

**WORKER CRUSHED**

Type of Incident: Fatal

Date of Incident: November 17, 2010

## TABLE OF CONTENTS

SECTION	TITLE	PAGE NUMBER
1.0	DATE AND TIME OF INCIDENT	3
2.0	NAME & ADDRESS OF PRINCIPAL PARTIES	3
2.1	Owner	3
2.2	Prime Contractor	3
2.3	Employer	3
2.4	Worker	3
3.0	DESCRIPTION OF PRINCIPAL PARTIES	4
3.1	Employers	4
3.2	Worker	4
4.0	LOCATION OF INCIDENT	4
5.0	EQUIPMENT, MATERIAL AND OBSERVATIONS	4
5.1	Equipment and Material	4
5.2	Observations	5
6.0	NARRATIVE DESCRIPTION OF INCIDENT	6
7.0	ANALYSIS	7
7.1	Direct Cause	7
7.2	Contributing Factors	7
8.0	FOLLOW-UP/ ACTION TAKEN	8
8.1	Occupational Health and Safety	8
8.2	Industry	8
8.3	Additional Measures	8
9.0	SIGNATURES	9
10.0	ATTACHMENTS	9

**SECTION 1.0      DATE AND TIME OF INCIDENT**

- 1.1    The incident occurred on November 17, 2011 at approximately 4:15 p.m.

**SECTION 2.0      NAME AND ADDRESS OF PRINCIPAL PARTIES**

**2.1    Owner**

- 2.1.1 Delcon Creekwood V Ltd.  
2500 10303 Jasper Ave.  
Edmonton, Alberta  
TT5J 3N6

**2.2    Prime Contractor**

- 2.2.1 Alltek Loss Prevention Inc.  
20204 – 110 Ave.  
Edmonton, AB.  
T5S 1X8

**2.3    Employer**

- 2.3.1 Sureway Construction Ltd.  
7331 – 18 St.  
Edmonton, Alberta  
T6P 1P9

**2.4    Worker**

- 2.4.1 Worker 1 

### **SECTION 3.0 DESCRIPTION OF PRINCIPAL PARTIES**

#### **3.1 Owner description.**

3.1.1 Delcon Creekwood V Ltd. is a land development company based in Edmonton, Alberta.

#### **3.2 Prime contractor**

3.2.1 Alltek Loss Prevention Inc. is an Alberta based organization that provides safety and loss control services to industry.

#### **3.3 Employer**

3.3.1 Sureway Construction Ltd. is part of the Edmonton based Sureway Group of Companies and provides underground storm and sanitary pipe installation services.

#### **3.4 Worker [REDACTED]**

3.4.1 The Worker [REDACTED] who became fatally injured had been employed as a labourer for Sureway Construction Ltd. since 2005 on a part-time seasonal basis while he attended high school and post secondary education.

### **SECTION 4.0 LOCATION OF INCIDENT**

4.1 The incident occurred in a future housing subdivision area located near 141 Street and 41 Avenue in the southwest area of the City of Edmonton.

### **SECTION 5.0 EQUIPMENT, MATERIAL AND OBSERVATIONS**

#### **5.1 Equipment and Material**

##### **5.1.1 Concrete manhole barrel (portion thereof)**

5.1.1.1 The portion of the concrete manhole barrel that was involved in this incident was manufactured by Lafarge. It was 2.4 m high with a 2.9 m wide outside diameter and a 2.4 m wide inside diameter. The approximate weight of the portion of the manhole barrel was 11,000 kgs. and was assembled with a base and a top portion to make a complete vertical concrete manhole from grade or street surface downward where horizontal storm sewer pipe would intersect into it.

##### **5.1.2 Excavator**

5.1.2.1 The 2003 excavator involved in this incident was manufactured by Caterpillar; it was a 385CL model with serial number [REDACTED].



### 5.1.3 Rigging

5.1.3.1 The rigging that was used to attach the concrete manhole portion to the boom of the excavator was a three legged grade 80 chain sling with hammerlocks fitted on the ends. A series of links and a master link were attached to the opposite ends of the three legged chain sling. An additional, larger grade 80 single chain sling connected the master link to the boom of the excavator.

### 5.1.4 Straight cut hard and compact soil wall

5.1.4.1 The straight cut hard and compact soil wall that Worker 1 [REDACTED] was crushed against was approximately 1.5 m high. The slope of the remaining upper portion of the wall did not meet legislative requirements for cut back purposes.

### 5.1.5 Environmental conditions

5.1.5.1 At the time of the incident, the outside air temperature was approximately -12 degrees Celsius with a wind chill of -22 degrees Celsius. Snow was falling with recorded wind gusts of 28 km/h.

## 5.2 Observations

5.2.1 Upon arrival of Occupational Health and Safety officers at the worksite, the fatally injured worker was in the process of being removed from the location by Emergency Medical Services. The Edmonton Police Service was still on location conducting their investigation. Most of the workers were gathered in a trailer on the worksite which was located approximately 800 m away from the incident scene. Darkness had fallen and the outside air temperature was approximately -12 degrees Celsius with a wind chill of -22 degrees Celsius with snow falling.

5.2.2 The incident scene consisted of an open excavation with a concrete manhole portion located at the bottom of the excavation near the south end of the excavation. A feeder trench that ran north and out of the excavation contained several lengths of horizontally placed concrete pipe. The trench was partially backfilled. The concrete manhole portion was sitting in an offset manner on top of its base (Attachment "C", Photograph 6).

5.2.3 The wall of the trench west of the vertically placed concrete manhole portion was straight cut. The Caterpillar 385C excavator involved in the incident was located approximately 50 m south of its original position near the excavation. A straight cut trench that led from the base of the excavation upward in a southerly direction was created immediately after the incident by the excavator operator for access/egress by Emergency Medical Services personnel (Attachment "C", Photograph 4).

## **SECTION 6.0 NARRATIVE DESCRIPTION OF THE INCIDENT**

- 6.1 At approximately 7:30 a.m. on November 17, 2010 a crew of workers arrived at the worksite in south Edmonton know as Chappelle to install horizontal storm sewer drainage pipelines that would connect into the side of a vertical concrete manhole. Two additional workers belonging to the crew arrived at approximately 7:40 a.m.
- 6.2 The crew of workers commenced digging a trench and installing horizontal storm sewer concrete pipe (Attachment "C", Photograph 3). At approximately 1:00 p.m. the crew took a 30 minute lunch break and then resumed their pipe installation duties. A brief coffee break was also taken around mid-morning.
- 6.3 The Excavator Operator [REDACTED] then dug the excavation where the vertical concrete manhole would be placed to eventually connect to the southbound horizontal storm sewer pipe. After digging the excavation, the crew of workers placed crushed stone on the ground at the bottom of the excavation where the circular base of the vertical concrete manhole would be placed. Some of the workers then attached the base for the vertical concrete manhole to the boom of the excavator via a set of chain rigging.
- 6.4 The Excavator Operator [REDACTED] then lowered the base of the concrete manhole into the excavation, placing it on top of the bed of crushed stone. The chain rigging was released by the workers in the excavation which allowed the Excavator Operator [REDACTED] to return the boom of the excavator to the surface.
- 6.5 Some of the workers remaining on the surface then rigged the vertical manhole portion to the boom of the excavator. The Excavator Operator [REDACTED] then lowered the vertical manhole portion into the excavation until its bottom was approximately 300 mm above the circular base. The remaining workers in the excavation then rotated the suspended vertical manhole portion so that the hole in the side of the vertical manhole portion would line up with the horizontal storm sewer pipe that would eventually be connected into the vertical manhole.
- 6.6 As the workers attempted to rotate the suspended vertical manhole portion, the Excavator Operator [REDACTED] could not see the hand signals being given by one of the workers in the excavation, due to weather conditions and the mitts on his hands. In order to communicate to the signaler that he could not read his hand signals, the Excavator Operator [REDACTED] opened the door on the left side of his excavator in preparation to tell the signaler to remove his mitts.



- 6.7 As the Excavator Operator [REDACTED] opened the door on the left side of the cab, a gust of wind caught the door and rapidly blew it open. The Excavator Operator [REDACTED] reacted by suddenly reaching for the door and with his left arm struck the operating lever that turned the excavator, (Attachment "C", Photographs 9 & 10).
- 6.8 The entire excavator quickly rotated counterclockwise and swung the suspended vertical manhole portion that was attached to the excavator boom towards the straight cut west wall. Worker 1 [REDACTED] was struck and crushed against the west wall by the suspended vertical manhole portion. The Excavator Operator [REDACTED] was able to move the lever in the opposite direction and simultaneously lower the suspended vertical manhole portion to the ground.
- 6.9 The remaining workers attended the seriously injured Worker 1 [REDACTED] and covered him with coats and other clothing material they could locate. Emergency Medical Services was contacted; they responded to the worksite and treated the seriously injured worker who was pronounced dead at the scene.

## **SECTION 7.0 ANALYSIS**

### **7.1 Direct Cause**

- 7.1.1 The direct cause of Worker 1's [REDACTED] fatal injuries was being crushed against the straight cut west wall by the suspended vertical manhole portion.

### **7.2 Contributing Factors**

- 7.2.1 The Foreman [REDACTED] of the crew allowed Worker 1 [REDACTED] to enter the pinch point area created when the vertical manhole portion was lowered into the excavation and suspended above the circular base by the excavator. The Foreman [REDACTED] did not identify the area between the west wall and the suspended vertical manhole portion to be a hazardous area. The Foreman allowed Worker 1 [REDACTED] and other workers to rotate the suspended vertical manhole portion with their hands without taking any precautions to guard against unexpected swinging movement.
- 7.2.2 The lock out device in the cab of the excavator (Attachment "C", Photographs 9 & 10) that prevents movement of any part of the excavator was not activated at the time of the incident by the Excavator Operator [REDACTED]. The Excavator Operator [REDACTED] could not see the hand signals that one of the workers was attempting to give to him for maneuvering the suspended vertical manhole portion. This worker had mittens on which made his hand signals difficult for the Excavator Operator [REDACTED] to clearly understand.

- 7.2.3 As the Excavator Operator [REDACTED] began to open the steel framed glass door of his excavator with his left hand to obtain verbal clarity about the confusing hand signals, a gust of wind swung the door rapidly outward. The Excavator Operator [REDACTED] reacted by attempting to grab a hold of the door and struck the lever that controlled movement for the excavator with his left arm (Attachment "C", Photograph 10).
- 7.2.4 The contact of the Excavator Operator's [REDACTED] left arm against the lever caused the excavator to immediately rotate counterclockwise, swinging the suspended vertical manhole portion against Worker 1 [REDACTED] and crushed him against the straight cut west wall of the excavation.
- 7.2.5 Sureway Construction Ltd. did not consider the manual rotation of suspended vertical manhole portions by workers to be hazardous work. The hazard assessment paperwork completed by the Foreman [REDACTED] did not identify or address any control measures for hazards created when a vertical manhole portion was suspended in an excavation, creating a pinch point.

## **SECTION 8.0 FOLLOW-UP/ ACTION TAKEN**

### **8.1 Alberta Employment and Immigration; Occupational Health and Safety**

- 8.1.2 Occupational Health and Safety issued a stop work order to Sureway Construction Ltd. for lowering vertical manhole portions into excavations and trenches until a control could be developed and implemented that would prevent dangerous movement of powered mobile equipment or loads.
- 8.1.3 Sureway Construction Ltd. was also ordered to ensure workers were protected from cave-ins while working in excavations, that hand signals were given by a competent signaller and that accident scenes remain undisturbed. Sureway Construction Ltd. was also ordered to provide information and to conduct an investigation into the incident.

### **8.2 Industry**

- 8.2.1 Sureway Construction Ltd. complied with all of the orders issued to them with the exception of the complete provision of information. Sureway Construction Ltd. was also in non-compliance from December 3 until December 31, 2010 for orders pertaining to ensuring proper hand signals and proper methods of protection for workers entering an excavation deeper than 1.5 m were in place where required.

### **8.3 Additional Measures**

- 8.3.1 No further measures required.

**SECTION 9.0      SIGNATURES**

\_\_\_\_\_  
Casey Leahey, Lead Investigator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Kristy Mauracher, Investigator

\_\_\_\_\_  
Date

\_\_\_\_\_  
Gerry Wagner, Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Joanne Garton, Regional Director, Central

\_\_\_\_\_  
Date

**SECTION 10.0      ATTACHMENTS:**

Attachment A	Map
Attachment B	Not available
Attachment C	Photographs



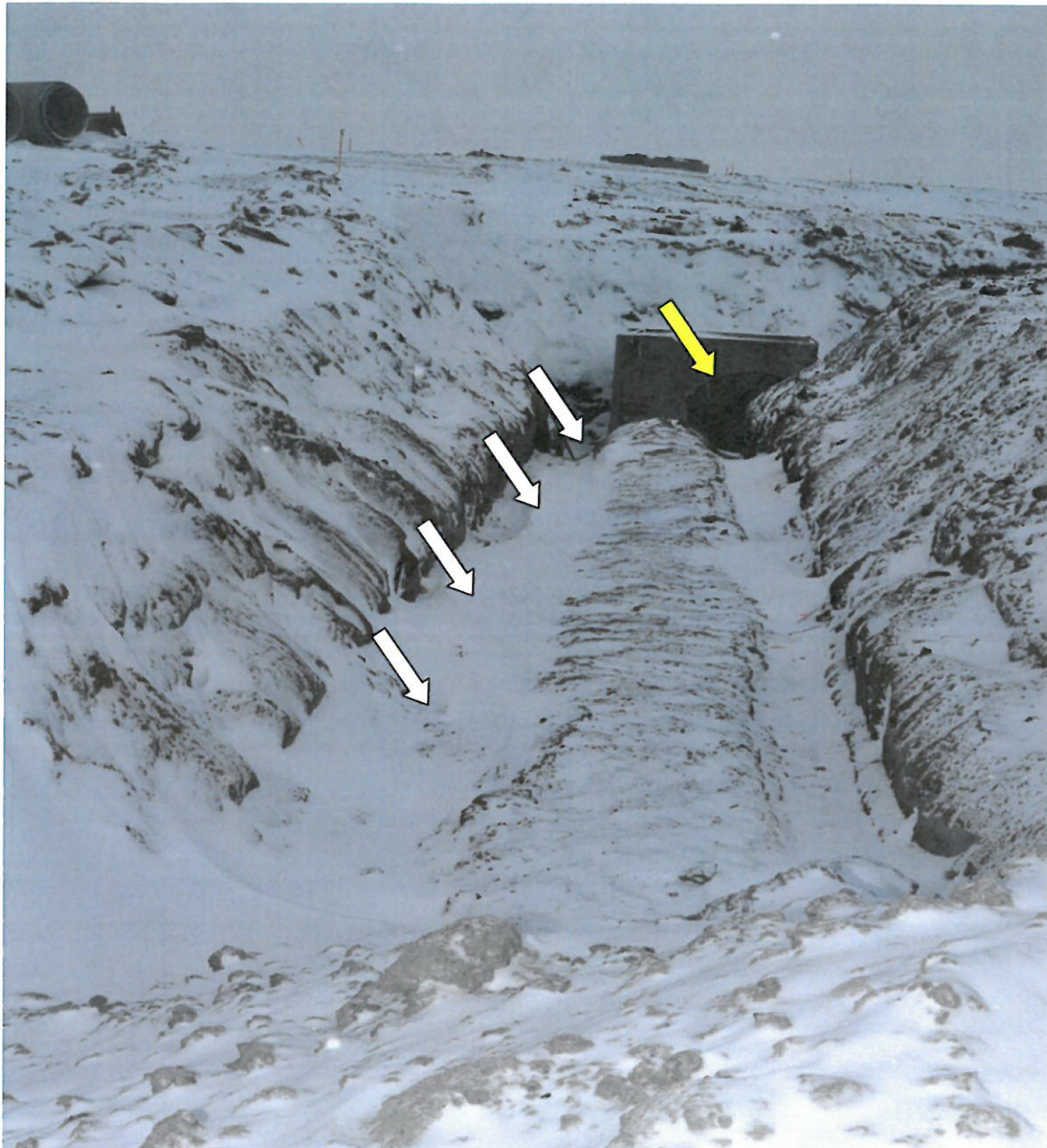


**Photograph # 1** A southeast to northwest view of the worksite is shown in this photograph. The excavator that was involved in the incident has been relocated from its original location at the time of the incident. The arrows identify the area of the excavation.





Photograph # 2 A closer view of the excavation is shown in this photograph as identified by the arrows.



Photograph # 3 The backfilled horizontal storm sewer pipe that was installed just prior to digging the excavation, is located in the foreground of this photograph and is identified by the arrows. The vertical manhole portion that struck and crushed Worker 1 [REDACTED] is shown at the south end (background) of the photograph. The horizontal storm sewer pipe was intended to connect into the opening in the vertical manhole portion identified by the yellow arrow.



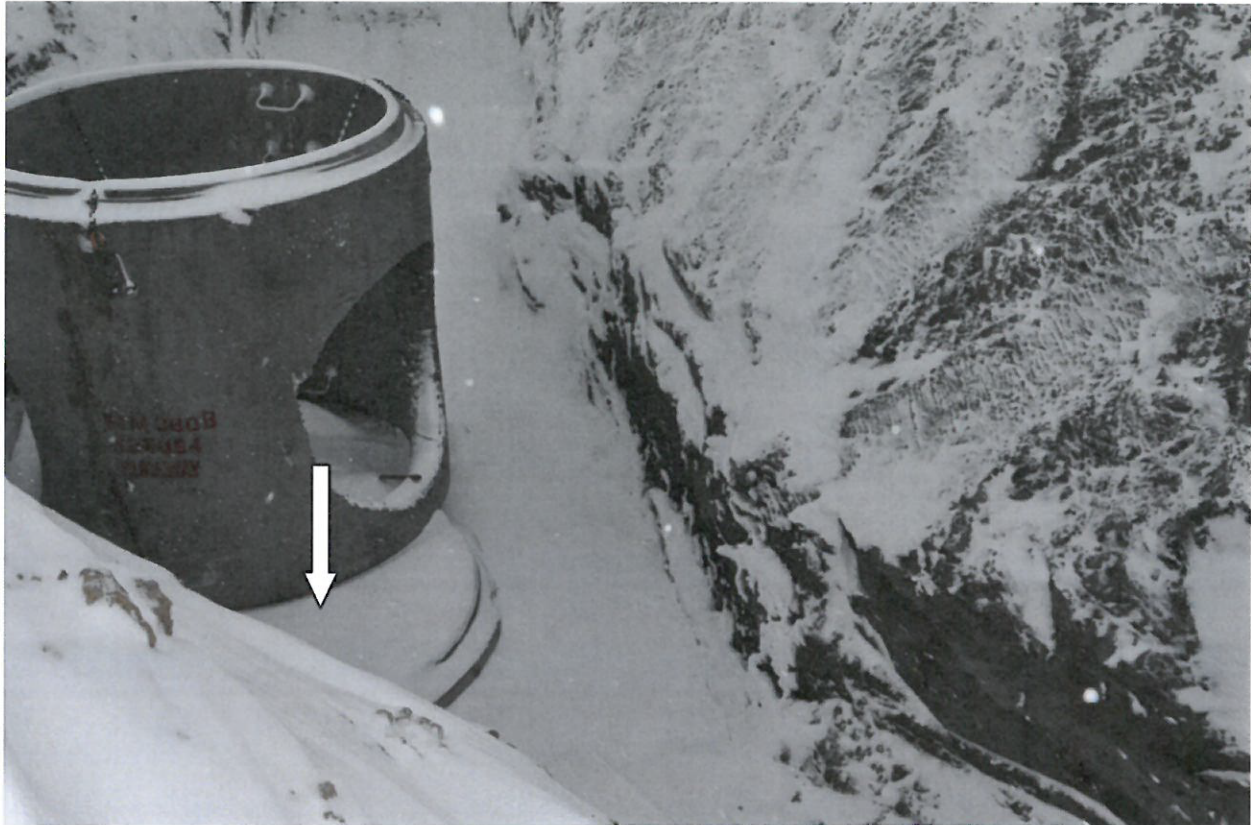


Photograph # 4 The trench that the excavator operator [REDACTED] dug immediately after the incident is shown in the foreground (south end) of this photograph. The vertical concrete manhole portion that struck and crushed Worker 1 [REDACTED] is also visible in the photograph.



Photograph # 5 A portion of the straight cut wall that Worker 1 [REDACTED] was crushed against is identified by the arrow. A portion of the three legged chain sling used to attach the vertical manhole portion to the excavator is visible draped over the top of the vertical manhole portion.





Photograph # 6 The entire portion of the straight cut wall where Worker 1 [REDACTED] was crushed against is visible in this photograph to the right of the base of the vertical manhole portion. The arrow identifies the circular base of the vertical manhole portion that was lowered into the excavation first.



Photograph # 7 Shows a re-enactment of the excavator returned to the approximate location it was in at the time of the incident. The arrows identify the portion of the slope above the straight cut wall that was removed to allow investigators to safely enter the excavation.





Photograph # 8 Shows a part of the chain sling inside the vertical manhole portion which struck and crushed Worker 1 [REDACTED]. The circular cut out shown in the vertical manhole portion was intended to receive the horizontal storm drain sewer pipe.



Photograph # 9 Shows the yellow lock out lever in the downward vertical position which prevents the hydraulic system for the excavator from operating. The arrow on the right identifies the door on the excavator that swung open when contacted by the gust of wind at the time of the incident.





Photograph # 10 The arrow on the left identifies the yellow lock out lever in the run or horizontal position which permits the hydraulic functions to be fully operational. The arrow on the right above the operator's glove identifies the control that rotates the excavator clockwise or counterclockwise which the excavator operator struck with his left arm when he reached for the door that swung open suddenly.