When he first saw Mr Linares he said he was unconscious with a large pool of blood at the back of his head. He was breathing initially upon his attendance but this was becoming progressively more shallow. Mr Linares was obviously very seriously injured.

[44] After administering initial treatment Dr Ley instructed that Mr Linares should be evacuated in a horizontal position down through the turbine. The reason for the horizontal position was to avoid cardiac arrest. He referred to the standard use of litter or “basket” stretchers by search and rescue services used to allow casualties to be moved in a horizontal position to take the weight off the casualty and allowing them to lie flat.

[45] There was however only rudimentary equipment available within the turbine. There was no equipment available to take the weight off Mr Linares. He remembered a half spinal board being used (others speak to a full board and on balance I accept their evidence). He said they tried to use the board as a base to lay Mr Linares. There were no straps on the board but they improvised with duct tape and then attached a short piece of rope on the bottom to his harness to keep him in a horizontal position. He said that the board used was not a key piece of equipment. It is used to slide a person onto a stretcher and was insufficient for these circumstances. There were no head locks. He estimated that it took around 10 minutes trying to work out a way of lowering Mr Linares. He felt the risk of cardiac arrest was still high on descent but that the plan formulated was the best in the circumstances.

[46] He indicated that if the correct equipment had been used i.e. without any pressure on his sternum that Mr Linares would not have cardiac arrested. He could not

say what the ultimate outcome would have been in terms of survivability but he would have had a much greater chance.

[47] Once Mr Linares weight had been put onto the rope, he stopped breathing. This was due to blood loss from his head and compression from the chest harness. The strong point of the harness was over his sternum. There was no other way to proceed in the circumstances. At this point it became apparent to Dr Ley that there would not be a good outcome. He manually ventilated Mr Linares so his lungs were operational but he was still in cardiac arrest.

[48] Dr Ley then proceeded to descend the ladder faster than Mr Linares was being lowered and so at each interval when he was moving through the platforms of the wind turbine, he was able to manually ventilate Mr Linares for a short time. In hindsight he thought carrying out the ventilation with the chest still compromised by the harness was probably futile, but he felt he still had to make attempts.

[49] Despite all the efforts in a very stressful environment, Dr Ley indicated they were not able to keep him horizontal and in fact he was at least at 45 degrees.

[50] In his opinion, the main problem in the circumstances was the lack of equipment to take the strain off Mr Linares' chest. When asked by the court what the spinal board was achieving re Mr Linares his response was "probably achieving nothing". The only real purpose of using it was to try and lever his body into a more horizontal position. There was still a huge constriction force on the chest and lungs. What was needed was something that took at least some of the weight and there needed to be a physical

connection between the board being used and the rope to remove the weight from the chest area.

[51] It was fortunate, according to Mr Wham that the lift had not yet been installed otherwise Mr Linares would have required to have been evacuated externally with a complex lift being required to get him to the exit point in the nacelle [check]. He further explained that would involve a lot of manoeuvring to allow them to lift Mr Linares and that the equipment they had was not designed for going up. He indicated that there was a small wheel hoist which could have raised him but in the circumstances that would have taken too long. He went onto say further that this was not really an option and as it would have required manoeuvring his body around quite significantly.

[52] At 19.06 hours, Mr Linares was finally evacuated from the turbine.

Death of Mr Linares

[53] Mr Linares was brought from the turbine at 19.06 hours and resuscitation efforts began under the direction of Consultant Dr Richard Price. He had been intubated by Crown witness Dr Ley in the wind turbine and given 150mls of saline. Continuous chest compressions were carried out and an intra osseous needle was inserted into Mr Linares' right tibia. Dr Price also carried out a bilateral finger thoracotomy (opening the chest wall to check for a punctured lung). Mr Linares was given 3 x 1ml of adrenaline, 500mls of saline and 1 gram of tranexamic acid. Mr Linares remained asystolic, there remaining no response to any treatment administered. Efforts at resuscitation were then ceased.

[54] Life was pronounced extinct at 19.51 hours by Dr Price in the presence of the Paramedic Dennis McGinn.

Cause of death/post-mortem examination

64] A post-mortem examination was conducted on Mr Linares within the mortuary at Dumfries and Galloway Royal Infirmary at 11.15 hours, 20 March 2017, by Crown witness Dr Kirsty Nale whose evidence was the subject of agreement.

The cause of death was noted as follows:

1(a) severe head and chest injuries.

(b) consistent with fall from a height.

There were no injuries to Mr Linares' lower body. The injuries he sustained were consistent with him falling and landing head first, with his helmet on. The pathologist commented as follows:

"The crucial feature of skull fractures is that they are a marker for the application of severe force to the head. The autopsy findings showed a contra coup type injury to the brain due to movement of the brain within the skull. The major force was deceleration and in this situation the injuries to the brain are found on the opposite side of the skull to the scalp injury. There was an extensive subarachnoid haemorrhage with underlying cortical contusion in the occipital region of the brain. The multiple fractures of the ribs with lacerations of the underlying lung were contributing factors"

[55] Dr Nale provided a further opinion stating that the severe head injuries and chest injuries sustained by Mr Linares were both life threatening. When asked by police if the injuries were survivable (although she could not answer this question fully), she

was able to say that there was a strong chance he would not have survived, even with immediate medical attention.

[56] Dr Nale was also unable to state if the length of time the deceased Mr Antonio Linares was in the turbine impacted on his cause of death as he may well have died from the injury sustained in the fall.

Issues for discussion

[57] Firstly, there was no controversy about the cause of death or the fact that Mr Linares fell from height.

[58] It is clear that Mr Linares fell. It is also clear that his equipment was not faulty. He was trained to use the fall arrest system but for some reason he was unconnected. He was careful about health and safety and something of a leader on this issue amongst his colleagues so it is with regret and sadness I say that the most likely that the cause of the accident was his failure to attach himself using the fall arrest system as he normally would have thereafter falling approximately 5 metres within the wind turbine to his severe injury and death. I wondered if an accident not involving some degree of carelessness on his part might have been possible such as him falling while attempting to attach himself and missing for example; but even on this scenario, for which there is no evidential basis as no one saw him fall, there would have been a limited degree of error on Mr Linares's part. A mistake on the day in question by Mr Linares in failing to connect to the fall arrest system is the most likely reason for the accident on the evidence.

[59] There were no identifiable defects in any system of working which contributed to his death. He had all the necessary equipment and had been trained to use it. He was - on the evidence - committed to using his safety equipment including his harness. His employers, indeed all contractors on the windfarm were committed to health and safety as a priority.

[60] Siemens Gamesa accepted that a stretcher and/or spinal board ought to have been readily available at Kilgallioch. On the face of it that is a defect however I am persuaded by their submission that the necessary causal connection for a finding under section 26(2)(f) is absent - an issue to which I will return below.

[61] A number of issues were raised by parties, principally by the Crown in the context of sections 26(2)(g) and 26(4) - that is matters relevant to the circumstances of the death or which might raise sufficient concerns as to require recommendations to me be made. I address these now. Parties made the most careful submissions on these aspects which guided me and provided great assistance; for this I am grateful.

Delay and alleged communication failures

[62] The Crown suggested that Patrick Murray provided incorrect information to the 999 handler and on that basis medical advice was given which was conveyed back to the turbine by Mr Murray and which might have led to delay in extracting Mr Linares. I cannot make such a finding; firstly - because of the nature of the information passed to the emergency services call handler.

[63] There were two calls to the emergency services made by Mr Murray who was passing on information which was being passed to him from the turbine. I heard the recording and had the benefit of the transcript. Mr Murray conveyed the seriousness of the situation. He said it was very serious. He said Mr Linares was conscious and breathing but had fallen ten feet and was at the top of the tower. He then said it was 10 metres. He advised of bleeding to the head. He said they did not know "if it's pouring out or spurting out the blood".

[64] He then said that Mr Linares was alert and was advised not to move him unless he was in danger. He passed on that advice which led to all waiting on the ambulance services and a medical assessment of Mr Linares's condition before evacuation was attempted. He also told the operator that he was a "wee bit dizzy, but he is talking".

[65] For completeness, Isabel Cernadas, Siemens Gamesa Site Manager, who was coordinating matters for the specialist subcontractor says at page 6, line 2 of her statement that:

"I remember at one point speaking to Patrick about preparing to bring the casualty down. He told this to the ambulance and they said not to move him. Patrick told me this, so I then told them on the radio. I am not 100% sure, but I think they told me initially that the casualty was conscious, but after a few minutes, I don't know how many, they told me he was unconscious".

[66] Mr Murray was told to call back if anything changed and that emergency services had been actioned to the scene.

[67] There was then a second call made by Mr Murray to the Scottish Ambulance Service. At that point, he explained the situation seemed to be deteriorating and that Mr Linares appeared to be breathing, but not responsive.

[68] This inquiry is not an exercise in fault finding but it is important to say that Mr Murray did not get anything “wrong”. He was passing along the information as it was being conveyed to him in a stressful and dynamic situation.

[69] It also seems clear to me that the emergency services call handler would not have told Mr Murray to instruct an emergency evacuation of a man with a serious head injury had she been told initially that Mr Linares was not responsive. It seems highly likely the advice would have been the same, that is not to move him before the ambulance and doctor got to the scene. As we know in any event Dr Ley required a horizontal evacuation. If those with Mr Linares had attempted an evacuation before Dr Ley arrived they would in all likelihood not have done so in a horizontal position and would have been taking Mr Linares down to the foot of the turbine to await the arrival of the emergency services. It seems clear such an attempt would not have been in his best interests given the serious nature of his injuries and would have resulted in cardiac arrest occurring on the way down.

[70] I find no significant delay or error in communication which contributed either to Mr Linares’ death and find no issue of delay or communication which might realistically have prevented his death. He should not have been moved until medically assessed and Dr Ley was on the scene as promptly as one could be in terms of the travel required to such a remote rural location.

The issue of availability of stretchers/spine boards

[71] I turn to the issue of the availability of spinal boards and stretchers and the associated issue of horizontal evacuation as recommended by Dr Ley.

[72] Very surprisingly there were no stretchers, spinal boards or neck braces on Kilgallioch Wind Farm. There was evidence that these were not available (for an unknown reason) on wind farms in construction (of which Kilgallioch was at the time of the death of Mr Linares) but were available at operational sites.

[73] The Siemens Gamesa Emergency Evacuation Plan (CP35) specified these were needed and should have been available but they were not on this site on this date. This plan produced in March 2016. At the inquiry Siemens Gamesa accepted that a stretcher and/or spinal board ought to have been readily available at Kilgallioch.

[74] A spinal brought from Arecleoch was ultimately used to try to keep Mr Linares horizontal as he was lowered on medical advice.

[75] This was all very unfortunate and a breach of basic good health and safety practice. There seems to have been an overreliance on the thought that the emergency services would bring such items to a serious incident.

[76] However, even if a spinal board had been present at the top of the turbine it seems to me that medical examination and advice was required before Mr Linares could be safely lowered and evacuated and the provision of a spinal board from Arecleoch coincided with the arrival of the medical teams. Dr Ley would have preferred the equivalent of a basket stretcher to have been available as he described it but it is by no

means certain that even that would have saved Mr Linares given the pathologist's opinion on the severity of his injuries.

[77] I note the submissions from Northstone that it was not for them to have such boards available because, in the event of an incident involving someone within the zone of work for which they were responsible, it would not be expected there would be an attempt to move that person, but that rather the emergency services would be called bringing their equipment. Northstone submitted that it was a matter for Siemens Gamesa to decide what equipment if any should be within a turbine under construction.

[78] On a straightforward view of the matter it would have been of assistance to have had a spinal board or basket stretcher within the turbine which was still under construction and within which, in the absence of the lift and until it was installed, such items could prove useful in a fall from height scenario. It seems self-evident that such spinal boards should be present within wind turbines under construction. Clearly different, though related, obligations lie on the various contractors involved and it seems appropriate that those who are installing the turbines and working within them should ensure that such health and safety equipment are within the turbines themselves or very nearby so that there need not be a cry for help to a team at a neighbouring windfarm to bring them to the affected turbine in an urgent situation.

[79] It is important that the lack of equipment does not cause a problem in a similar set of circumstances in future.

[80] I am persuaded that appropriate findings in terms of section 26(2)(g) and recommendations are required in this regard.

The issue of horizontal evacuation

[81] This is obviously related to the issue of the absence of spinal boards. Mr Linares had very particular life threatening injuries which required him to be lowered horizontally in the turbine to avoid cardiac arrest. Great care was taken to do so but ultimately this was not possible given the equipment and space constraints. However one returns to the issue that his injuries were in all likelihood not survivable. The failure to lower him horizontally was not itself causally connected to his death in the particular circumstances which occurred here in my view.

[82] This does not justify any finding in terms of subsection (f) however it is a factor relevant to the circumstances of the death in my view that a doctor recommended horizontal lowering and that this was not possible in the circumstances.

[83] This is a matter for the various industries to consider and review as they go forward. It may be that the presence of spinal boards within turbines or nearby will be sufficient to deal with the issue if all are assiduous in ensuring current health and safety guidance and training is complied with within the turbines.

[84] I pause to note that the inquiry heard helpful evidence from Mr Norman Potts, Training Centre Manager from Siemens Gamesa. He is qualified in rescue training for the wind turbine technicians for both basic and advanced training.

[85] He advised that Emergency Rescue Plans should specify appropriate rescue techniques which might apply to the site in question. His evidence covered a number of detailed scenarios in relation to rescue from height and the equipment now available.

[86] He gave extensive evidence on the type of training which would be offered to technicians and spoke of the types of stretchers and boards which can be used. He had not worked on a construction site. This limited his evidence in that when asked by the Crown whether he could envisage any scenarios when a basket stretcher might be useful he was unable to assist indicating that this was because of his lack of experience on a construction site.

[87] He was asked if Mr Linares could have been brought up into the nacelle and he indicated that this would not have been possible as the procedure known as “rescue up” did not exist at the time of the incident and is primarily used for offshore turbines. He was not able to advise when rescue up came into being and he advised the court that this procedure was not in place as Siemens Gamesa were still exploring how they could raise a casualty from the base of the turbine to the top. He seemed to accept that this procedure could be used in onshore sites. There was no way, even today, to bring a person down the turbine vertically without pressure being brought to bear on his or her chest area. This was due to the design of wind turbines.

The issue of drills

[88] The evidence was that Scottish Power Renewables had carried out drills prior to the incident although they would not be directly involved in a rescue from a wind turbine.

[89] Northstone had not conducted any drills either independently or together with or other contractors or sub-contractors. It was explained by the witnesses Mr Guy,

Mr Sturdy and Mr McVitty that until the date of this incident, there had been no drills carried out, despite they were the principal contractor on this wind farm. They went on to say however that there were two previous live situations in which procedures had been tested beforehand. They were not able to explain why required drills had not taken place. When pressed on why they did not occur they were not able to fruitfully assist with any explanation.

[90] Drills had been conducted by Gamesa, as a forerunner to Siemens, and these had been focused on a rescue at height scenario.

[91] Ms Rawson of the HSE advised of the need and desirability of practice drills which could range from desktop exercises through to practice drills in conducting rescues from height in a turbine.

[92] No party demurred from the potential usefulness of practice drills on a joint basis. Indeed I note the Onshore Health and Safety Guidelines, issued in 2015, which at page 100 indicate that "Emergency arrangements should be tested at suitable intervals." Further at page 104 it is said that in terms of any Emergency Rescue Plan there should be: "Training requirements, to ensure that people are competent in the procedures that support the plan, including defining initial requirements, and periodic drills / exercises." The Health and Safety Executive also recommended that the wind turbine industry should appreciated the need for appropriate drills to test and familiarise people with emergency procedures.

[93] This is important. There was some measure of chaos described by a number of witnesses at the bottom of the turbine which led to the requirement of an ad hoc rescue

team from a nearby windfarm taking on the task of climbing the tower to effect the rescue. Mr Ferrier of Scottish Power stepped into the breach and led on the ground at the turbine and is to be commended for doing so. But the response should have been less chaotic, more streamlined and organised and in accordance with emergency planning which in fact had Gamesa in the lead for a situation of injury within a turbine.

[94] Joint drills will help all parties rehearse lines of responsibility and will provide of purpose in circumstances under pressure. If anything like this happens again it will have to be done better in terms of organisation.

[95] As a matter of fact Mr Linares's injuries were not survivable and therefore the various issues which arose were not in my view causally connected to his death but they should be noted formally in this determination and steps taken to make sure the prospect of such a death happening in future are minimised.

[96] One can imagine a situation of survivable injury requiring a rescue from height in future and the presence of spinal boards, joint drills of emergency plans and scenarios on windfarms in construction will help ensure all parties are better prepared and know what to expect in the pressurised environment of an actual serious incident within a turbine.

Section 26(2)(g) and wind turbine design

[97] So what if this happened again, as it could, and the injuries were not as severe and were survivable if the injured person could be lowered or extricated in a horizontal position?

[98] This is an issue for the industry to risk assess on an ongoing basis. I heard no detailed evidence about turbine design and why certain choices are made; no doubt there are good and scientific reasons for these. I have noted the careful submissions made by the Crown in respect of section 26(2)(g).

[99] Parties were agreed that whilst section 26(2)(g) affords the court broad scope for findings under this head, it is important to note that the facts found must be “relevant to the circumstances of the death.” Under reference to the 1976 statutory regime (which contained an identical provision in section 6(1)(e)), it has been suggested that this means the circumstances of the death as they may affect the public interest.

[100] The Crown submitted that the design of wind turbines be revisited with a view to facilitating rescue from height whilst keeping casualties horizontal. I have thought carefully about the Crown’s considered submissions and have decided that I ought not to make findings or recommendations in relation to future design of wind turbines and prefer the submissions on behalf of Siemens Gamesa by senior counsel on the matter.

There was no evidence led about wind turbine design or the technical or operational constraints thereon to allow the inquiry to make any finding or recommendation.

I asked parties about this issue during the inquiry and was advised that the Crown had tried to find a suitably qualified expert who was able to give evidence on design, but without success. I could have pressed further on this issue but did not do so as it seemed to me that the inquiry was dealing with distinct set of circumstances in which what was most likely a tragic mistake made by Mr Linares led to a severe injury to the head which was more than likely to be fatal. There is a strong reliance placed on

technicians being harnessed and attached to the system and that this prevents incidents like this in the overwhelmingly majority of cases. The industry places reliance on health and safety training and individual responsibility and compliance and not unreasonably. I was not provided with any statistics on the number of injuries suffered in accidents in wind turbines or at height within them. I feel sure I would have been had these been available and infer from this that incidents like this are very unusual. Parties were however, as one would expect, also agreed that falls from height are not unforeseeable.

[101] To make findings about turbine design on the evidence and the broader situation before the inquiry would have been disproportionate in these circumstances. The likelihood of recurrence can be ensured to a very large extent by ensuring that all technicians working at height are vigilant in ensuring they are attached to the fall arrest system as per their training. Nonetheless the wind turbine industry should be vigilant to minimise casualties and fatalities from injuries suffered on windfarms and make appropriate adjustments including to design if, for example, significant numbers of other injuries or fatalities develop. An ongoing commitment to training, good health and safety practice and appropriate use of available technology (an issue which I will return to briefly) will also help to ensure no other fatalities occur.

Health and Safety Executive recommendations

[102] At the hearing on submissions a number of recommendations were made by the Health and Safety Executive and opposed by Siemens and Scottish Power Renewables. I turn to these briefly now.

[103] The Health and Safety Executive invited the inquiry to remind “Construction, Design and Management ‘CDM’” clients of a number of pre-existing obligations under the current regulations, the Construction (Design and Management) Regulations 2015: for example that principal contractors have a duty to co-ordinate matters relating to health and safety during the construction phase and that wind turbine construction CDM contractors should be reminded of their obligations to provide employers about the procedures to be followed in emergencies and to test same at regular intervals.

[104] These suggested recommendations met with adverse comment from Siemens Gamesa and Scottish Power Renewables.

[105] Senior counsel for Siemens suggested that the Construction (Design and Management) Regulations 2015 were already in place to regulate relationships on projects such as the one in this case. Further the court should be wary about approaching its determination through the prism of these regulations. It is not for the court to spell out to duty holders what their duties are or to remind them of them as HSE suggested. The HSE was suggesting that their suggested recommendations should be made in terms of section 26(1)(b) of the 2016 Act. Counsel referred to the interaction of that sub-section with sub-section 4 suggesting that it was doubtful whether points two to five in the HSE list of suggested recommendations were really apt to meet the terms of sub-section 4 in particular.

[106] Senior counsel for Scottish Power Renewables also took issue with the recommendations proposed by the HSE. He suggested that they raised a relevancy issue given the terms of the Crown’s Rule 3.7 note; that there was a lack of evidence to

support them as they had not been put to witnesses who attended from Scottish Power Renewables far less to senior managers who could have been called; and that finally there was a risk of procedural unfairness. It was simply unfair to raise these issues now without the Scottish Power Renewables having been asked about these matters.

[107] In response, counsel for the HSE accepted that the recommendations were slightly unusual but he argued they were nonetheless competent. They related to the system. Everything did not go according to plan on the night of the rescue. It was carried out by an ad hoc rescue team from a different windfarm not as envisaged in any of the plans. Further the health and safety report had foreshadowed all of the concerns outlined by counsel for Scottish Power Renewables. The HSE was not attempting to appoint blame.

[108] I can be brief - I agree with the concerns set out by counsel for the reasons expressed and will not make the recommendations set out at paragraphs 2 to 5 of the HSE submissions note. It was accepted by all that the issue of drills was of a different nature, that it had been canvassed in evidence and was more apt to fall within the terms of section 26(4). The proposed recommendations were well meaning but, other than the issue of the joint drills, could not reasonably be said to be likely to realistically prevent other deaths in similar circumstances.

Looking to the future and the use of technology

[109] It is clear that there are learning opportunities from the events of 15 March 2017 which might assist the industry in going forward to mitigate risk. For example,

technology might assist to minimise the risk of de-harnessing or failing to connect to the arrest system; this being the central issue in the death of Mr Linares.

[110] The accident was tragic and unusual and against a background of an acute awareness of and compliance with health and safety requirements including by Mr Linares himself. One will never know why he had not attached himself to the fall arrest system. Perhaps it was not deliberate, perhaps it was momentary - I simply cannot make findings about these aspects. However this was the cause of his accident and death, that much seems clear.

[111] We are 7 years on. Much has changed and there were a number of investigations, including by the Health and Safety Executive into the circumstances of Mr Linares's fall and subsequent death. Improvements in training have been made as spoken to by Mr Potts at the inquiry.

[112] Following the accident, the circumstances were fully investigated by HSE with the cooperation of the duty holders. Separately, the duty holders carried out their own investigations. Safety documentation and procedures were reviewed and updated. In particular, the Emergency Response Plan for the site was revised and updated in cooperation with the Health & Safety Executive in August 2017 and further training and equipment was provided. Notwithstanding these positive changes, any serious accident on a remote site such as Kilgallioch will unavoidably bring challenges.

[113] More widely, as I find in fact, in the onshore renewable energy industry, positive improvements have been made since this accident. In September 2020, industry body "SafetyOn" published "SafetyOn Onshore Emergency Response – Good practice

guidelines for onshore wind energy developments.” The guidelines were developed through industry collaboration and aim to provide a process that allow the duty holder to develop site-specific plans and procedures (ERPs) to mitigate the consequences of incidents and help protect casualties until they can be taken to a place of safety.

[114] As I have said I am not satisfied that I can make any finding or recommendation relating to the design of wind turbines. It is true that as things stand it is not possible to lower a casualty down from the top of the turbine (yaw deck and nacelle area) in a horizontal position neither is it possible to evacuate such a casualty externally while keeping the body largely in a horizontal position. There was no evidence before me as to why turbines are constructed as they are and why the lifts are so narrow. The industry also proceeds, not at all unreasonably, on the basis that technicians are trained to attach themselves so as to avoid a fall and resulting injury. This approach seems to work. There was no evidence before me of other incidents of falls and injuries. The requirement to utilise the fall arrest system seems to be well understood and applied. The incident involving Mr Linares appears to be highly unusual.

[115] However neither do I feel that I can leave the facts of this tragedy with the conclusion that it is enough to rely on individuals using the fall arrest system. One cannot rule out human error no matter how comprehensive and effective the available training may be or how committed the individuals involved. That much is obvious. Mr Linares was a careful and safety conscious technician. Anyone can make a mistake in the workplace. The industry should continue to self-examine and be assiduous in making improvements to further reduce the risk of lives being lost; including through

the use of technology where appropriate to prevent failures to connect to the fall arrest system. Surprisingly, there was very little evidence about the potential use of technology to assist (and the HSE report did not focus on this at all) but it stands to reason that attempts should be made to harness technological advancements to avoid a repetition of what happened to Mr Linares.

[116] In cross-examination of the health and safety inspector, Mr Anderson for Northstone suggested that a warning sound might be emitted when a person de-harnessed or disconnected from the fall arrest system. This seems a simple improvement which might be of considerable benefit. If colleagues heard such a sound they might check in promptly with the colleague from whom it came to check that all was well and thus help prevent an accident.

[117] The submissions for Northstone returned to this theme of technology and looking to the future and I quote from paragraph 3:

“The HSE evidence does not investigate whether steps could be taken to enhance the awareness of workers at height of the essentials of their safety. HSE have not considered if devices such as a ‘buddy system’ – with two people working together to make sure that they remained safely attached could be adopted; no consideration is given to an ‘inertia reel’ type of attachment which would allow a worker at height to walk away from the fall arrest system, but remaining attached (not dissimilar in theory to a seatbelt arrangement in a motor vehicle); it does not consider the prospect of CCTV coverage being monitored with the option of radio calling out a failure on the part of an employee to remain safely attached. It does not consider whether some interlock mechanism would be possible so that the hatch could not remain open unless workers on the platform are hooked up to the arrest system. It does not consider whether an audible warning could continue to sound where a worker is at height and not hooked up. It does not consider the possibility of edge protection for the hatch opening.”

[118] It seems to me that all of this has potential to be helpful and safeguard those who require to work within turbines.

[119] It is a matter for the industry to give further consideration whether technology can assist and I find particular favour with Northstone's first suggestion namely that technology could be utilised to provide an audible or visual warning to identify when a person has disconnected from a fall arrest system, said warning being capable of being recognised by others working in the vicinity. I will make such a recommendation.

Findings

[120] My formal findings are as follows:

The Sheriff having considered all the evidence and the submissions of parties, determines in terms of section 26 of the Inquiries into Fatal Accidents and Sudden Deaths Etc (Scotland) Act 2016 ("the Act") that:

1. In terms of section 26(2)(a) Antonio Linares, born on 8 December 1979, died at 19.51 hours on 15 March 2017 at Wind Turbine A8 at Kilgallioch Wind Farm, Barrhill, South Ayrshire, Scotland.
2. In terms of section 26(2)(b) Mr Linares fell from height within wind turbine A8 on 15 March 2017.
3. In terms of section 26(2)(c) the cause of Mr Linares's death was:
 - 1(a) severe head and chest injuries;
 - (b) consistent with fall from height.
4. In terms of section 26(2)(d) the cause of the accident was as follows:

Mr Linares's failure to attach himself using the fall arrest system as he normally would have thereafter falling approximately 5 metres within the wind turbine to his severe injury and death.

5. In terms of section 26(2)(e) I find that the following is a precaution which could reasonably have been taken and had they been taken might realistically have resulted in the death being avoided:

If Mr Linares been attached to the fall arrest system he would not have fallen the distance he did. The rule that technicians must attach themselves to the fall arrest system is well known and universally applied. Had it been followed by Mr Linares and had he attached with his usual care, the accident and his tragic death would have been avoided.

6. In terms of section 26(2))(f) I make no findings.
7. In terms of section 26(2)(g) - the following matters are relevant to the circumstances of the death:
 - (i) There was no spinal board or stretcher on the windfarm and one had to be brought from the neighbouring windfarm.
 - (ii) It was not possible to bring Mr Linares down from the site of the accident in a horizontal position consistent with the medical advice given.
 - (iii) There had been no joint drills on this site focused on a rescue from height within a turbine, this led in part to the rescue being conducted in an unnecessarily chaotic manner.

Recommendations

[121] In terms of section 26(4), I am permitted to make recommendations as to:

- (a) the taking of reasonable precautions;
- (b) the making of improvements to any system of working;
- (c) the introduction of a system of working, or;
- (d) the taking of any other steps,

which might realistically prevent other deaths in similar circumstances.

After careful consideration and for the reasons explained within this determination I make the following recommendations:

- (1) There should be joint health and safety drills/exercises on windfarms in construction involving the principal contractor(s) and all relevant subcontractors (those working on the construction of the turbines at any stage) which focus on a rescue from height.
- (2) There should be basket stretchers or spinal boards which are able to be used to keep a casualty as horizontal as possible without undue pressure on the chest area during a rescue from height, either in every wind turbine (both operational and under construction) or very close by on site.
- (3) The wind turbine industry should further consider whether technology to identify when a person has disconnected from a fall arrest system could be utilised so as to provide an audible or visual warning to other colleagues working in the vicinity.

I make these recommendations to the wind turbine industry broadly defined. It seems to me that Scottish Power Renewables, Northstone and Siemens Gamesa have a role to play in responding to them and in promulgating this determination within that industry. The Health and Safety Executive could also assist in this regard.

Conclusion

[122] Once again I record my thanks to those who participated at the inquiry;

I received extremely helpful submissions and have considered them fully. I convey once again the sincere condolences of the inquiry and all parties to the family, friends and colleagues of Mr Antonio Linares. He must not be defined by the circumstances of his passing. He was a father, a husband and a very much loved and valued colleague.

Que ele sempre descanse em paz sabendo que foi amado.

Postscript

During the inquiry I learned of the existence of rescue platforms, some of which can extend up to 100 metres. I ask parties for further short written submissions suggesting that there might be scope for a recommendation that, when considering the forthcoming determination as a whole and the circumstances of the death, the industry in liaison with HSE should give consideration to the availability and potential use of such platforms to help mitigate the risk of a future fatality.

I received helpful further helpful written submissions in August 2024. On reflection after receiving these I took the view that a specific recommendation was not

appropriate; once again upon a consideration of the overall facts and circumstances before the inquiry. As was pointed out by senior counsel for Scottish Power Renewables “the decisive issue in the case resulted from the need to move Mr Linares from level to level”. Further such platforms operate externally, seem to be weather and wind dependent and to utilise them in the scenario which arose in this case would have required additional external hatches to be installed on wind turbines, in essence a review of wind turbine design which for the reasons set out in this determination I view as disproportionate. Notwithstanding this – a responsible industry should keep the ongoing development of such platforms in mind and under review as a potential rescue resource in appropriate circumstances, perhaps in very remote locations where the speed of emergency service response might create difficulties. This is an issue that should be left to the wind turbine industry to reflect upon.