

Forensic Identification of Workplace Accidents Causing Death (A Case Report)

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Abstract—*The industrial revolution brought progress to society, but indirectly led to a high number of work-related accidents. Data from ILO stated nearly 2.3 million people died per year worldwide due to work-related accidents/diseases. In case of workplace accidents, forensic doctors have a very important role to help law enforcement and justice in the form of Visum et Repertum on an expert statement. Problems: Deaths due to work accidents rarely undergo an autopsy process, thus the cause of death cannot be determined. In some cases, rejection of autopsy could be polemic, especially when the corpse was buried. Research methods: This study used work accident case review method which consisted of single units, but it was deeply analyzed through forensic and legal aspects. Discussion: Death due to workplace accident is unnatural death, usually caused by negligence, but it can be categorized as a criminal act. Conclusion: The perpetrator violates Criminal Code Article 359 and Article 361 regarding negligence in work. Meanwhile, the victim's heirs are entitled to compensation for death in accordance with Government Regulation No. 44/2015 on Implementation of Work Accident and Death Security Programs.*

Keyword : Law; Forensic; Workplace Accidents

I. INTRODUCTION

Workplace accidents are part of society. The industrial revolution which triggered the construction of new factories, an increase in the number of vehicles on the road and others, brought progress to society, but directly or indirectly, it was related to the high number of workplace-related accidents.

In 2015, National Census of Fatal Occupational Injuries stated that 3.38 out of 100,000 full-time workers had fatal injuries. Meanwhile, data from International Labor Organization (ILO) stated that nearly 2.3 million people die per year worldwide due to workplace-related accidents/diseases.[1,2]

In Indonesia, the Manpower Social Security Administration (BPJS-TK) stated that the number of workplace accidents in 2015 reached 105,182 cases and the death toll reached 2,375 people. This number increased in 2018 with 147,000 cases of workplace accidents and 2,575 people died.

Based on the Regulation of the Indonesian Minister of Manpower No. 03/MEN/1998, a workplace accident is defined as an undesirable and unexpected event that can lead to human casualties and/or property. Meanwhile, based on the Australian/New Zealand Standard 4801:2001, workplace accident is defined as unplanned events that result or have the potential to result in injury, illness,

damage, or other losses. As for the Occupational Health and Safety Assessment Series (OHSAS) 18001: 2007, a workplace accident is a work-related event that can result in injury or illness (depending on the severity) or events that can lead to death.[3-5]

According to Bird and Germain, there are three types of workplace accidents:

- Accident, an unexpected event that causes harm to both humans and property.
- Incident, an unexpected event that has not caused a loss.
- Near miss, an almost accidental event. In other words, it almost creates an incident or accident.[6]

Statistically, 85% of workplace accidents are triggered by unsafe acts and 15% by unsafe conditions. This can be explained as follow:

- Unsafe act, behavior or mistakes that can lead to accidents, such as workers who do not use personal protective equipment, and other safety equipment. This is due to health problems, visual disturbances, illness or lack of knowledge in work processes and work steps, and so on.
- Unsafe conditions, several physical environmental factors that can cause accidents, such as machines without safety, unsafe lighting, inefficient personal protective equipment (PPE), oily floors, and so on.

Based on location and time, workplace accidents are divided into four types:

- Workplace accidents due to direct work.
- Accidents during work.
- Accidents on the way to work (from home to work or vice versa, via a reasonable road).
- Occupational illness.

Based on the level of effects, workplace accidents are divided into three types:

- Minor workplace accidents, work accidents that require healing on the same day and are able to carry out their duties again or rest for less than two days. Example: slipped, sprained, and others.
- Moderate workplace accidents, work accidents that require healing and need to rest more than two days. Example: squeezed, laceration wound, and so on.
- Serious workplace accidents, work accidents that result in disabilities due to amputation and failure of a limb. Example: fracture, and others.

Men are more likely to have accidents at work than women, because men are more dominant in fields of work that involve physical work and mostly work in jobs that

require outdoor activities, such as mining, manufacturing, construction sectors, and so on. In this regard, work environment that is most often associated with work accidents is the production area, factory, or workshop.[1,6]

Workers who consume alcohol and illegal drugs are more prone to workplace accidents due to lack of attention and reflexes. The use of tobacco and its by-products also causes various diseases and increases absenteeism from work. Thus, it can be concluded that alcohol, drugs, and tobacco can be associated with workplace accidents.[1]

For workers who work shifts, shift that records the most accidents is the morning work shift compared to day shift and night shift. This is because workers who have a morning shift usually use their rest time at night to do overtime work and do other things which ultimately reduce their physical endurance and work concentration while working the next day.

On the other hand, the highest number of workplace accidents among workers occurs on Monday, which is the first day of work. This might be because of the need of the human body to adjust to work after resting on the weekend. In addition, the influence of alcohol consumption on weekends might also be considered as a contributing factor.[1,7]

In relation to workplace accidents, forensic doctors have a very important role in assisting law enforcement, also in matters related to the rights and obligations of workers and institutions/companies in workplace. The help of doctors with the knowledge they have is very much needed in an effort to find the complete clarity and material truth about an accident that has occurred. The assistance that a doctor could provide is in the form of *Visum et Repertum* or an Expert Statement.

II. PROBLEMS

In death cases due to accidents or work accidents, death is often considered a common thing by the community, because it is clear that the victim died due to an accident. This situation raises the assumption that an internal examination (autopsy) by a forensic doctor is not necessary. External examination of the body is considered sufficient. However, in some cases, polemics often arise regarding the cause of death, especially when the body has been buried. This polemic is often related to insurance or death benefits for the victim, where doctors are often asked to fill out insurance forms but they do not have adequate data due to not carrying out an autopsy on the body. This becomes more complicated if there is an alleged criminal act related to the victim's death.

Every death that occurs outside a health care facility should be performed an autopsy by a forensic doctor to determine the exact cause of death, therefore the results can be used as guidance for various purposes, both administratively and legally. However, autopsy is rarely done.

III. RESEARCH METHOD

This case report used a case review method by examining the problem through a case that consisted of a single unit, but it was analyzed through forensic and legal aspects thoroughly.

The case was from Forensic and Medicolegal Medical Installation of Dr. Soetomo District General Hospital Surabaya on March 16th, 2020, with the subject of the case report a worker who passed away at his workplace.

Data collection method was carried out through observation method, where an observation was conducted using five senses and tools according to the autopsy guidelines. Interview method was also performed on police who examined the crime scene to obtain complete and accurate information about the accident, as well as through related literature studies in forensic science and law science.

The purposes of this research were to identify whether the death of the victim was purely an accident at work or was caused by other factors. It further investigated whether the work accident in this case was a criminal act, and how the settlement of the work accident case was reviewed from the perspective of legal aspect.

IV. DISCUSSION

Case Chronology

On Monday, March 16th, 2020, at around 09:10 WIB, a 46-year-old man died in a factory area where he worked in Surabaya. According to the investigators, the victim died after being hit by a heavy vehicle called a "Begho" driven by his colleague. At that time the victim and his co-worker were at their place of work, a factory where ceramics are made. Prior to the accident, the victim stood in front of the heavy equipment and was not seen by his coworker who was driving the vehicle, thus his body was hit and run over. The victim suffered extensive open wounds in the abdomen and died instantly. The police who came to the scene of the case brought the victim's body to the hospital for examination by a forensic doctor. The corpse body arrived at the Forensic and Medicolegal Medical Installation of Dr. Soetomo District General Hospital Surabaya on Monday, March 16th, 2020 at 12:40 WIB with a Request for *Visum et Repertum* No. B/09/III/2020/SPKT from Karangpilang Police Station for external and internal examinations (autopsy).



Figure 1. The Crime Scene

Examination Results

On external examination, there were Paleiness of mucous membranes of upper and lower eyelids of the eyes, mucous membranes of the lips, gums, and the tips of fingers and nails of hands and feet. Abrasion wounds on right eyebrow, nose, mouth, chin, left arm, left hand, upper and lower back were also discovered. Besides, sliding abrasion wounds were found from upper left chest to lower right abdomen accompanied by bruises. Laceration wound was on the right eyebrow, sized 2 x 0.5 cm. Additionally, this examination also detected extensive tearing wounds on chest, abdomen, and pelvis sized 64 x 27 cm accompanied by spilling of abdominal and pelvic cavity contents. Laceration wound was located on buttocks, sized 12 x 8 cm. The spleen existed in a rupture state and was separated from the body. Bone crepitation were palpable in the chest, back, waist, and pelvic.

While the internal examination shows blood absorption in chest muscles, lungs, liver, pancreas, kidneys, small intestine, and large intestine. Blood clots were located in lower respiratory tract. Rupture gastric was detected accompanied by the release of smooth food remnants. Additionally, the examination looks at laceration of liver, pancreas, kidneys, small intestine, and large intestine. Wrinkle capsule of the spleen occurred while other results indicate fractures of right rib anterior number four and six, right rib lateral number three, and right rib posterior number three, four, five, and six. Besides, there were fractures of left rib anterior number two, three, four, five, and six and pelvis bone fractures.

The results of laboratory examinations supporting forensic histopathology stated that chest muscle showed bleeding areas, kidneys' blood vessels appeared to be enlarged and congestion occurred with no visible tubular cell necrosis. The heart did not show any infarction area. Lung tissue and pancreas were difficult to assess because they had undergone autolysis.

Forensic Analysis

Trauma or injury is defined as body damage due to energy transfer from outside that exceeds the body's resistance. Trauma-causing agents can be mechanical, chemical, and temperature action. The outcomes of trauma are wound, bleeding, scar, impaired organ function, and death. Death from trauma is mainly caused by severe brain injury, shock from bleeding, and multiple organ failure.[8-10]

Globally in 2017, trauma was the third leading cause of death in the world after cardiovascular disease and oncological disease or malignancy. Trauma or injury cases cause 1 in 10 deaths per year. In other words, there are nine deaths due to trauma in every minute. Each year, around 5.8 million people die from traumatic injuries and accidental violence, of which 1.3 million are recorded as a result of traffic accidents, 844,000 suicides, and 600,000 homicides. Meanwhile, the number of injuries caused by trauma might reach 50 million cases per year.[10-12]

Based on the known facts, traffic accidents are a major cause of trauma worldwide, where injuries due to traffic accidents have the potential to cause serious disability, morbidity, or mortality. A traffic accident is defined as an event that occurs on an open road that results in one or more people being injured or killed by at least one moving vehicle. A traffic accident might happen because of a collision between two vehicles, between a vehicle and a pedestrian, between a vehicle and an animal, or between a vehicle and a geographical or architectural obstacle. Traffic accidents are usually unintentional, but some individuals have attempted suicide or committed homicide by using a vehicle.[11-12]

Vehicle accidents are the most common cause of blunt trauma to body. However, injuries from blunt trauma can also be caused by physical attacks, falls from heights, sports injuries, bomb explosions, and so on. The degree and type of injury differ depending on strength and nature of the impact, which might occur without organ injury to multiple organ injury. The force applied to trauma can also be direct or indirect, where the greater the impact, the more likely the sign will be obvious. In this case, it can be said that death from trauma or injury depends on many factors, such as the level of trauma, type of trauma, tools causing the trauma, organs involved, and access to medical care.[12-14]

Men experienced more trauma than women with a ratio of 4:1, or 81%:19%. This is due to men are usually the breadwinners of the family, they are more often outside the home and are more prone to accidents or trauma than women. The dominance of men is also due to their tendency to use physical violence, besides the fact that men consume more alcohol than women.[11,14-16]

Based on age, the group most vulnerable to trauma is the 20-40 years age group. This may be due to the fact that this period is the most active, productive period of life, and people in this period tend to take a lot of risks, leaving them vulnerable to many unexpected events, accidents, and injuries.[12,15,16]

Abdominal trauma ranks third, after head trauma and chest trauma, as a cause of death. Abdominal trauma is an important source of bleeding and requires special attention. This occurs because nearly half of cases of bleeding in abdominal cavity display few or no symptoms.[17]

The level of damage to organs in abdominal cavity is determined by endogenous and exogenous factors at the time of trauma. Endogenous factors depend on the degree of susceptibility of the organ to the cause of trauma, and exogenous factors depend on the size and strength of the trauma source, the speed and consistency of the trauma, the

area of the abdomen affected by the trauma, the strength and degree of resistance of the abdominal wall, and the condition of the organ before the trauma.[15,17,18]

Blunt abdominal trauma might occur together with blunt chest trauma, where traffic accidents are a major cause of death in blunt thoracoabdominal trauma. Blunt chest trauma might present in the form of abrasions, bruises, lacerations, and fractures. Rib fractures are found in two-thirds of blunt chest trauma, where ribs number four through nine are the most common and ribs number eight to twelve are often a marker of blunt abdominal trauma. Rib fractures due to blunt trauma are an important indicator of trauma severity.[13,19,20]

In blunt pelvic injuries, pelvic fractures are the most common result of high-energy trauma. Open pelvic fractures are frequently associated with urogenital and intra-abdominal injuries. Statistically, pelvic fractures constitute 6% of all fracture cases in adults; however, it is extremely life-threatening because they might cause retroperitoneal bleeding with little external evidence.[10,21-22]

Bleeding is the main cause of death, accounting for 91% of trauma patients who potentially survive. Anatomically, deadly bleeding occurs in truncus (67%), junctional (19%), and extremities (14%). Of these, the focus of bleeding is on the chest (36%) and abdominopelvic (64%). Bleeding might leave blood vessels to enter anatomical space in the body, therefore blood volume inside the vessel/circulation is insufficient for oxygen delivery to body cells. If bleeding continues and does not stop, inadequate oxygen supply can cause death.[23]

Bleeding is the loss of volume of blood in circulation or blood vessels, it might occur acutely or chronically. In trauma cases, blood loss is usually acute. Physiological effects that appear as clinical signs are classified into four classes that can be used to estimate the percentage of blood loss and determine medical management.[24]

Based on Advanced Trauma Life Support, the classification system is:

1. Class I hemorrhage: blood volume loss <15% (less than 750 ml). Minimal clinical symptoms might include mild anxiety.
2. Class II hemorrhage: blood volume loss of 15-30% (750ml-1,500 ml). Characterized by a physiological response to compensation, namely tachycardia tachypnea and decreased pulse pressure.
3. Class III hemorrhage: blood volume loss of 30-40% (1,500-2,000 ml). There are tachycardia and hypotension. The patient looks very anxious, and loss of consciousness might occur.
4. Class IV hemorrhage: blood volume loss >40% (more than 2,000 ml). It is a preterminal event requiring immediate therapy. There are severe hypotension and tachycardia.[23-25]

Based on research conducted by Dr. Runkey, death after trauma can be classified as follows:

- Immediate death, i.e. death that occurs within 1 hour after trauma.

- Early death, i.e. death that occurs within the first few hours after trauma.
- Peak death; i.e. death from trauma that occurs within days or weeks of trauma.[23]

Based on the description above, in this case the victim experienced multiple traumas, a combination of various traumas, such as chest trauma, abdominal trauma, and pelvic trauma. The multiple traumas experienced by the victim are the result of blunt force with high energy, therefore they gave extraordinary impact on his body. The victim experienced an "immediate" death because the victim's death occurred at the scene of the incident less than 1 hour after trauma without the opportunity to get medical help.

On the victim's body, there were abrasions and tearing wounds, bone fractures, lacerations, and ruptures of intra-abdominal organs that met the characteristics of wounds due to blunt force. Meanwhile, the presence of right ribs number four and six fractures, and left ribs number two, three, four, five, and six fractures, as well as damage to diaphragm, indicate a high-energy mechanism associated with trauma to the chest.

On the other hand the abdominal trauma experienced by the victim, which was characterized by extensive tearing of abdominal skin to the chest and pelvis, accompanied by lacerations and ruptures of the intra-abdominal organs, was an equally important source of bleeding. In this case, pelvic trauma also played a role in the victim's death.

Pelvic trauma is one of the most devastating injuries, where pelvic fractures are a significant source of bleeding and hemorrhagic shock, but are not always detected quickly. Bleeding from pelvic trauma might cause death in the first hours after trauma.

Thus, it can be concluded that the victim experienced multiple trauma due to blunt force involving chest, abdomen, and pelvis organs, all of which contributed to large amounts of acute bleeding. It caused the victim to experience hemorrhagic shock in a short time followed by death.

Law Analysis

From a medicolegal aspect, this case report is related to several regulations and laws of force in Indonesia. The first was regarding the death that occurred outside the health care facilities, which in this case was located in a ceramic factory area in Surabaya. According to the Joint Regulation of Indonesian Ministry of Home Affairs and Ministry of Health Number 15 of 2010 regarding Reporting of Deaths and Causes of Death, Article 6 paragraph (2) states "Every death that occurs outside a health care facility must be investigated for the cause of death". Investigation for the cause of death in question is conducted through verbal autopsy method by a doctor or other health worker. The verbal autopsy is in the form of interviews with family, friends, or witnesses who know about the death of the deceased and the results will be synchronized with a physical examination in the form of an external examination of the corpse. If the death is suspected to be unnatural, for example, injuries to the body of the corpse such as the case of workplace accidents mentioned above,

the examination must be followed by internal examination (autopsy) to determine the exact cause of death.[27,28]

Article 120 paragraph (1) of the Criminal Procedure Code (KUHP) states that investigators could ask an expert or a person with special expertise, in this case a forensic doctor, to determine the cause of death through an internal examination (autopsy). This request is submitted by the police through a written form, the Request for *Visum et Repertum* (SPVR), as suggested in KUHP Article 133 paragraph (2) that states "A request for an expert statement is conducted through a written form, where in the letter it clearly stated the request for wound examination or the body examination and or post mortem examination". Furthermore, a forensic doctor will answer this written request in writing as well in the form of "*Visum et Repertum*". The KUHP Article 179 paragraph (1) states that "Every person who is asked for his opinion as an expert in judicial medicine or a doctor or other expert, is obliged to provide an expert statement for the sake of justice". In this case, *Visum et Repertum* plays a very important role as an evidence substitution (KUHP article 184) because the corpse cannot be presented at the court and cannot be stored for long time.[29]

According to Abdul Mun'im Idries, *Visum et Repertum* is a written report from a doctor who has been sworn to write honestly about what the doctor had seen and found on the evidence that the doctor had examined and also contains conclusions of the examination for judicial purposes. In this case, *Visum et Repertum* is not only required in the examination of criminal cases, but also required in civil case examinations for certain cases, for example in insurance claims for death due to accidents or workplace accidents.[30,31]

Workplace accidents, as previously discussed, are events that can be categorized as the result of a criminal act, and the person who committed the act can be subjected to criminal sanctions. Work accidents are usually caused by negligence, often referred to as a "culpa". In law science, culpa is interpreted as a kind of error but it is not as serious as deliberate action, because it happens because of carelessness which results in accidental consequences.[32-36]

In a criminal act, two elements must be present, the subjective and objective element. The subjective element is related to a criminal act committed by the perpetrator, whether intentionally or unintentionally, deliberately or due to negligence. Meanwhile, the objective element is the object of the criminal act committed by the perpetrator, either in the form of goods or humans.[32-34,36]

In this case, the results of the crime scene investigation conducted by the police and the autopsy conducted by forensic experts concluded that the victim died due to the negligence of his colleague. This is based on the Criminal Code (KUHP) Article 359 that states "Whoever because of his mistake (negligence) causes the death of another person, shall be punished with a maximum imprisonment of five years or a maximum prison confinement period of one year". This penalty can be increased if the criminal act is committed in a position or occupation as suggested in the KUHP Article 361 that states "If the criminal act that was

stated in the previous section was conducted during a period of certain position of occupation or job, the punishment can be increased by one third and the perpetrator can be deprived from his rights to doing the job and the judge might order the verdict to be announced".[29]

However, apart from the legal settlement, a criminal act also has the possibility to be resolved through a mediation process. Mediation is one form of alternative settlement for cases outside the formal or court channels. The Law Number 30 of 1999 Article 1 point 10 regarding Arbitration and Alternative Dispute Resolution (APS) determined that APS is an institution of disputes or differences of opinion through a procedure agreed by the involving parties, which is a settlement outside the court by consultation, negotiation, mediation, consolidation, or expert judgment.[37,38,39]

Although in general out-of-court dispute resolution only occurs in civil cases, in practice certain criminal cases are sometimes settled out of court. In other words, not all criminal cases go to court and undergo legal processes. In a case, for example in the case of accidents or workplace accidents, sometimes a "peace agreement" is reached, and in this condition the police do not process the case because there has been mediation between the perpetrator and the victim's family.

In a situation where a victim or a worker dies due to a work accident, the heirs of the worker are entitled to compensation in accordance to the prevailing laws and regulations or based on the rights stipulated in the work agreement, company regulations, or collective labor agreement. The Indonesian Government Regulation Number 44 of 2015 regarding Implementation of Work Accident Security and Death Security Programs in Article 34 paragraph (1) states that "Death Security Benefit (JKM) is paid to the participant's heirs, if the participant dies during active working period", which includes:

- Compensation of Rp.16,200,000.00, paid at once.
- Periodic compensation of 24 x Rp.200,000.00, paid at once.
- Funeral fee of Rp.3,000,000.00.
- Children's education scholarships of Rp.12,000,000.00 for each participant.

The Article 37 paragraph (4) also states that "In the event that a worker as referred to in paragraph (1) and paragraph (2) dies, the right to Work Accident Security (JKK) benefits is given to his heirs".[40]

V. CONCLUSION

In this case, an autopsy was carried out to determine the cause of death and for legal and administrative purposes, in accordance with the Joint Regulation of Indonesian Ministry of Home Affairs and Ministry of Health Number 15 of 2010 Article 6 paragraph (2) regarding the obligation to trace the cause of death that occurred outside health service facilities, KUHP Article 179 paragraph (1) regarding the doctor's obligation to provide expert testimony for justice, and KUHP Article 184 which states that *Visum et Repertum* is an evidence substitution that cannot be presented in the court. An autopsy showed the corpse had a wide-open wounds on the abdomen, chest, and

pelvis, as a result of blunt force that caused bleeding. The manner of death was due to a workplace accident (unnatural death).

The perpetrator violated the KUHP Article 359 regarding negligence at work and was subject to a maximum imprisonment of five years or a maximum prison confinement period of one year. Because the criminal act was committed while carrying out a position or a job as stated in Article 361 of the KUHP, the criminal sanction could be increased by one third and the defendant's right to carry out work could be lifted.

The victim's heirs are entitled to compensation in accordance to the prevailing laws and regulations or based on the rights stipulated in work agreements, company regulations, and collective labor agreements. Regarding the work accident in this study, the heirs were entitled to compensation for death in accordance to the Indonesian Government Regulation Number 44 of 2015 regarding the Implementation of Work Accident Security and Death Security Programs, Article 34 paragraph (1) and Article 37 paragraph (4), of Rp.36,000,000.00 as the total accumulated compensation for death, funeral expenses, and children's education compensation.

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