

ROBSON FORENSIC REPORT

of the

JARED NEFF INJURY

February 1, 2010

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REPORT

FEBRUARY 1, 2010

A. INTRODUCTION

On May 23, 2005, first grader Jared Neff was playing at “tot-park” playground at the Community Park, borough of Macungie, Lehigh County, PA. Jared fell from an overhead ladder and struck the protective surface. After he rose, he collapsed backwards and lost consciousness. It was determined he had received a concussion and suffered traumatic brain injury as a result of his fall.

Robson Forensic, Inc. was requested to determine if conditions at the Community Park were dangerous in a manner that caused Jared’s injury.

B. MATERIALS AVAILABLE FOR REVIEW

1. Complaint
2. Jane Neff deposition
3. Ben Smith deposition
4. Plaintiff’s First Set of Interrogatories on Borough of Macungie and Community Park
5. Defendants, Borough of Macungie and Community Park’s Answers to Interrogatories of Plaintiff
6. Video and annotated photographs of the playground
7. Borough of Macungie Parks and Recreation minutes: September 10, 2003; November 12, 2003; February 11, 2004; April 14, 2004; July 14, 2004; September 8, 2004; October 13, 2004; November 10, 2004; January 20, 2005; February 9, 2005
8. My site inspections on June 29, 2006 and January 28, 2010

C. BACKGROUND

1. Site Conditions

Community Park is a 90 acre facility at 535 Highland Road, Macungie, PA. The Park includes pavilions, sports fields, picnic areas, a fishing pond and three public playground areas referred to as “tot parks.” This incident occurred at the north-most of the three playgrounds referred to as the “tot-park building tot park.”

This playground consists of a single composite play structure assembled from components manufactured by the JJA Thomas Company. The structure includes slides, platforms, a clutter bridge and upper body equipment including overhead ladders and overhead rings. The equipment was designed to be suitable for use by 5 year old to 12 year old children.

Jared was injured when he fell from the overhead triangle ring ladder which is the last equipment component on the north end of the structure. That ladder consists of a series of rigid triangular rings suspended 18” below a serpentine overhead tube. The rings are 1.32” round stock bent into 1-11” wide triangles with a 13” wide gripping surface. Parallel rings are spaced 10 1/2” apart. Angled transition rings are 14” center to center. Access to the ladder from the structure on the south end is from a platform 48” lower than the rings. There is no platform or climbing access point at the north end. Jared fell near the middle of the ladder.

The playground was constructed with a loose-fill protective surface. The loose fill material was engineered wood fiber, applied over a fabric membrane atop a stone drainage base. I measured the height of the ladder’s ring grips above the membrane to be 7’-5” and the height of the overhead tube above the membrane to be 8’-11”.

Ben Smith was the Borough of Macungie’s engineer and director of public works while the Park was developed. According to Smith, the protective surface was originally specified to be “Fibar” engineered wood fibers; however no documents have been produced to establish whether that manufacturer or an acceptable alternate was actually used.

When Jared fell, the loose fill was missing and thin to the degree that in some places, the membrane was exposed and the stone base was visible. The thickness of fill where he fell was between 0” and 2”.

2. Jared’s Injury

Jared was a 6 1/2 year old first grader who was a little less than 4’ tall. On May 23, 2005, his mother Jane took him and his two brothers to the tot park playground after school. The weather was cloudy and dry.

Jared played without incident for about half an hour before he fell. He was attempting to traverse the overhead ring ladder when he lost his grip about midway across and fell to the surface below. He initially landed in a sitting position (KM 43, 45), got up and then lost

consciousness, falling backwards (KM 56, 105). He was taken from the Park by helicopter. It was determined that he had suffered traumatic brain injury and a grade III concussion (KM 105).

Jane subsequently returned to the park and documented conditions by measurement and photography. There was barely any thickness of resilient surfacing material under the triangle rings. Areas of landscaping fabric were exposed over the stone base below the fabric. She measured the distance from the serpentine tube to be about 9' above the underlying surface and the bottom of the rings to be about 7 1/2' above the ground (KM 40, 41). Jane identified that the protective surfacing was similarly thin throughout the playground. She also videotaped the conditions.

3. Playground Construction and Maintenance

Smith described the Park's history in his deposition. The Park had been designed by the Borough's consultants Simon J. Flanders and their subcontractors, and was constructed in two phases. Phase 1 work included general site work and some of the facilities, including the subject playground. Phase 1 work was performed by contractor Howard Pellini & Sons who completed their work and turned the playground over to the Borough when construction was complete. According to the Borough's Answers, this playground was opened for public use in the fall of 2004.

The Phase 2 Park construction contract was awarded to Blueskies, Inc. According to the Borough's Answers to Interrogatories:

Blueskies was the general contractor on site completing construction to various areas within Community Park including the Tot-Park area and Pavilion and may have had construction materials in and around the Tot-Park playground.

Smith stated that as part of the Phase 2 construction, Blueskies and the Borough were both responsible for maintaining the subject playground at the time Jared was injured (WJB 88, 90, 160, 206).

- Q As of May of 2005 up until May 23rd, that the responsibility of repairing that ground surface, if it needed repair, would be either Blueskies or Borough of Macungie employees working at the park?
- A Yes, either.
- Q: And as you sit here today, you don't know which?
- A Correct. (WJB 127).

The Borough replenished the safety surfacing soon after Jared's injury. Smith never inspected the playground after Jared was injured. The Borough had no protocols for documenting or investigating playground injuries (WJB 121, 122, 123). The Borough has not produced any records documenting inspections or maintenance at the playground.

By Borough Ordinance, supervision and maintenance of borough parks, including playgrounds at those parks, falls under the Borough Park and Recreation Board. They are responsible for:

The Borough Park and Recreation Board shall have general supervision of all borough parks, and all maintenance thereof, including replacements of property and equipment therein. The Board shall be responsible for the cleanliness of the borough parks or the general public health and welfare... (Borough Ordinance §138-5. Powers and duties of the Park and Recreation Board. [Amended 10-18-1993 by Ord. No. HR-215])

Before Jared was injured, the Borough had hired the Urban Research & Development Corporation to prepare a Park, Recreation and Open Space Plan which was adopted by the Borough of Macungie Board of Supervisors on May 2, 2005. The plan included a report of a review of the Borough's policies and procedures:

The Department of Public Works maintains all Borough-owned parks and open spaces. While this involves many tasks, the primary focus is on maintaining playing fields, ensuring the safety of playground areas, and keeping the parks attractive. The Department of Public Works does nearly all park maintenance work in-house. However, the Borough retains private contractors for major tree work, fence installation/maintenance, resurfacing playing courts, and applying pesticides and herbicides.

The Director of Public Works, the Assistant Director of Public Works and the foreman in charge of park maintenance typically meet each morning to discuss park maintenance priorities and related matters. Park maintenance personnel use cell phones, pagers, and radios to communicate while on the job. Public Works personnel conduct informal safety inspections of playground equipment about once per week...

The report identified deficiencies in Playground Maintenance and made recommendations for correcting same. These included:

Recommendation: Formalize Safety Inspections at Borough Parks
Macungie's parks appear attractive and highly maintained. However, Macungie should formally inspect its parks on a regular basis to further ensure the safety of the parks and their recreation facilities. While ongoing informal inspections should continue between formal inspections, formal inspections should be used to determine the following in a regular manner:

- needed grounds work (e.g., regrading, clearing of overgrown vegetation, etc.)
- needed structural repairs
- current condition of recreation facilities
- grounds/repair work which will be needed in the near future
- other safety and security concerns

Designated inspection days are intended to ensure parks and recreation facilities are thoroughly inspected in a formal, structured manner. Such safety inspections should be conducted frequently to detect and repair faulty facilities. A designated person (two people) on the Public Works staff should become the staff's designated expert (experts) on the U.S. Consumer Product Safety Commission Handbook for Public Playground Safety. This person (these persons) should lead all future park inspections.

In a related matter, Macungie should do what is possible to continue maximizing risk management at its parks. For example, the Borough should establish written emergency procedures and use standardized accident report forms for park mishaps...

The report's Table 18, "Summary of Recommendations and Action Program" summarized and prioritized each recommendation in the plan, including "Formalize safety inspections at Borough parks" which was given the highest priority level.

D. ANALYSIS

1. Causes of Jared's Injury

Jared was injured when he fell from the overhead ladder and landed on what should have been an effective protective surface. However, the loose fill surfacing was worn, missing and ineffective, so he landed instead on a stone base covered by little to no protective material. The failure to properly maintain the playground's protective surface caused his injury.

2. Playground Equipment and Protective Surface

ASTM F1487, Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, is a nationally accepted standard for safe playground equipment construction, installation and maintenance. The 2001 edition of the standard was current up to August 2005, when the 2005 edition was issued. Their requirements relevant to this matter are substantially the same. F1487 defines the Use Zone of a playground as:

the area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

Discussion-. The surface area within the use zone shall meet the minimum impact attenuation requirements of Specification F1292 from the maximum *fall height*.

ASTM F1292, Attenuation of Surfacing Materials within the Use Zone of Playground Equipment, is the nationally accepted standard for establishing the impact attenuation effectiveness of protective surfacing. Its Introduction explains:

Surveys by the United States Consumer Product Safety Commission (CPSC) and others have shown that falls from playground equipment onto the underlying surface are a significant cause of injuries to children. Severe head injuries are the most frequently implicated cause of death in playground equipment-related falls. Use of appropriate impact-attenuating surfacing materials in the use zone of playground equipment can reduce the risk of fall-related injury. In particular, it is believed that the risk of life-threatening head injuries is reduced when appropriate surfacing materials are installed.

The requirements for the protective surface in a use zone are related to the type and height of the installed equipment as defined in ASTM F1487 and the CPSC's Handbook for Public Playground Safety. Applying the standards relies on three terms involving the word "Height"

- **Maximum Height:** the maximum permitted height above the surface of playground equipment designated play surfaces or use components such as gripping rungs on an overhead ladder.
- **Fall Height:** the vertical distance between a designated play surface and the protective surfacing beneath it
- **Critical Height** — the fall height below which a life threatening head injury would not be expected to occur.

Jared was injured in a fall from a piece of upper body equipment which was an overhead ring ladder that was part of a composite play structure. ASTM F1487 required:

8.3.3 ... The maximum height of upper body devices for use by 5 through 12-year-olds shall be no greater than 84 in. (2130 mm).

8.3.5 The fall height of upper body equipment shall be the distance between the highest part of the equipment and the protective surface below.

The CPSC Handbook requirements for Horizontal Ladders and Overhead Rings were substantially the same:

12.1.5 The maximum height of upper body equipment measured from the center of the grasping device to the protective surfacing should be:

- **Preschool-Age Children:** 60 inches.
- **School-Age Children:** 84 inches.

And:

4.3 Fall Heights for Equipment. Recommendations for the fall heights for various pieces of playground equipment are as follows.

Climbers and Horizontal Ladders — The fall height is the maximum height of the structure.

This playground was for use by School Age (5 to 12 year old) children, and Jared was a member of that population of users. The rungs of this ladder should not have been any higher than 84 inches (7 feet). The fall height for the equipment was the 9' height of the overhead tube, and this established a 9' critical height for the protective surfacing within the equipment's use zone. At the time of Jared's fall, the actual equipment height was as much as 7'-6" in areas where the membrane was exposed.

F1487 places the responsibility on the Owner for ensuring that appropriate protective surfacing is installed in section 11, Installation:

11.2 Owner's/Operator's Responsibilities:

11.2.2 The owner/operator shall install protective surfacing within the use zone of each play structure in accordance with Specification F1292 appropriate for the fall height of each structure...

Playground owners have a choice of materials available to provide appropriate protective surfacing in playgrounds. These are generally classified as either Unitary Surfacing Material, which includes resilient mats, or Loose-Fill materials, which may be either organic or non-organic. Non-organic loose-fill materials include sand, pea gravel or shredded rubber. Organic loose-fill materials are generally wood-based and may be shredded or chipped wood or engineered wood fibers. The Borough opted to construct this playground using loose fill organic materials, which according to Smith was specified as Fibar, an Engineered Wood Fiber material. In construction projects, alternative manufacturers are often substituted for those which are specified, and the Borough hasn't provided any information as to whether Fibar was the material actually installed. The CPSC Handbook provides an appropriate basis for establishing the required depth for this type of protective surfacing material:

Table 1 - Critical Heights (in feet) Of Tested Materials

	Uncompressed Depth			Compressed Depth
	6 inch	9 inch	12 inch	9 inch
Wood Chips	7	10	11	10
Double Shredded Bark Mulch	6	10	11	7
Engineered Wood Fibers	6	7	>12	6

At least 12" of uncompressed Engineered Wood Fiber was required to accommodate the 9' critical height at the equipment that Jared was using when he was injured. The 12" depth would also have reduced the height of the rungs to 6'-6", achieving compliance with the requirements

for maximum height. Equivalent protection could also have been provided by 12” of Wood Chips or Double Shredded Bark Mulch. Loose fill materials are subject to becoming compressed, and the Table shows that this surfacing becomes dangerously insufficient unless maintained so it remains uncompressed.

When Jared was injured, the actual depth of safety surface was only about 2”, with some areas having no safety surfacing at all. The playground lacked appropriate protective surfacing and this also made the play equipment dangerously high. The playground was dangerous in a manner that caused Jared’s injury.

3. Playground Maintenance

ASTM F1487 section 11.2, Owner’s/Operator’s Responsibilities, describes the responsibility of Owners to maintain protective surfacing at playgrounds:

13.2.1 The owner/operator shall maintain the protective surfacing within the use zone of each play structure in accordance with Specification F1292 appropriate for the fall height of each structure...

13.2.2 The owner/operator shall maintain the protective surfacing within the use zone of each play structure free from extraneous materials that could cause injury, infection, or disease.

The CPSC Handbook presents similar requirements, including specific recommendations when loose fill surfacing is used:

A comprehensive maintenance program should be developed for each playground. All equipment should be inspected frequently for any potential hazards, for corrosion or deterioration from rot, insects, or weathering. The playground area should also be checked frequently for broken glass or other dangerous debris. Loose-fill surfacing materials should be inspected to insure they have not become displaced or compacted in high traffic areas such as under swings and at slide exits.

Any damage or hazards detected during inspections should be repaired immediately in accordance with the manufacturer’s instructions for repair and replacement of parts.

In fact, the CPSC Handbook’s “Suggested General Maintenance Checklist” includes:

Surfacing (4)

- ___ The equipment has adequate protective surfacing under and around it and the surfacing materials have not deteriorated.
- ___ Loose-fill surfacing materials have no foreign objects or debris.

- Loose-fill surfacing materials are not compacted and do not have reduced depth in heavy use areas such as under swings or at slide exits.

According to Smith, the Borough decided to install organic loose fill surfacing to save money compared to the cost of a unitary protective surface. That decision made the playground surfacing subject to displacement, deterioration and contamination. The CPSC Handbook's APPENDIX C, describes that Organic Loose-Fill Materials:

- Requires periodic renewal or replacement and continuous maintenance (e.g., leveling, grading, sifting, raking) to maintain appropriate depth and remove foreign matter.

The CPSC's Public Playground Safety Checklist also addresses maintenance of Loose-Fill Materials:

Here are 10 important tips for parents and community groups to keep in mind to help ensure playground safety.

- 1 Make sure surfaces around playground equipment have at least 12 inches of wood chips, mulch, sand, or pea gravel, or are mats made of safety-tested rubber or rubber-like materials.
- 2 Check that protective surfacing extends at least 6 feet in all directions from play equipment. For swings, be sure surfacing extends, in back and front, twice the height of the suspending bar.
- 9 Check playgrounds regularly to see that equipment and surfacing are in good condition.

The National Recreation and Park Association administers the national Certified Playground Safety Inspector program and publishes Points about Playgrounds which stresses the need for loose fill surfaced playgrounds to be inspected on a daily basis:

A number of daily checks should be done, particularly during the active use season of a playground. If the agency does not have a policy for checking the playground for trash or debris, animal feces, or vandalism and for checking and ensuring adequate depth and uniformity of the fall zone surfaces, it is likely that other aspects of playground maintenance are similarly neglected.

Last, check the maintenance of fall zones. Focus primarily on the adequacy of the understructure. Check the depth around all structures. Are raking or additional fill needed? Have materials been compacted down or carried away over time?

The Safety First Checklist – Audit & Inspection Program for Children's Play Areas also requires daily inspections for this type of playground surfacing:

Daily Inspection Checklist:

11. When loose fill safety surfacing is used:
 - a. Is the surfacing free of low areas and holes?
 - b. Is the surfacing free of animal feces and hidden debris?
 - c. Is the surfacing completely unfrozen when the play area is in use?

By the time Jared was injured, the safety surfacing in this playground had been permitted to degrade to the degree that there was only between 0” and 2” remaining. Photographs show that this was the general condition in the playground, not just in the area where Jared fell. In normal conditions of use, this degree of deterioration could only have occurred over an extended period of time. Any reasonable program of formal and knowledgeable inspections by those responsible for maintaining this playground would have identified that the protective surfacing was degraded and dangerous before Jared was injured.

The standard of care for safe playgrounds required that inspections be formally performed by knowledgeable inspectors and that records of such inspections are maintained. When a playground is installed or altered, standard practice is to have an audit performed by a Certified Playground Safety Inspector. That audit report is made part of the maintenance record for the playground. Subsequent inspections and repairs must also be documented and those records maintained. This is in fact a requirement under ASTM F1487:

13.3 Records-The owner/operator shall establish and maintain detailed installation, inspection, maintenance, and repair records for each public-use playground equipment area.

The “Park, Recreation and Open Space Plan” adopted by the Borough of Macungie Board of Supervisors memorialized that the Borough did not perform formal, scheduled or knowledgeable playground safety inspections. They lacked properly trained personnel to perform those inspections and they didn’t maintain records of inspections or injuries. No records have been produced to document that any competent inspections of the playground were ever performed by the Borough or by Blueskies.

E. FINDINGS

Within the bounds of reasonable certainty, and subject to change if additional information becomes available, it is my professional opinion that:

1. The playground protective surfacing on which Jared fell was degraded and thin in a manner that violated the standard of care for safe playgrounds and was dangerous in a manner that caused him to be seriously injured.
2. The protective surfacing had been dangerous for an extended period of time before Jared was injured, and the defects in surfacing would have been readily discovered in the course of reasonable inspections and maintenance of the playground.

3. Borough of Macungie's actions with regard to maintaining this playground violated the applicable standard of care for safe playgrounds and created the dangerous conditions that caused Jared to be injured.
4. If Blueskies, Inc. was responsible for maintaining this playground as alleged by the Borough of Macungie in their Answers to Interrogatories and by their witness, Ben Smith, their actions also violated the applicable standard of care for safe playgrounds and created the dangerous conditions that caused Jared to be injured.