# **REGULATION 28: REPORT TO PREVENT FUTURE DEATHS**

#### **REGULATION 28 REPORT TO PREVENT FUTURE DEATHS**

#### THIS REPORT IS BEING SENT TO:

- 1. MANAGING DIRECTOR OF HAMERTON ZOOLOGICAL
- 2. SPHERE RISK HEALTH & SAFETY MANAGEMENT LTD
- 3. THE CHIEF CONSTABLE OF CAMBRIDGESHIRE CONSTABULARY
- 4. THE DEPARTMENT OF THE ENVIRONMENT, FOOD AND RURAL AFFAIRS
- 5. THE HEALTH AND SAFETY EXECUTIVE\* (see note (ii) below)
- 6. THE LOCAL GOVERNMENT ASSOCIATION

#### **NOTES:-**

- (i) While this report is confined to the risks from tigers, recipients of this report may wish to consider the desirability of taking action in relation to other animals carrying a similar high risk of fatality in the event of keeper contact and/or animal escape, in particular other high risk carnivores.
- (ii) \*I am aware that the HSE is in the course of handing over its guidance on Managing Health and Safety in Zoos to the industry; I would nevertheless invite the HSE to give consideration to what action it might take in the areas identified in this report.

# 1 CORONER

I am NICHOLAS MOSS, assistant coroner for the coroner area of Cambridgeshire and Peterborough

#### 2 CORONER'S LEGAL POWERS

I make this report under paragraph 7, Schedule 5, of the Coroners and Justice Act 2009 and Regulations 28 and 29 of the Coroners (Investigations) Regulations 2013.

#### 3 INVESTIGATION and INQUEST

On 30 May 2017, the Senior Coroner commenced an investigation into the death of **ROSA ANN KING, aged 33**. The investigation concluded at the end of the inquest on 10 July 2019. The conclusion of the inquest was:

Medical Cause of Death: 1a traumatic injuries

## How, when and where the deceased came by her death:

- Rosa King was the senior carnivore keeper at Hamerton Zoological Park, Hamerton, near Sawtry, Cambridgeshire. On 29 May 2017, at sometime between 09.38 a.m. and 10.45 a.m., she died when she was attacked by the Malayan Tiger, Cicip, as she went to exit the Zoo's Malayan tiger paddock.
- She entered the paddock when all the tiger slides between the tiger paddock and the tiger den were open.
- There was no mechanical failure with the keeper gates or the tiger slides and associated pulleys.

 The system for a keeper entering any part of the tiger enclosure required the tiger to be excluded from that area by a tiger slide before the keeper entered.
 That system depended entirely on the keeper reliably following their training.

Conclusion of the Jury as to the death: Accident.

## 4 CIRCUMSTANCES OF THE DEATH

- 4.1 **Background.** Rosa King (Rosa) was a senior and experienced zoo keeper with 13 years' experience, of which 8 had been as head of the zoo's carnivore section. All the evidence suggested that she was conscientious about safety, instructed others in safety regarding the tiger enclosure, and was fully aware of the importance of never entering any part of the tiger enclosures if a tiger was present.
- 4.2 Working hours / night-time hand-rearing work for keepers working with tigers. Rosa's summertime working hours were 45 hours per week, with a six day working week. She worked 9.5 hours overtime in the month leading up to her death. In addition, she volunteered to hand-rear a serval kitten belonging to the zoo, which had been abandoned by its mother. From 1 22 May the kitten required feeding/care roughly every three hours. Rosa took care of the kitten for 14 nights between 1 22 May, with a pattern of feeds at (roughly) 10/11 pm, 2/3 am, and 6/7 a.m.. Each feed might take only 10 minutes. From 22 May 29 May, the night-time feeding regime reduced to a feed at about midnight and 6 am. Rosa did 4 of these reduced night time feeds in the week before her death, including on the Saturday and Sunday nights before her death on Monday 29 May 2017. Whilst a significant number of witnesses stated that Rosa was her normal cheerful self on the morning of her death, there was some evidence that she was tired.
- 4.3 The safety system in brief outline. On the day of the accident, Rosa had entered the tiger paddock to clean the windows of the visitor building within the tiger enclosure. The process to be followed for this task involved checking where the tigers were physically located; isolating them into one of the areas away from the paddock by use of one of the vertical (guillotine-type) tiger slides; checking the slides were in place; before then entering the paddock.
- 4.4 The immediate circumstances. When Rosa entered the paddock, the critical slide that should have been closed was in fact locked in the open position. It is possible that Rosa had left that slide open the evening before, and then failed to notice that it was open before entering the paddock on the Monday morning. There was good visibility of the slide's position from both the tiger service area and the metal security gate that gave entry to the paddock. Despite knowing the system well, and knowing the risks, Rosa entered the paddock when the critical slide was in the open position. There was no evidence that she would have done so knowingly/deliberately and post-mortem toxicology was entirely normal. The jury's conclusion reflects that this was an accidental omission on Rosa's part. However:
  - Dependence on human reliability for a safety-critical task. The system for safe entry into the tiger enclosure depended entirely on the keeper following their training. All the control measures to reduce the risk of a fatal tiger attack depended on the reliability of the keeper. The inquest heard evidence from an HSE human factors expert that training, on its own, is not an effective measure to reduce the risks of slips, lapses or violations. Further, that in relation to a task with a risk of single or multiple fatalities, human actions should not be solely relied on to control the hazard unless as a final resort.
  - **Fatigue.** It is *possible* (though it could not be said on the evidence to be probable) that work-induced tiredness was a contributory factor.
- 4.5 Absence of air-lock type double keeper gates to the tiger paddock. For the

keeper entry into the tiger enclosure, the zoo did not have a tiger-secure double gate system installed at the entrance that Rosa used. There was only one tiger-secure metal entry gate leading into the paddock. While there was a second gate in this area, it was a wooden gate within a wooden fence which was not designed to keep the tigers in, merely to keep the public away from the tiger service area. Further and in any event, when keepers accessed the tiger service area before the public were admitted to the zoo, they would often leave the wooden gate open behind them.

- 4.6 When Rosa went through the wooden gate on the morning of her death (sometime after 9.38 am), she left it open behind her in accordance with this practice. She would have entered the paddock through the metal security gate and closed it behind her, failing on this occasion to notice the fact that the critical tiger slide was in the open position. Rosa then went to clean the windows on the outside of the visitor building within the paddock. Having done so, as she opened the metal secure gate to leave, Cicip attacked her causing multiple traumatic injuries, which were rapidly fatal.
- 4.7 The further risk to life caused by the open gates. There was then a very serious risk of casualties and fatalities to the visiting public. The metal gate and wooden gate were both open. For a period of not less than 15 minutes, and possibly as long as 1 hour and 20 minutes, Cicip could simply have walked out of the tiger enclosure into the public areas, where families with children had already been admitted. In fact, Cicip remained in the paddock. It was thus largely by chance, and by the later action of a zoo visitor and members of staff (the staff acted quickly to close both gates when Rosa's body was eventually seen at about 11 am that morning), that the risk of multiple casualties / fatalities to the public did not in fact materialise. Members of the public including children had congregated by the open wooden gate. They could easily have been killed. A tiger-secure double gate entry system into the tiger paddock would very likely have prevented this risk of public casualties/fatalities.
- 4.8 Lack of conventional firearms held by the zoo. Cicip was enticed back into his den by zoo staff and in the event did not need to be killed. At the time of the accident, however, the zoo did not possess any conventional firearms. By a historic arrangement with police, the zoo relied upon police firearms officers attending should a firearm be needed to shoot an escaped tiger. The only firearm held by the zoo was a form of dart gun which is of limited range and which, even if successfully deployed, would take some time (in the order of 15 minutes) for the medication so administered to incapacitate the tiger. Accordingly, had Cicip walked through the open gates into the public area, limiting the human casualties would likely have depended upon the response time of authorised firearms officers, who could not be guaranteed to be close to the rural area in which the zoo is located.

### 5 CORONER'S CONCERNS

During the course of the inquest the evidence revealed matters giving rise to concern. In my opinion there is a risk that future deaths could occur unless action is taken. In the circumstances it is my statutory duty to report to you.

The MATTERS OF CONCERN are as follows.

- 5.1 Conventional firearms not held by Hamerton Zoo / Lack of clear national guidelines
- 5.1.1. Should a tiger escape from the tiger enclosures at Hamerton Zoo or a keeper should inadvertently find themselves in the same area as a tiger, I am concerned that the zoo still does not currently have access to conventional firearms to shoot a tiger in that situation to preserve human life.
- 5.1.2 I heard evidence that the zoo has taken measures for two members of staff to

obtain firearms' licences and they have received firearms training. However, I heard evidence that the zoo has not yet been approved as premises to hold firearms (action for which rests with the firearms licensing department at the local constabulary) and the zoo has not yet fitted appropriate firearm secure containers. While moving to hold conventional firearms has been made a condition of the zoo's licence under the Zoo Licensing Act 1981 (ZLA), I am concerned that more than two years after Rosa's death, the process of the zoo obtaining conventional firearms has still not been completed. This carries a risk of further deaths.

- 5.1.3. Moreover, at present only two members of the zoo staff have been trained to use conventional firearms. I am concerned that this is too few a number to ensure that a member of staff trained in conventional firearms will always be on duty when the public have admittance to the zoo. This carries a risk of further deaths.
- 5.1.4 I heard evidence that DEFRA's "Secretary of State's Standards of Modern Zoo Practice" is being redrafted/has been redrafted but is not yet published. Paragraph 8.20 of the guidance as currently drafted states,

"Where a zoo holds any primate, carnivore, elephant, or hoofed mammal, listed in category 1 of Appendix 12, appropriate firearms must be available, unless a risk assessment has shown that a firearm would not provide the most appropriate means of protection to the public from that animal, and other arrangements have been made."

I am concerned that the wording of this provision may have contributed to the zoo being able to pass ZLA inspections since it held one form of firearm (a darting gun) and had an arrangement with local police for conventional firearms cover. In contrast, I received evidence from an independent expert and highly experienced zoo manager, designer and consultant that he was "stunned to learn that no firearms were kept on site at Hamerton and they had had tigers since around 2003". I am concerned that a lack of clear guidance that all zoos which hold tigers must possess licensed conventional firearms carries a risk of further deaths.

- 5.1.5 Similarly, the HSE's guidance "Managing Health and Safety in Zoos" states.
  - "63 Firearms <u>and/or</u> dart guns/blowpipes will be needed wherever there are hazardous animals whose escape or uncontrolled movement would represent a high risk to employees or members of the public. If your zoo possesses or requires such equipment, you will need to consult with the police, as all firearms must be licensed. You will also need to keep in touch with the police to ensure your procedures are up to date.
  - 64 It is essential that firearms and ammunition are readily available but, at the same time, kept secure in accordance with police licensing requirements. In drive-through enclosures containing dangerous animals (see dangerous animals categorisation in Appendix 12 of the Secretary of State's Standard of Modern Zoo Practice) where they are needed at all times, specifically authorised people should be in charge of them.
  - 65 Firearms and dart guns must be properly maintained, cleaned and tested. It is recommended that external specialists should examine them periodically and that firearm testing and examination is recorded.
  - 66 Staff licensed to use firearms or dart guns must be given proper training and undertake practice exercises in their use. Refresher training and assessment is essential. Particular attention should be paid to employees' ability to make the right decision in the presence of members of the public, and the training should reflect this. The advice of firearms trainers recommended by the police should be sought in this matter. Practice exercises will help to test the efficiency of control measures. You should ensure that sufficient staff are authorised and trained to use firearms, to provide cover for absences or complex situations (see section 8(20) of the Secretary of State's Standard of Modern Zoo Practice1 and British and Irish Association of Zoos and Aquariums (BIAZA) guidelines in Further

# 5.2 Absence of air-lock type double keeper gates to the tiger paddock

- 5.2.1 I am concerned that simple human error on the part of a safety-conscious experienced zoo keeper led to a situation whereby a tiger could have attacked multiple members of the visiting public. Double keeper gates to the tiger paddock would very likely have prevented this risk. They were not fitted at the time.
- 5.2.2 The zoo has since fitted air-lock type gates at the those entrances to their tiger enclosures that are regularly used by keepers.
- 5.2.3 DEFRA's "Secretary of State's Standards of Modern Zoo Practice" in its current form states,
  - "8.6 All animals should be kept in enclosures so constructed as to avoid escape. Gates and doors to enclosures must be securely locked so as to prevent unauthorised opening. In general, there should be a double gate/door system in place to prevent escape from the secure area should one gate/door be breached" (my emphasis added)
- 5.2.4. Similarly, the HSE's guidance "Managing Health and Safety in Zoos" states, "Normally, an internal and external door or gate would be provided to minimise the risk of an animal escaping. The design should allow for any lock, latch or bolt to be easily operated from the inside. The inner door to the enclosure should be kept closed when workers are in the enclosure, and should be hung to make it open inwards into the enclosure to avoid closing it against the weight of an animal." (my emphasis added)
- 5.2.5 I heard evidence from both Hamerton Zoo and the independent expert in zoo management and design that not all other zoos had air-lock type double keeper gates even for tiger enclosures.

## 5.2.6 I am concerned that:

- Hamerton Zoo was able to pass previous ZLA inspections without any recommendation being made that a double keeper gate be fitted to its tiger enclosures.
- The DEFRA guidance by inclusion of the words, "In general ..." is insufficiently clear and insufficiently prescriptive on the standards that should apply to an enclosure holding animals as deadly as tigers. Similar considerations apply to the HSE guidance.

The fact that other zoos may not have double keeper gates fitted to tiger enclosures, and the lack of more prescriptive guidance, carry a risk of further deaths.

# 5.3 Working hours / night-time hand-rearing work for keepers working with tigers.

5.3.1 I heard evidence that the risk assessment of Hamerton zoo staff involved in night-time feeding / hand rearing of infant animals was limited to an informal discussion between staff to share out the task and an understanding that they would raise a concern if they got too tired. At Hamerton zoo, doing this work was entirely voluntary but it was then unpaid, with the hours taken in doing the work unmonitored and unrecorded (save for a diary, the focus of which was the animal's progress not staff working time). I heard evidence that no advice was taken on the safety implications of carnivore keepers who were already working 45 hour, 6 day weeks also hand-rearing animals overnight with the consequent potential for disruption of sleep patterns. I heard evidence that no limits had been put on the number of consecutive nights that a keeper could be responsible for night-time feeding. Earlier in May, Rosa fed the serval kitten for 7 consecutive nights every 3 hours while working a 6 day week, for 45 hours with 1.5 hours of overtime. I heard evidence that it was left to the keepers themselves to raise if they felt they were getting too tired. I heard evidence that Rosa and other keepers found hand-rearing animals extremely rewarding and they were happy to do it. However, I also

heard evidence from an independent expert in Health and Safety human factors that fatigue is a risk factor for slips and omissions, and that employees tend to underestimate the effect of tiredness on their own performance. I am concerned that those risks may be all the greater where the night-time work is seen by the worker as rewarding and something they may be reluctant to give up. I heard evidence, and am concerned, that despite the animals belonging to the zoo as a commercial organisation, the management of the zoo viewed this activity as akin to a private activity comparable to a keeper caring for their own pet, and did not view it as working time. The employment-law implications of such an arrangement are beyond the scope of the inquest and this report, but the employee safety implications of that approach are a concern. I am concerned that keepers involved in safety critical daytime work with quite extensive daytime hours were carrying out intermittent additional night time work with little risk assessment, and no advice regarding appropriate limits on, or the monitoring of, those night-working hours.

- 5.3.2 I heard evidence that since Rosa's death, the zoo has introduced a formal policy for the hand-rearing of animals. That policy (which on its face was meant to have been reviewed on 24 April 2019) reduces, but does not eliminate, my concerns in this regard. It provides that the period of consecutive days staff spent hand-rearing should be "kept to a minimum". However, it goes on to provide that this is to be, "at the staff members own discretion" after what is said to be "self-evaluation". For hand-rearing done at home, the work remains viewed as voluntary and unpaid. The policy does not make provision for the hours spent in such activity to be monitored for safety reasons, although in a document provided on the last day of the inquest, I was told that this would be introduced before any further hand-rearing was done. The policy does not make any separate provision or safeguards for those keepers whose day job involves them working with the highest risk animals like tigers, where there is a risk of fatalities if fatigue-induced mistakes are made. No advice had been taken from any outside expert on the safety implications of night-working or the patterns of work being undertaken. I am concerned that there remains a risk of further deaths.
- 5.3.3 I am concerned that the above situation has continued notwithstanding the involvement of Sphere Risk Health and Safety Management Ltd who were engaged as the zoo's competent person under the Health and Safety at Work Act 1974. I am further concerned that Stephen Smith of Sphere had assessed the risk of animal handling (including the tigers) as having a severity rating of only 4 (major injury), in the risk assessment dated 1 August 2016. That that was the risk assessment operative at the time of Rosa's death. I heard evidence that the risk of fatality from errors in tiger handling was obvious, and that only a severity rating of 5 (single or multiple fatality) should have applied. I am concerned as to how such a severity rating could have been reached by a health and safety consultant considering the work of keepers who were involved in tiger-handling. I am concerned that similar errors would carry a risk of further deaths.
- 5.3.4 I am concerned at the apparent absence of national guidance in relation to the risk of zoo keepers involved in safety-critical tasks during the day also undertaking night-time hand-rearing of zoo animals. I am concerned at the apparent absence of scrutiny of these risks in zoo inspections, both under the ZLA (since it affects public safety) and in health and safety inspections.

# 5.4 Risk of fatalities from systems that are solely dependent on the human reliability of tiger keepers.

5.4.1 The system for entering the tiger enclosures at Hamerton zoo was simple, and involved a number of visual checks by the tiger keeper. However, as found by the jury, I heard evidence that this system was totally dependent on the keepers reliably following their training. There was no further control measure (whether involving engineering design, a flag or sign system, CCTV, the use of radio checks or otherwise) to limit the human error risk. I heard expert evidence that training on its own is not an effective measure to reduce the risks of slips, lapses or violations. I heard evidence that in relation to a task which carries the risk of single or multiple fatalities, human actions

should not be relied on to be the control of the hazard unless as a final resort.

5.4.2 I heard evidence that Hamerton zoo's "Review of Tiger Protocols" was not a suitable method statement for working in the tiger enclosures. It did not explicitly set out every necessary stage of checks in the system for entering a tiger area; it had not been updated; it addressed only some of the tasks that were required (for example, it did not address entry into the Tiger paddock where Rosa was attacked). I heard evidence that the relevant risk assessment was not suitable; that it did not consider the risk of human failure, and did not address the risk of a member of staff omitting a critical check or action due to an unintentional slip, lapse or mistake, or an intentional violation.

# 5.4.3 I heard evidence that despite the aforesaid:

- ZLA inspections in 2013 (informal) and 2015 (informal), and a Health and Safety inspection by Huntingdonshire District Council in 2014 failed to notice these shortcomings in the zoo's tiger system, method statement and risk assessments.
- A ZLA periodic inspection in 2016 simply failed to take place at all.

#### 5.4.4 I heard evidence that since Rosa's death,

- The zoo has introduced a radio call system requiring the tiger keeper to confirm the tiger slide position before entering any part of the tiger enclosure.
- The zoo has improved its method statement for working with tigers and its risk assessments.
- Huntingdonshire District Council has improved the system for programming zoo licensing inspections. They have sought to establish a network of animal experts and others with experience in health and safety matters within the Local Authority enforcement sector to improve the standard of their inspection regime.
- 5.4.5 I heard evidence that leading HSE publications to which Zoo owners/managers might turn for advice on risk assessment made little or no reference to human factors risks. Those risks are not specifically addressed in the current DEFRA guidance. I heard expert evidence from (ergonomics team, HSE Science Division) that it would be of benefit if these risks were given a higher profile, including in HSE publications online.
- 5.4.6 In light of the aforesaid, I am concerned that there is an ongoing risk nationally that systems for entering tiger enclosures may be entirely dependent or overly-dependent on the reliability of individual zoo keepers without sufficient account being taken of the risk of human failures. Further, such risks may not be being effectively addressed by zoo inspections nor sufficiently publicised in DEFRA and HSE guidance. This carries a risk of further deaths.

## 6 ACTION SHOULD BE TAKEN

In my opinion action should be taken to prevent future deaths and I believe that:

# **Conventional firearms**

- 6.1 Constable of Hamerton Zoo and the Chief Constable of Cambridgeshire Constabulary between them have the power to take action to speed up the steps necessary for the zoo to obtain suitable conventional firearms and ensure that a suitable number of zoo staff are licensed and trained in the use of such weapons: see paragraphs 5.1.1 5.1.3 above.
- 6.2 **DEFRA** and the **HSE** have the power to take action to provide further / better guidance on the need for zoos holding tigers to possess and have access to conventional firearms to shoot tigers if necessary for the preservation of human life: see paragraph 5.1.4 -5.1.5 above.
- 6.3 **DEFRA** and the **Local Government Association** have the power to take action to ensure that the need for zoos holding tigers to have access to conventional firearms is robustly assed in ZLA inspections carried out nationally by both

inspectors nominated by the Secretary of State and those inspectors employed by Local Authorities as the enforcing body for health and safety in zoos. See paragraph 5.1.4 above.

## Absence of air-lock type double keeper gates

- 6.4 **DEFRA** and the **HSE** have the power to take action to provide further / better guidance on the need for double keeper gates to be fitted to tiger enclosures. See paragraphs 5.2.3 5.2.4, 5.2.6 above.
- 6.5 **DEFRA** and the **Local Government Association** have the power to take action to ensure that the need for zoos holding tigers to have double keeper gates fitted to tiger enclosures is robustly assed in ZLA inspections carried out nationally by both inspectors nominated by the Secretary of State and those inspectors employed by Local Authorities as the enforcing body for health and safety in zoos. See paragraphs 5.25-5.26 above.

# Working hours / night-time hand-rearing work for keepers working with tigers

- of Hamerton Zoo and of Sphere Risk, Health and Safety Management Ltd have the power to take further action to take advice on, assess, and reduce the risk of tiger keepers at Hamerton Zoo working during the night in the hand-rearing of animals, having regard to best practice for working patterns/hours for those engaged in safety critical tasks carrying a risk of fatalities. See paragraphs 5.3.1 5.3.3, above.
- 6.7 **DEFRA,** the **HSE** and the **Local Government Association** have the power to take action to provide guidance on the risks involved in tiger keepers being involved in hand-rearing of animals during the night, while doing safety-critical work by day. See paragraph 5.3.4, above.
- 6.8 **DEFRA** and the **Local Government Association** have the power to take action to ensure that the risks associated with night-time hand-rearing of animals being conducted by those doing safety-critical work with the highest risk category of animals is robustly assessed in ZLA inspections carried out nationally by both inspectors nominated by the Secretary of State and those inspectors employed by Local Authorities as the enforcing body for health and safety in zoos. See paragraph 5.3.4 above.

# Risk of fatalities from systems that are solely dependent on the human reliability of Tiger Keepers.

- 6.9 **DEFRA**, the **HSE** and the **Local Government Association** have the power to take action to publicise and provide further / better guidance on:
  - the human factor risks for zoo keepers working with tigers;
  - the unacceptability of having the human reliability and training of individual tiger keepers as the only control measure for safe entry into tiger enclosures.

See paragraph 5.4.5 above.

6.10 DEFRA and the Local Government Association have the power to take action to ensure that systems for entering tiger enclosures that are solely dependent upon the human reliability / training of individual keepers are identified and corrected as part of ZLA inspections carried out nationally by both inspectors nominated by the Secretary of State and those inspectors employed by Local Authorities as the enforcing body for health and safety in zoos. See paragraph 5.4.6 above.

#### 7 YOUR RESPONSE

You are under a duty to respond to this report within 56 days of the date of this report, namely by 6 September 2019. I, the coroner, may extend the period.

	Your response must contain details of action taken or proposed to be taken, setting out the timetable for action. Otherwise you must explain why no action is proposed.
8	COPIES and PUBLICATION
	I have sent a copy of my report to the Chief Coroner and to the following Interested Persons: Rosa's mother), Council. (Rosa's father), and Huntingdonshire District Council.
	I have also sent it to:  • The Chartered Institute Of Environmental Health.  • The British and Irish Association of Zoos and Aquariums (BIAZA)  • The European Association of Zoos and Aquariums (EAZA)  • Expert witness human factors, ergonomics team HSE Science Division  • Expert witness (zoo management / design)
	who may find it useful or of interest.
	I am also under a duty to send the Chief Coroner a copy of your response.
	The Chief Coroner may publish either or both in a complete or redacted or summary form. He may send a copy of this report to any person who he believes may find it useful or of interest. You may make representations to me, the coroner, at the time of your response, about the release or the publication of your response by the Chief Coroner.
9	12 JULY 2019 Nich Koll