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## **Products Liability**

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## **Abstract**

For the past year we have been doing research on a type of civil action called Products Liability with Professor Hagglund and Professor Dimentburg. We have read two books, *An Engineer in the Courtroom*, concentrating on the happenings of a civil court, and *Products Liability in a Nutshell*, written by Jerry J. Phillips stating what exactly Products Liability is in legal terms. We watched six videos on the proceedings before during and after a civil trial. After we became well acquainted with the material, we began to study three different cases, all involving Products Liability. We were given many pieces of information from the case including depositions, pictures, and measurements. We were not however aware of the outcome of any of the cases. We were to use the information from the cases combined with our knowledge of what we have learned at WPI thus far (Physics, Dynamic Equilibrium...etc) and our understanding of Products Liability and form our own opinions on what we believed actually happened and who was at fault. A year of work was presented at a Mock Trial, where we gave our opinion on what we think happened and debated with other students who had their own ideas on how the events unfolded and who was to blame.

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# Chapter 1

## What is Products Liability?

### 1.1 Products Liability

Products liability refers to the legal liability of manufacturers and sellers to compensate buyers, users, and even bystanders, for damages or injuries suffered because of defects in goods purchased. It is a tort, or civil action, which makes a manufacturer liable if his product has a defective condition that makes it unreasonably dangerous to the user or consumer.

Although the ultimate responsibility for injury or damage in a products liability case most frequently rests with the manufacturer, liability may also be imposed upon a retailer, occasionally upon a wholesaler or middleman, and infrequently upon a party wholly outside the manufacturing and distributing process, such as a certifier. This ultimate responsibility may be imposed by an action by the plaintiff against the manufacturer directly, or by a claim for indemnification, asserted by way of a cross-claim or a third party claim by the retailer or wholesaler, or others who might be held liable for the injury caused by a defective product. Under modern principles of products liability, and with the elimination of privity requirements in most instances, recovery is no longer limited to the purchaser of the product, or even to a user, but may extend to the non-user;

the bystander who is injured or damaged by a defective product, for example. However, the term “products liability” normally contemplates injury or damage caused by a defective product, and if loss occurs as a result of a condition on the premises, or as a result of a service, as distinguished from loss occasioned by a defective product, a products liability claim does not ordinarily arise, even though a product may be involved.

## **1.2 Related Terms**

Product: Tangible personal property or consumer goods. Includes some intangibles such as electricity.

Requirements of a Product: The product must meet the expectations of the user, not be unreasonable dangerous, and not be defective. It or accompanying manuals must warn of hidden hazards as well as provide proper instructions for safe operation. It also cannot be misrepresented.

Requirements of the User: The user must use the product in accordance with instructions and warnings, must not misuse or abuse, must maintain, repair, and inspect the product in accordance with instructions provided.

Defect: An actionably wrong aspect of a product. Caused by production errors, design oversights, inadequate warnings of hazards, and/or product misrepresentation.

Accident: An occurrence that is unexpected, and causes injury or loss that can be expressed in economic terms. The cost of an accident should be assessed to those who most likely could have prevented it.

Expert Witness: A witness used to assemble technical opinions and translate them into lay terms for the jury.

Accident Reconstruction: The assembly of evidence into the most probable scenario of action before during and after an accident.

## **Chapter 2**

### **The Litigation Process**

#### **2.1 Introduction to the Litigation Process**

In any case that is begun there are several steps to the litigation process. They are the claim, response and defense, the discovery process, and the trial. In addition to the litigation process there are some extra steps that are not always utilized. These extra steps include settlement and post-trial activities. Settlement is a resolution to the disagreement at anytime during the litigation process. Post-trial activities are motions for retrial and appeals. The motion for a retrial is the motion for the trial to start over from the beginning. Appeals are usually called for when there is further evidence to add to the case that was not allowed in the original case or was not discovered until after the case was completed. In reference to the regular steps of litigation, the claim is the plaintiff's request for a trial. Response and defense is the basis of the legal reasons that the defendant is not liable for what he is charged. The discovery process includes some intermediate steps and includes the gathering of facts for both the defense and the prosecution. Finally the trial is the trying of the present case to see who is liable for the damages concluding with the verdict.

## **2.2 The Discovery Process**

The discovery process is sometimes the most difficult of all the steps of litigation. It constitutes much research and inspection to determine who is liable or at fault. While continuing this process it is helpful to remember some hints. Always watch out for inflexible or infinite words such as always, never, all, none, impossible, absolute, and certainly. Also we do not want to be misled from the issue and we want to use generic terms. During this process we are always looking for information that can without a doubt win the case. This type of information is usually called “the smoking gun.” The process includes some intermediate steps. These steps include interrogations, requests for production, requests for admission, inspections, and depositions. The interrogations are a set of questions that the prosecution and defense ask of each other. Some questions that it may include are: When was the product designed? What was the quantity that was produced? What is the accident history? Are there similar models? Have there been other complaints? What standards, codes, and laws apply? At this point the names and addresses of the key players of the case are taken. A request for production of materials is the production of materials that are needed for the case. These materials include drawings, blueprints, sales materials, manuals, complaints, and samples. A request for admission is usually a written statement of admittance that an event occurred. Requests for admission can also be oral. Inspections include the site of the accident and any machinery or injuries that are involved. Depositions are official meetings with both the prosecution and defense attorneys present that are written down by a court reporter.

These meetings are held to question 1 or more witnesses at a time so that they can be held accountable for their statements and not lead the opposing side in the wrong direction.

Depositions can be used in the trial to refresh a witness's memory. All of these steps are used to show how injuries or economic loss occurred, how the product in question caused them, whether the defect existed at the time of the accident, and if there were alternate designs.

### **2.3 The Trial**

The trial is the final time when the prosecution and the defense attorneys present their cases usually to a jury. There are also many steps to the trial. The first step is to pick a jury. The attorneys attempt to choose people who they think would be partial to their ideas or that would be impartial to both sides. The second step is the opening statements. The attorneys will attempt to tell the jurors what the case consists of and present their ideas as to why their client is in the right. The third step is when the plaintiff presents their case. This can include the story of the accident, the medical proof, proof of losses, witness testimony, and expert witnesses. The fourth step is the presentation of the defense. It can entail testimony about the machine or product, testimony concerning the manufacturer, witnesses, expert witnesses, accident reconstruction, and the display of medical claims and economic losses. The next step is the final arguments. The attorneys repeat their opening statement adding what they have shown through the presentation of their cases. Finally the jury will deliberate and decide

who is liable, if anybody. Deliberation can last weeks at a time. Then the jury delivers the verdict.

## **Chapter 3**

### **The Role of the Engineer**

#### **3.1 Assisting the Attorney**

In the process of litigation it is not the engineers job to try the case. That is left up to the attorneys. The engineer's job is to assist the attorneys in any way possible to allow hem or her to do the best job that they can. It is a fact that the engineers and the lawyers will not always agree. We must work together and compromise in order to do the best thing for the client. There are many things that the engineer is more knowledgeable about than the attorney is and it is our job to assist in these areas. We must know and explain the design and development process to the lawyers. We can explain the nature of products, systems, parts, and the operation of machines along with the methods of engineering. We know how a successful product is developed, evaluated, and tested. We can test and analyze the products ourselves and show clear demonstrations. We conduct the accident reconstruction and list the possible scenarios. We translate technical information, engineering literature, and explain complex technical processes. We can assist in interviews and suggest questions. Finally we testify as an expert witness.

#### **3.2 Avoiding Litigation**

There are many ways to avoid litigation. By stating these we can also define whether the product in question is defective or not. Avoiding accidents is the most obvious way to avoid litigation by eliminating any hazards in design. This is not always possible. Then we need to protect from the accident. This means place the dangers of the design away from the operator or cover them with barriers. Next we can make the accident safe. Design so that there is no injury in the case of an accident, for example rollbars in case of a rolled jeep. We can also warn against an impending accident. These include designing warning lights and buzzers. Warning of the possibility of an accident will make operators more aware of dangers. This includes decals and the operator's manual warnings. Lastly we can protect the operator. This includes seat belts and hard hats. When designing we need to create a balanced product. The safest product is not always the best product. A balanced product includes a balance of specifications, performance, life, reliability, serviceability, cost, and safety. Then we take the balanced product and make improvements without compromising any of these characteristics. Finally we need to do failure analysis which includes accident probability, effect, and severity studies, failure simulations, and life and reliability predictions.

### **3.3 Accident Reconstruction**

The accident reconstruction is one of the engineer's most effective weapons in a courtroom. It entails the assembling of the most probable actions prior to and during the accident. In order to do this we need to know every detail of the accident in question.

We need to know the situation before the accident, the people involved, the physical evidence, the final positions, and the knowledge of the sciences. The next step is to lay out all the information that we have gathered. Some information will contradict each other, some may be generalized, some may be missing, some may be false, and some information may be too perfect. Using this information we can now assemble some possible scenarios. Some scenarios will stick out more than others will. We can now focus on the most probable. We need to establish this scenario as accurate and believable. This final scenario must follow the laws of physics and engineering, agree with most of the information, be explainable to lay people, free from bias, and no big surprises. Remember that this scenario may be disputed.

### **3.4 The Deposition and Expert Testimony**

The rules concerning depositions and expert testimony are the same. Only the purposes differ. There are a few purposes for the deposition. First we need to discover and determine facts and origins. Next we need to determine the opposing opinions so that we can prove them wrong. This brings us to getting a basis to impeach opposing witnesses and pin down unchangeable testimony. This testimony is also preserved for trial. The attorneys can also learn strategies or plans. Expert testimony is used to prove scenarios and ideas or it is used to disprove opposing scenarios and ideas. The rules start with listen and pause. We need to listen to the question and understand it; the pause is one to give the attorneys time to object, and two so that we give the proper answer. Next

we answer only the question asked. We don't want to volunteer information. Don't argue or advocate, except with technical information with which we are the experts. Technical terms should be translated into lay terms as much as possible. This will help to clear up misunderstandings. Don't accept definitions that vary. Don't ask questions, just phrase your answer in how you understand. Do not "schmooze" answers. Finally be polite and truthful.

We also need to follow proper conduct in the courtroom. We need to be professional at all times. Proper attire of a suit and tie is expected. Be polite at all times. Refer to the judge as "your honor."

## **Chapter # 4**

### **Case 1**

#### **John Frazier v. S-B Power Tool Company**

##### **4.1 Background**

The plaintiff, John Frazier, a resident of Braintree MA, is seeking compensation from S-B Power Tool Company, for injuries that he suffered on May 4<sup>th</sup> 1996 while using their 10” table saw model 3400-type 2. He claims that as a result of a defective rip fence and a defective anti-kickback finger, his left hand came in contact with the saw blade. He severely injured his left hand and fingers. Frazier is taking S-B Power Tool Company to civil court on two Counts: Count One- Negligence, Count Two- Breach of Warranty.

##### **4.2 Investigation and Analysis**

Consulting engineer Darry Robert Holt of Holt Associates, P.C, handled the investigation and analysis of this case. On June 28, 1996, he visited the home of Mr. Frazier to inspect the table saw. He found that the rip fence would not always clamp or align parallel to the saw blade. This intermittent non-alignment ranged from 0” to 1/8” differential between the front and the rear of the fence as measured to the saw blade. It

was also observed that the anti-kickback pawl on the right hand side of the blade was distorted to the right. Blade marks were observed in the cut edge of the workpiece indicating that the workpiece had bound against the blade. Also, marks in the top face of the workpiece appear to have been made by the anti-kickback pawls. In his opinion, the accident occurred because the fence would not always align parallel to the saw blade, which resulted in kickback. He believes that the anti-kickback pawls were inadequate to prevent kickback and that the blade guard was inadequate to provide protection against contact with the blade. He states that the saw is unsafe and defective in design and not in conformance with good accepted safety engineering principles and standards and presented a severe hazard to operating personnel during the normal and foreseeable use of the saw. The nature of the non-alignment of the fence, coupled with the deficiencies in the guard and anti-kickback pawls from preventing a kickback, can result in an injury of this subject type.

#### **4.3 Depositions**

##### John Frazier

John Frazier was visiting his daughter in Agora, California in May of 1996. He often does random projects around her house while he is there. He constructed a workshop, which consisted of a workbench and a backboard with tools on it in her garage. Some examples of projects that he did are a small fence, birdhouse, and stools.

He purchased the table saw on February 4<sup>th</sup> 1994, to aid him with his projects. The saw was purchased at Home Depot. He claims that he used it once, shortly after it was first purchased. He then put canvas and a rope on it and put it under the bench and came home. Every three or four months he would visit his daughter and use the saw to do small projects around the house. From the time of the purchase to the time of the accident, he used the table saw around seven or eight times. At the time of the accident, he was constructing a bench that would cover-up various water and electrical pipes that were along the house. On May 14<sup>th</sup> 1996, he was ripping a board to make it fit better when the accident occurred. The board was 27" long, 2 ½" wide, and ¾" thick. He was attempting to take off 3/16". He fed the board through as in figure 4a, and at some point the board began to shake or as Mr. Frazier says, "all hell broke loose." His hand slipped and he injured it on the blade.

#### Peter Domey

Peter Domey is the Director of Product Safety Department at S-B. S-B was formerly a company called Skil. Domey worked for Skil or S-B from 1982 to the present. Skil became S-B in 1992. P & F Corporation in Taiwan in this case manufacture the table saw. Domey is asked to explain what S-B meant by self-aligning when they described the table saw as having "Skil exclusive Accu-Lign self-aligning quick set rip fence." He says that the rip fence aligns itself through the clamping process with a single motion of pushing down on the lever. However, he also states that the rip fence will not always align itself in a sense that it will know whether it is parallel or not parallel. It is

aligned only to the degree that you align it to begin with and then it will self align through the clamping process to the degree that you have set it to begin with. This is different from other table saws in which the aligning must be done through actual clamping instead of just pushing down on a lever. He then is asked about kickback. He says that kickback is caused by one of two ways. It is caused by incorrect setting of blade height, and by non-parallel alignment of the rip fence to the blade. Domey admits that if the user attempts to align the rip fence before it is locked it is possible that from the point of parallel alignment to the lever being completely pushed down, that it may become slightly non parallel. He also states that it the responsibility of the user to perform and check the alignment in the locked position.

#### **4.4 Reconstruction**

By the inspection of the rip fence on the video we can see that the rip fence may not align correctly. If we look at the Owners Operating Guide for this particular saw, we see that on page 22 it specifically says with respect to ripping to be sure A. rip fence is parallel to blade. On the video it is obvious that the fence is not completely parallel to the blade. If it was checked before ripping Mr. Frazier should have noticed this and reset the fence. Also looking at the medical report concerning Mr. Frazier's hand, it says that the blade went through his thumb and nail up to the knuckle and then proceeded to semi-amputate his index finger, amputate his middle finger and cut half of his ring finger. The only way for his hand to enter the blade in this direction is if he was holding on to the

board with his fingers wrapped around the bottom. This contradicts his testimony that he had given. Also it explains why his testimony was so vague in saying “all hell broke loose.”

#### **4.5 Conclusions**

By looking at the medical reports and the testimony that Mr. Frazier gave in his deposition we can clearly see that they contradict themselves. With this and the owners operating guide making it clear to double-check the rip fence to see if it is parallel to the blade we can make an easy verdict. It is clear that the saw is not defective and that it was the fault of Mr. Frazier himself that caused the injury to his hand.

## **Chapter 5**

### **Case # 2**

#### **Hector Hernandez v. Robert Michael Mackenzie**

##### **5.1 Background**

On the twenty-first of July 1992, at about 9:08 a.m., the defendant, Michael Mackenzie an employee of Zachery Taylor, was driving his tanker truck used for hauling water for swimming pools West on route 12 in the town of Ashburnham. Apon rounding a curve he approached Laura Hernandez who was driving her 1981 Dodge Aires East towards Mr. Mackenzie. At the end of the curve the two vehicles collided head on causing the death of Mrs. Hernandez. The left front of Mr. Mackenzie's truck was severely damaged and skidded about 65 feet to a stop on the opposite side of the road after bumping the guardrail. The rear of Mrs. Hernandez's car was violently spun away from the truck, due to the massive damage to the left front and the force of the truck, and came to rest on the same side of route 12 facing the opposite direction in which it came. The final positions of the vehicles are shown in the photographs 2a and 2d in appendix B. No one witnessed the accident first hand. The first people to arrive on the scene were spectators followed by the local fire department and the ambulance crew. Following these individuals, Ronald P. LaPlante, the chief of police of Ashburnham arrived. He

took control of the accident scene and attempted to reconstruct the accident to identify whom was at fault. The only person to testify to the vehicles before the accident was Robert Kohlstrom, who was traveling east on route 12 ahead of Laura Hernandez. After passing Mr. Mackenzie and hearing the accident he returned to the scene to offer his help. When it was not needed he left and was later contacted by Chief LaPlante that night. Since he did not see the accident there were no eyewitnesses.

## **5.2 Investigation and Analysis**

In order to identify whom, if anybody, was at fault an investigation and an analysis of the findings must be conducted. It must be considered that anybody can attempt to examine an accident and come to his or her own conclusions. It is imperative that we look at the credibility, educational background, and experience in accident reconstruction. These characteristics will be taken into further consideration when reviewing the depositions of the people who attempted to investigate this accident.

The first person to attempt to investigate the accident was Chief LaPlante. He was also responsible for the majority of the information that we have concerning the crash site. Initially he attempted to establish a point of impact. This is the specific place in which the two vehicles struck each other. He established this by identifying a fresh gouge that was surrounded by debris from both vehicles and deduced that it must have been caused by the impact. Following this he took measurements of all the tire marks and distances from the established point of impact. Winchendon Firemen took the

pictures that were provided on the scene. From this information he drew a diagram of the area including the point of impact, the final positions of the vehicles, the tire marks, and the appropriate measurements to go along with these positions. To follow up his investigation he also checked the driving records of the two operators. He noted that in the past two years Laura Hernandez had been involved in two accidents, had been cited twice for speeding, and cited once for having no license and registration. After collecting this information and speaking with the remaining survivor of the crash, Mr. Mackenzie, Chief LaPlante came to his conclusions on what happened prior to the accident. He deduced that Laura Hernandez's vehicle had crossed the solid double-yellow line and struck Mr. Mackenzie. The most convincing information that lead him to this conclusion was the point of impact that he established. The gouge that distinguished it was a few inches into Mr. Mackenzie's lane of travel.

The next person to investigate this accident was James H. Burson. He found that the point of impact was not at the gouge on the truck side of the road, but rather on the car side of the centerline. He stated that the truck drove over the car and became airborne momentarily. The gouge that Chief LaPlante found as the point of impact was actually caused by the massive truck returning to the pavement. Its shocks took such an impact that they quickly dug into the road. He supported this statement by saying that if the gouge was caused by Mrs. Hernandez's vehicle it would be in a circular pattern due to the violent spinning of the car after impact. He also estimates the speed of the truck to be 40 to 45 miles per hour, which was at least 5 miles over the speed limit. According to Mr. Burson after this the trucks brakes were engaged and it skidded to a stop 65 feet away after striking the guardrail.

The final person to investigate the collision was Charles Deitrich. He deciphered that Mrs. Hernandez's vehicle crossed the median and struck Mr. Mackenzie much like Chief LaPlante did. Mr. Deitrich estimated that she was about 18 inches over the yellow line. He also looked at the damage that was caused and decided that the impact caused the left front tire of the truck to be pinned to the left. This pinned wheel is the reason that Mr. Mackenzie's truck ended in the wrong lane of travel. The wheels became turned and he could not turn them back due to the excessive damage. Mr. Deitrich also pointed out that there was really no point of impact. Rather it was a line about a foot long that was located on the truck side of the road.

To summarize the findings Robert LaPlante and Charles Deitrich both believe that the origin of the collision occurred in the trucks lane of travel. James H. Burson on the other hand believes that the truck crossed the median and struck the car.

### **5.3 Depositions**

#### **Ronald P. LaPlante**

Stephen Campobasso, the attorney for Hector Hernandez, deposed Ronald P. LaPlante on May 26, 1995. Chief LaPlante is 54 years old and has been the Ashburnham Chief of Police for 21 years. His first formal training in police work came in 1971 when he joined the Massachusetts State Police Academy in Framingham, where he studied many subjects including criminal law, motor vehicle law, first aid, CPR, and self-defense.

Of all his classes motor vehicle law is the only relevant coursework for this case. It was made clear that he had taken no accident reconstruction classes. Chief LaPlante was the only person to investigate at the time of the accident three years earlier. No other officers from the Ashburnham Police Department assisted directly and there was no state police called in due to the fatalities, because it was not procedure to do so. Chief LaPlante was not the first person on the scene of the accident but arrived after the fire department, ambulance personnel, and many bystanders. He soon realized that there were no witnesses to the accident. It was stated that he was the person that performed the measurements of the tire marks, and the final positions of the two vehicles. He made the assumption that the gouge mark located a few inches into Mr. Mackenzie's lane of travel was the point of impact. He made this hypothesis due to the debris that was surrounding it from both vehicles, the tire marks that followed it and led up to the rear of the tractor trailer, and the appearance that the gouge was extremely fresh. He did not attempt to determine what part of either vehicle caused the gouge. Due to the placement of the point impact Chief LaPlante concluded that Mrs. Hernandez's vehicle must have crossed the solid double-yellow line and struck the tractor-trailer in the left front fender and tire. Included in his deposition was the driving record of Laura Hernandez, which included two accidents, two speeding violations, and one violation for not having a license or registration.

**Michael Mackenzie**

Michael Mackenzie was deposed in 1995. Throughout his deposition he frequently answered that he could not remember many of the details due to the fact that it was three years following the accident. Mr. Mackenzie was, at the time of the accident, employed by Zachery Taylor. His job consisted of filling a water tank and delivering the water to residential swimming pools in the area where he would fill them. At the time of the accident he was returning from filling a pool and therefore the tank was nearly empty. He was taught to drive tractor-trailers by his father at the age of 15 and subsequently got his license when he was 17. He had received speeding tickets but only in a car not in a truck. The tractor-trailer he was driving was approximately 43 feet long and 6 feet tall at the nose of the cab where he is overlooking while driving. On July 21, he had performed his pre-check of the truck before driving as required by strict regulation concerning the operation of such tractor-trailers. He was also very familiar with route 12. At the time of the accident he stated that his speed was 30 to 35 miles per hour and that he was coasting around the curve and not accelerating but not braking. Concerning Laura Hernandez's vehicle he stated that he did not see her until he was in the act of colliding with her and that due to the height of the nose of the truck he could only see the trunk and it was in his lane of travel. He also stated that the color of the car was brown when in fact it was not. He also stated that he does not remember any vehicles passing him prior to the accident.

**Robert Kohlstrom**

Robert Kohlstrom was deposed on October 6, 1997. He was travelling east on route 12 ahead of Laura Hernandez and he passed Michael Mackenzie's truck moments before the accident took place. He was travelling from Leominster to deliver a set of clothes to a funeral home in Winchendon. He testified that he did not see the accident. He did witness the truck traveling up an incline approaching the curve where the accident occurred. He was travelling at about 35 to 40 miles per hour. He stated that the truck was close to the centerline but did not cross it. He also testified that the truck was so close that it startled him and Mr. Kohlstrom consequently yanked the wheel of his automobile to the right in fear of the truck drifting into his lane, although it never did enter his lane. He stated that the truck was apparently "hugging the yellow line." After the accident he turned around and went back to the scene to offer his assistance. When he arrived and there was no need for his help, he went on to Winchendon and was contacted by Chief LaPlante later in the evening to take his statement.

### **James H. Burson**

James H. Burson was deposed on October 14, 1997. He is 49 years old and owns his own company called Code 16 Investigations. His company deals with motor vehicle accident investigations and reconstruction. He has a long history in the accident reconstruction business including being a member of the Massachusetts State Police since 1974, where he was taught through many accident reconstruction and investigation courses. He has also been an expert witness in about 30 different cases involving motor

vehicle accidents. He contends that Mr. Mackenzie was the one who crossed the solid double-yellow line and caused the collision. He states that the truck crossed over into Laura Hernandez's lane of traffic and after colliding drove up onto the hood of her car and into the air landing back on the road. He states that the gouge mark in the trucks lane is caused by the shocks of the truck when it lands back on the asphalt. If the gouge mark was caused by Mrs. Hernandez's car then he contends that the mark would be circular due to the violent rotation that she undergoes. He also calculated the velocity of the truck to be between 40 and 45 miles per hour. He uses the length of the skidmarks to decipher the approximate speed.

### **Charles Deitrich**

Charles Deitrich was deposed on November 14, 1997. He is 62 years of age and is the President of his own firm, The Dietrich Group Incorporated. His company provides forensic engineering services not only limited to motor vehicle accidents. Mr. Dietrich contends that Mrs. Hernandez caused the accident when she crossed the median and collided with Mr. Mackenzie. He believes that she was up to 18 inches over the yellow line into the trucks lane of travel. He also states that when the two vehicles collided the left front tire of the truck was smashed to the left and this is the reason that the tires are turned to the left and the reason that the truck was carried into the opposite lane following the crash. The pinned left wheel dragged the truck to the left. He ahas no reason to

believe that the truck was travelling more than 35 miles per hour. This is within the speed limit. From his calculations Mr. Mackenzie is not at fault.

#### **5.4 Reconstruction and Calculations**

In order to reconstruct this accident we need to use the materials that were collected on the day of the accident. These materials include the measurements taken by Ashburnham Chief of Police Ronald LaPlante of the tire marks and the fresh gouge, and the pictures taken by the Winchendon Fire Officials of the accident scene. In picture 2a from appendix B, we can clearly see the fresh gouge that Chief LaPlante identified as the point of impact and James Burson identified as a mark made by the truck after striking Mrs. Hernandez's car along with the tire marks and debris. There is also another mark that is circular stretching across the solid yellow lines in the middle of the road. By evaluating the damage of the two vehicles we can determine whether the truck was driven onto the car and the gouge was created when the truck remade contact with the road or whether it was made when impact occurred. The damage of the tractor-trailer is isolated to the left wheel and fender, and the left of the bumper. The damage can be seen in picture 2c. The rim is damaged on one half with lug nut covers ripped off and large scratches, which can be seen in picture 2d. We can also see that the large tank directly behind the wheel is virtually untouched. By evaluating this damage we can make the assumption that the truck did drive up onto the front of the car because if it just scraped straight across the whole rim and the tank would have been damaged. If the truck

traveled up onto the car half the rim and the tank would be out of harms way. The damage on Mrs. Hernandez's car as seen in picture 2e shows that the left front wheel is completely crushed and the hood and fender are damaged. Although the roof of the car is not damaged with scrapes that would come from the truck. Also on the hood of the car there were black rubber marks that could only be caused by the left front wheel of the truck. This makes us infer that the truck smashed the front fender and drove over the wheel of the car. At this point the car started a violent rotation that kept the truck from driving over the roof of the car. This rotation also caused the circular tire mark that was left on the road. When the heavy truck crushed the wheel of the smaller car, Mrs. Hernandez's car continued to rotate causing the skid to be curved. The tractor-trailer then dropped from the car back onto the road causing the gouge in the road on the trucks lane of travel. The gouge may have been caused by the shocks coming in contact with the road momentarily due to the violent drop. Also other debris that had come from its underside may have come in contact with the road and caused the gouge.

In order to determine which side of the road the contact was made on an approximate speed of either car would be of great importance. If Mr. Mackenzie were travelling at a high speed the curve in the road would tend to pull him out of his lane and across the road. Also at high speeds there is a chance of the truck rolling over. We can calculate at what approximate speed the truck could roll:

Variables:

$A_m$  = acceleration

$V$  = velocity

R = radius

G = gravity

Equations:

$$A_m = V^2 / R$$

$$A_m = .24 * G$$

We know the acceleration due to the curve, which is constant at .25\*G for a truck of that size, the radius of the curve in question is 620 feet, and gravity is 32.19 feet per second squared. Therefore by substitution:

Solution:

$$.24*(32.19) = V^2/620$$

$$V \approx 47 \text{ mph}$$

(Approximate)

Therefore the approximate speed of rollover is 47 miles per hour. Now it we need to calculate the speed of the truck in order to see if it is approaching the speed of rollover.

We can use the length of the skid marks in order to get an approximate speed of when the brakes were engaged:

Variables:

S = length of skidmarks

$\mu$  = Coefficient of friction

Equation:

$$V = (30 * \mu * S)^{1/2}$$

The length of the skidmarks are approximately 100 feet, which is calculated by adding the 65 feet that Chief LaPlante measured and approximately 35 feet for the length of the truck. The coefficient of friction for dry asphalt against the tractor-trailer tires is .6, but taking into account the damage to the front left tire, which is completely turned left, we take it as .8, therefore:

Solution:

$$V = (30 * .8 * 100)^{1/2}$$

$$V \approx 49 \text{ mph}$$

(Approximate)

Since these values are approximate we can infer that the truck was approximately close to the rollover velocity.

## 5.5 Conclusions

With the amount of information that we have we are now ready to make some educated conclusions. As Mr. Mackenzie rounded the curve he was approaching the speed of rollover. As he neared the end of the curve, the tank that he was hauling started

to tip. The only way to stop the rollover at this point would be to move the wheels back under the tank in a sense. This means that Mr. Mackenzie would have to yank the wheel to the left in order to regain control. When he does this it is definite that he would travel into the opposite lane of and cross the median because we know that he was "hugging the yellow line," according to Mr. Kohlstrom. With Michael Mackenzie in the wrong lane and Laura Hernandez approaching the collision would be evident. Through the evaluation of the damage to the vehicles we know that the truck drives over the wheel of the smaller Dodge Aires. When the violent rotation of the car begins the crushed wheel causes the curved tire mark on the road. It also caused the truck to launch off the car momentarily and land back on the pavement causing the sharp straight gouge mark. The truck's brakes are engaged at this point and it skids 100 feet into the guardrail in the opposite lane of travel where it comes to rest. Mrs. Hernandez's vehicle spins 180 degrees and comes to rest facing the opposite direction than she was travelling in, but on her side of the road. Therefore we can resolve that the fault of the accident falls on Michael Mackenzie.

## **Chapter 6**

### **Case # 3**

#### **Norma Lopez v. Encore Wire Corp., MGS Manufacturing Inc., EWC Leasing Corp.**

##### **6.1 Background**

On December 10, 1997, Hector Lopez was performing work at Encore Wire Corporation, unspooling defective wire from a rewinding machine onto the floor, so that it could be sold for scrap. When he approached the machine to cut the wire from the moving spool, he was entangled in scrap wire on the floor and to Mr. Lopez's surprise, the machine started to wind the wire back into the spool. The rewinding machine pulled Hector Lopez onto the spool and was repeatedly tossed against the floor. Before his fellow employees could shut down the machine his head, neck, back, arms, and legs were battered. Hector Lopez died before his coworkers could cut him out of the wire wrapped around him. At the time of his death he was a 25-year-old full time worker providing for his wife and son. The rewinding machine that he was caught in was designed, manufactured, and sold by MGS Manufacturing Corporation to EWC Leasing Corporation. EWC Leasing then leased the machine to Encore Wire. Encore Wire is

being sued for, among other things, instructing in an unsafe manner by knowingly unspooling onto the floor, no formal training, and no warnings in English or Spanish even though Encore had prior knowledge of the dangers. They are also being sued for no barriers or brakes, and interlocks were bypassed in order to unspool onto the floor even though the machine was on notice that it was not in compliance with safety standards. MGS Manufacturing is being sued for unreasonably dangerous design and lack of safety devices such as a deadman switch and brake. MGS could also reasonably foresee that the machine could be used to unspool onto the floor and there were no warnings to prevent this. Also MGS had known of other injuries contracted in the same manner. EWC Leasing is being sued for leasing a defective product, and not supplying proper warnings.

## **6.2 Investigation and Analysis**

In a letter to Gary Bliss, the Vice President of Product Development and Environmental Matter since 1993 at Encore Wire, from the area director, following an inspection on December 12, 1997, did not get any citations but did get told to fix some problems. The reason that no citation was given is because no OSHA (Occupational Safety and Health Act) standards apply. One problem was that employees could be entangled in offwinding scrap wire from spools onto the floor and pulled into the spool when attempting to clear the backlash with out shutting off the machine. So that Encore does not violate the general duty clause of OSHA, which says that employers are responsible for providing a safe workplace, they must remedy some hazards. In order to

fix this problem certain steps must be taken. Deadman controls must be installed so that the machine stops when the operator leaves the control panel. Also devise a method of removing the wire from the spools with out off winding them onto the floor. These steps would make it safe to use the rewinding machine to clear the spools of scrap wire.

There was also a letter to Fernando Aristeguieta from the Texas Workers Compensation Commission (TWCC) on July 3, 1996. This letter relayed to the management of Encore that under Texas Labor Code section 411.041, Encore needed to renew their safety inspection. It also stated that they needed to devise an accident prevention plan. On September 20, 1996, Encore Wire completed a hazard survey. It included a time line of when safety issues would be addressed. This time line stated that a training program had started on August 17, 1996. It also guaranteed that bimonthly inspections of hazard recognition were to commence immediately. Machine guarding and other issues regarding the rewinding machine were to be addressed for November 1996 and February 1997. Encore also stated that the inadequate guarding and the bypassed interlocks were necessary in order to use the machine to scrap defective wire, but that the problems would be fixed by February 1997. The survey also stated that "Safety is everyone's responsibility."

On June 25, 1997 employees held a safety review meeting, of which we have the notes from. There was some safety issues concerning the rewinding machine that caused the death of Hector Lopez that the employees felt needed to be addressed. They noted that the guards were still removed and the machine was still running without them. They also noted that the reel was exposed and that was an entanglement danger. Finally it was

also noted that warnings were needed and that the instruction manual stated that the machine should not be run without the guards that were missing.

### **6.3 Depositions**

#### **Dean Williams**

Mr. Williams was deposed on December 12, 1998. He is a Professional Engineer in Mechanical Engineering and went to the Rochester Institute of Technology for three years. He was involved in the design of the rewinding machine and was extremely familiar with it. He explained that when this type of a machine is sold to a company it is the customer's responsibility to fill out a questionnaire explaining what type of safety devices will be needed on the specific piece of machinery. There are many options that the customer has to choose from and they must decide what is needed and what is not. Concerning the machine in question he explained many things about its design. He said that normally around the take-ups and pay-offs of the machine there were no guards installed unless they were specifically asked for. This was because the operator needed this area to work after the process was finished and the machine was turned off and the barriers would get in the way. It was also established that the operator was purposely placed in front of the spool so that he or she could see the process clearly, but that they were far enough back so that they were out of danger. Mr. Williams was also asked why a deadman switch or foot pedal was not installed. He replied that the operator needed to

be able to let the machine run and leave the control panel to perform other tasks. These tasks were away from the running spool so there was no danger. Also if the machine was loaded and off and someone accidentally stepped on the pedal thousands of dollars of wire may be ruined and if there was anyone near the reel they may be injured. Mr. Williams knew of an accident four years preceding this one and nothing was done to prevent it from happening again. He established that this was because the machine was altered and used in a manner that it was not intended for. He also stated that in this case it is impossible to foresee that the spool will be turned around and spilled onto the floor. He can't see any reason why a company would have their employee do that.

### **William Gurecki**

William Gurecki was deposed on September 29, 1998 at 8:50 a.m. He is the Vice President of Engineering at MGS Manufacturing. He said that a safety analysis was never done at Encore Wire, before or after the sale and lease of the machine. Encore Wire did all of the maintenance to the rewinding machine. Mr. Gurecki also stated that he only trained one operator to use the machine to rewind the wire and he knew the dangers of unspooling the scrap wire onto the floor. He did install warnings against this after the accident that claimed Mr. Lopez's life. He also stated that there was one hazard survey done in the summer of 1997 at Encore Wire.

### **Gary Bliss**

Gary Bliss was deposed on November 24, 1998 at 10:25 p.m. He is the Vice President of Product Development and Environmental Matter at Encore Wire since May 1993. He stated that Hector Lopez disregarded well Known safety rules by approaching the front of the rewinding machine and the spinning reel while it was still spinning. He said that it was well known by everybody that it is extremely dangerous to cut the wire from the machine while it was still running although there is no formal written policy that deals with the scrapping of wire and how it should be cut. The counter on the rewinding machine that would not let the machine run without wire threaded through it was rendered inoperable. This change in the machine was done after it was sold to EWC Leasing by MGS Manufacturing, and leased to Encore Wire. He also states that there is no formal written policy for the training on this machine.

### **Billy Alley**

Billy Alley was the nearest witness to the accident that killed Mr. Lopez. He was not deposed but rather his sworn oral statement was taken and recorded. It was taken on January 7, 1998 at 4:00 p.m. He is the Plant Manger at Encore and he was one of the first to arrive on the accident scene to help cut Mr. Lopez out of the reel that he was wrapped up in. It was actually Carlos Juandiego, a coworker that stopped the machine. Mr. Alley

was about 100 yards away at the initial time of the accident. He said that when the emergency brake was hit it slowed down and came to a stop. The employees at Encore do the maintenance of this machine about 3 times a year. The oil in the hydraulics is checked and there is an emergency brake inspection. The rewinding machine was in low gear at the time of the accident. The speed dial goes from 1 to 10, 10 being the fastest. The setting at the time of the accident was slightly below 1. He also stated that the machine was bought primarily to scrap wire. Lastly he said that following the accident there was a deadman pedal added to the machine so that accidents like this one won't happen again.

#### **6.4 Reconstruction**

For this accident there are no calculations needed to decipher what was the cause of Hector Lopez's death. Mr. Lopez was instructed by the management of Encore Wire to use the rewinding machine in a manner that it was not intended to be used for. It was designed for the rewinding and winding of wire onto large spools. Mr. Lopez was instructed to turn the spool around so that when the machine is used the defective wire spills onto the floor. Since there is no formal written training program we cannot see exactly what he was taught. There was also a safety device that was bypassed in order to use the machine in this manner. The counter was disassembled and not operating. In normal and regular use of rewinding if the wire was not fed through the counter the machine would not run. Also Encore wire was served notice of these dangers and they

were supposed to supply a deadman switch and guards by February of 1997, 10 months before Mr. Lopez's death. This switch would make the machine safe to be used for scrapping wire. Encore was warned of the dangers by OSHA, TWCC, and its own employees through the safety review meeting in June before the accident.

## **6.5 Conclusions**

In this case the plaintiff Norma Lopez, the deceased's wife made claims against 3 companies. MGS Manufacturing Incorporated designed, manufactured, and sold the rewinding machine. To summarize the charges against them, MGS knowingly designed an unreasonably dangerous machine, which lacked safety devices that existed and that would have saved Mr. Lopez's life. When Encore Wire altered the machine and used it for a different purpose than what it was designed for the liability completely shifted from MGS. If the machine was being used in the proper operation that it was designed for Mr. Lopez's legs never would have been caught on the wire on the floor. There never would have been wire on the floor.

EWC Leasing is the second of the companies that was being sued by Mrs. Lopez. They were being charged with leasing a defective product and not supplying warnings in Spanish. Again if the rewinding machine was used in the purpose of rewinding Mr. Lopez would not have been killed. Therefore EWC is not liable for this charge. There is no evidence that lets us believe that EWC sold the machine so that Encore could scrap wire onto the floor. EWC also could not reasonably anticipate that a person that only

speaks Spanish would be using the machine. Again this liability falls on Encore Wire. When they hired a non-English speaking person to run this machine it is their responsibility to train and warn him so that he can understand. If they cannot, he should not have been positioned in a dangerous area until such a time that he can be trained and warned by his superiors and coworkers so that he can be aware of the dangers.

The third and final defendant is, of course, Encore Wire Corporation. They are being charged with knowingly instructing in an unsafe manner to unspool the wire onto the floor. Along with this they are being charged with improper training and warnings even though they had prior knowledge of the dangers. They also did not provide sufficient safety devices while requiring Mr. Lopez to use the machine. Lastly they did not warn him of the dangers in a language that he could understand. The Encore Wire Corporation is liable for all of the charges. They disassembled the safety devices and then instructed Mr. Lopez to use the machine not as it was intended for. They knew that the machine was dangerous from the numerous letters that they received and were petitioned to fix the problems within a reasonable amount of time. Encore's lack of a strict training program allowed Mr. Lopez to use the machine even though he obviously did not understand the most common of instructions such as do not walk up to the spool while the machine is running. This leads us to believe that he was not instructed in a language he could understand. Therefore Encore Wire Corporation is liable for Hector Lopez's death.

## **Chapter 7**

### **The Mock Trial**

On May 2, 1999, at 2:00, the seven groups involved in the Products Liability IQP met in Higgins Lab room 102: The Price Conference Room. There were six groups of two and one group of three students. The point of this meeting was to present our opinions on Case #2: Hector Hernandez Administrator of the Estate of Laura Hernandez vs. Michael Mackenzie, and Case #3: The Estate of Hector Lopez vs. Encore Wire Manufacturing, MGS Manufacturing, Incorporated, and EWC Leasing Corporation. We were to present our opinions based on our research and calculations of the information given to us. A Mock Trial was created to add some drama to the presentation. At the end of the debates, the Jury would deliberate and come to a decision to determine who was at fault and how much the plaintiff should receive if the Jury finds in his favor. Professor Hagglund and Professor Dimentburg were coordinating the presentations.

We started out with Case #2 or Trial #1 as it was called this day. The professors called out a group and asked them to present their opinion of the case. They were to say who they think was at fault and show the Jury how they came to these conclusions. After the group had gone for about ten to fifteen minutes the professors would ask another group to go. The next group would take their stand on the case and present their reasons for the way they portrayed the information. Some groups agreed with each other while others debated what was said by certain students. Any jury member or student was

allowed to pose a question to the group doing their presentation at any time. Mostly everybody agreed that Michael Mackenzie was at fault. About an hour into the first Trail, the professors believed that enough information was presented to the jury and debated upon by the students. We moved on to Case #3 or Trail #2. The same process followed with this trail as with the previous one. Mostly everybody felt that Encore Wire was mostly to blame. There was some heated debate as to whether EWC Leasing and MGS Manufacturing were also at fault. After about another hour the jury was sent to deliberate on the two cases.

The Jury was sent into another room and given a sheet of paper where they could decide on whom was at fault, how much each party was at fault, and how much the plaintiff should receive if they find in his favor. In Trail #1, the jury felt that both Hernandez and Mackenzie were both at fault. They said Laura Hernandez was 20% at fault and Michael Mackenzie was 80% at fault. They awarded \$750,000 dollars to the estate of Laura Hernandez. In Trail #2, the jury claimed that Hector Lopez, Encore Wire, MGS Manufacturing, and EWC Leasing were all at fault in some way. Hector Lopez was 5% at fault, Encore Wire was 50%, MGS Manufacturing was 40%, and EWC Leasing was 5% at fault. They awarded \$5,000,000 dollars to the estate of Hector Lopez. In real life, both cases settled out of court. The estate of Laura Hernandez settled for \$600,000 dollars, while the estate of Hector Lopez settled for \$2,000,000 dollars.

## **Appendices**

### **Appendix A: Pictures from Case 1**

- 1a. A picture of the skill saw in question with the rip fence intact. Where the board is placed is where the rip takes place.
- 1b. Another picture of the skill saw with rip fence in place.

### **Appendix B: Pictures from Case 2**

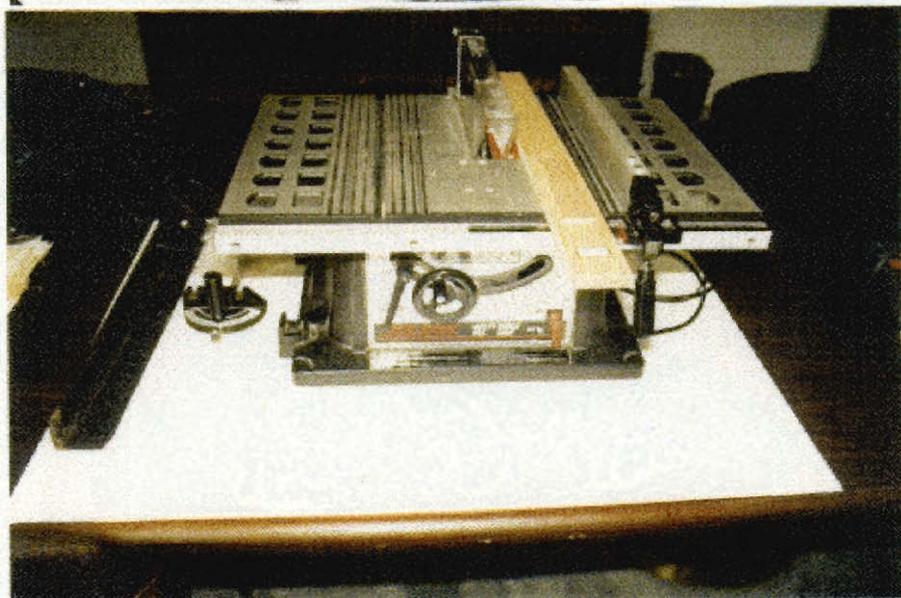
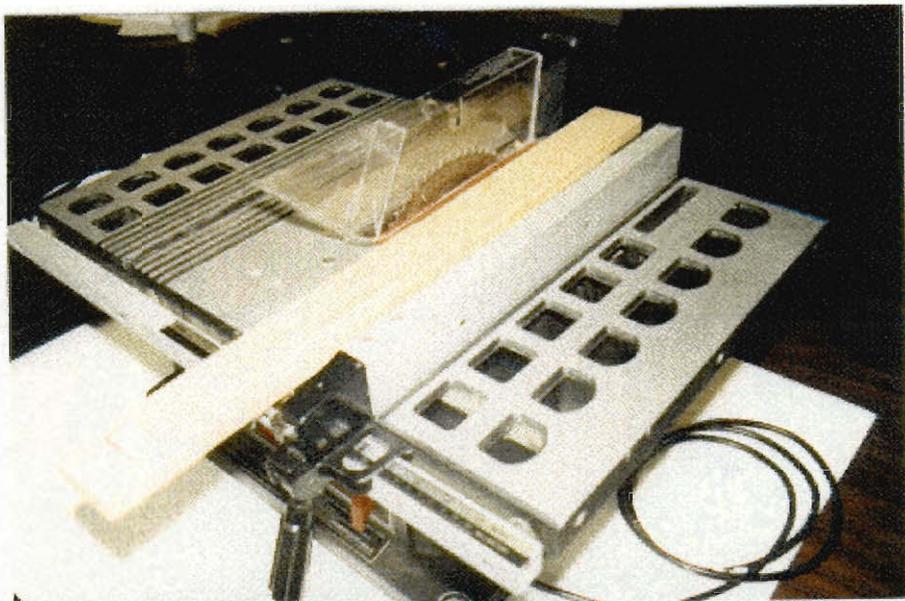
- 2a. Picture was taken at the scene at the time of the accident. It shows the final positions of the two vehicles and where the gouge marks are positioned.
- 2b. Picture was taken at the time of the accident. Shows the final resting places of the two vehicles.
- 2c. Picture taken at the time of the accident. Shows the damage to the front left of the truck.
- 2d. Picture taken after truck was towed from the scene. Shows tire damage.
- 2e. Picture taken years following accident. Massive car damage.

### **Appendix C: Pictures from Case 3**

- 3a. Picture taken following the accident. Shows the machine being used to unwind onto the floor.
- 3b. Picture taken following the accident. Shows the machine being used to take-up wire.
- 3c. Picture taken at time of the accident. Mr. Lopez is caught in the wire.

## Appendix A

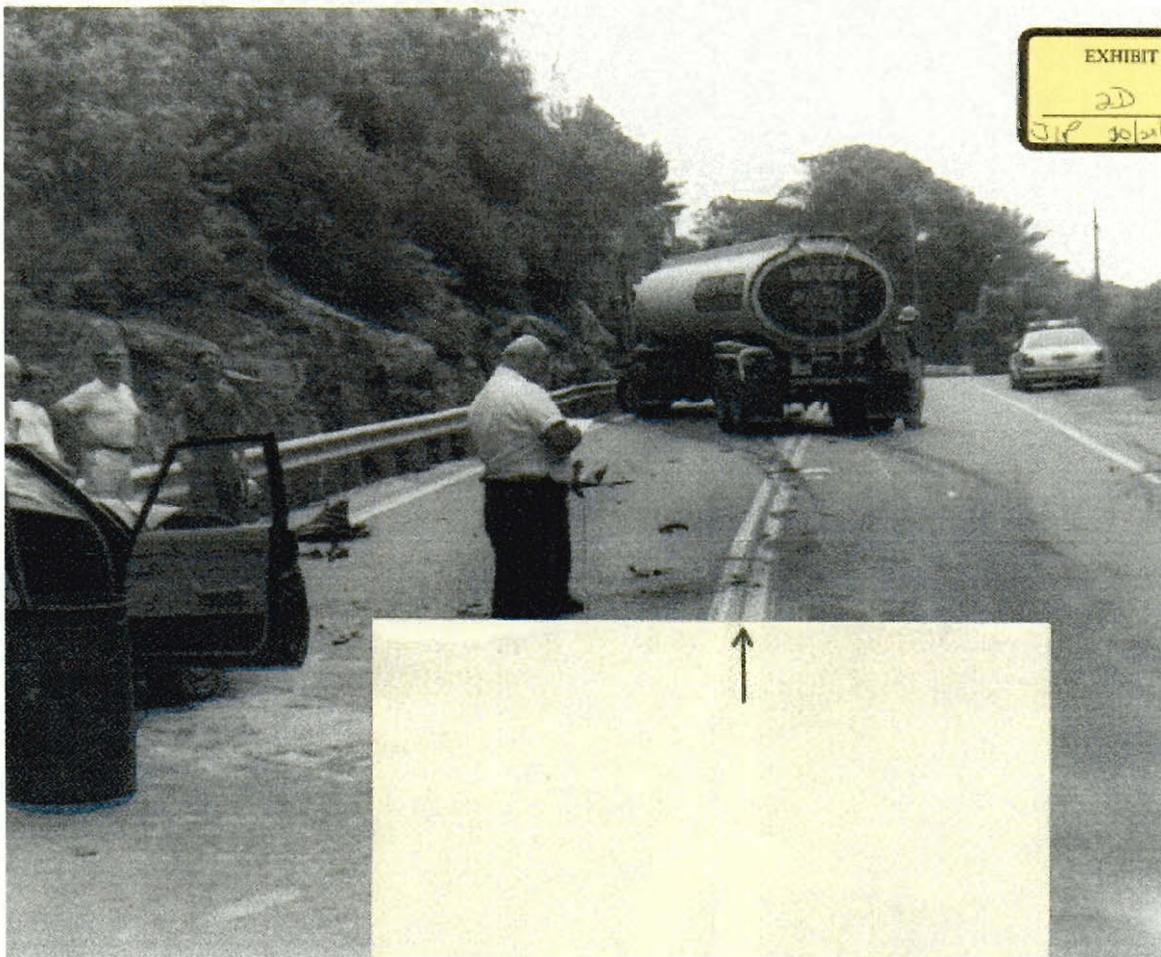
1a.



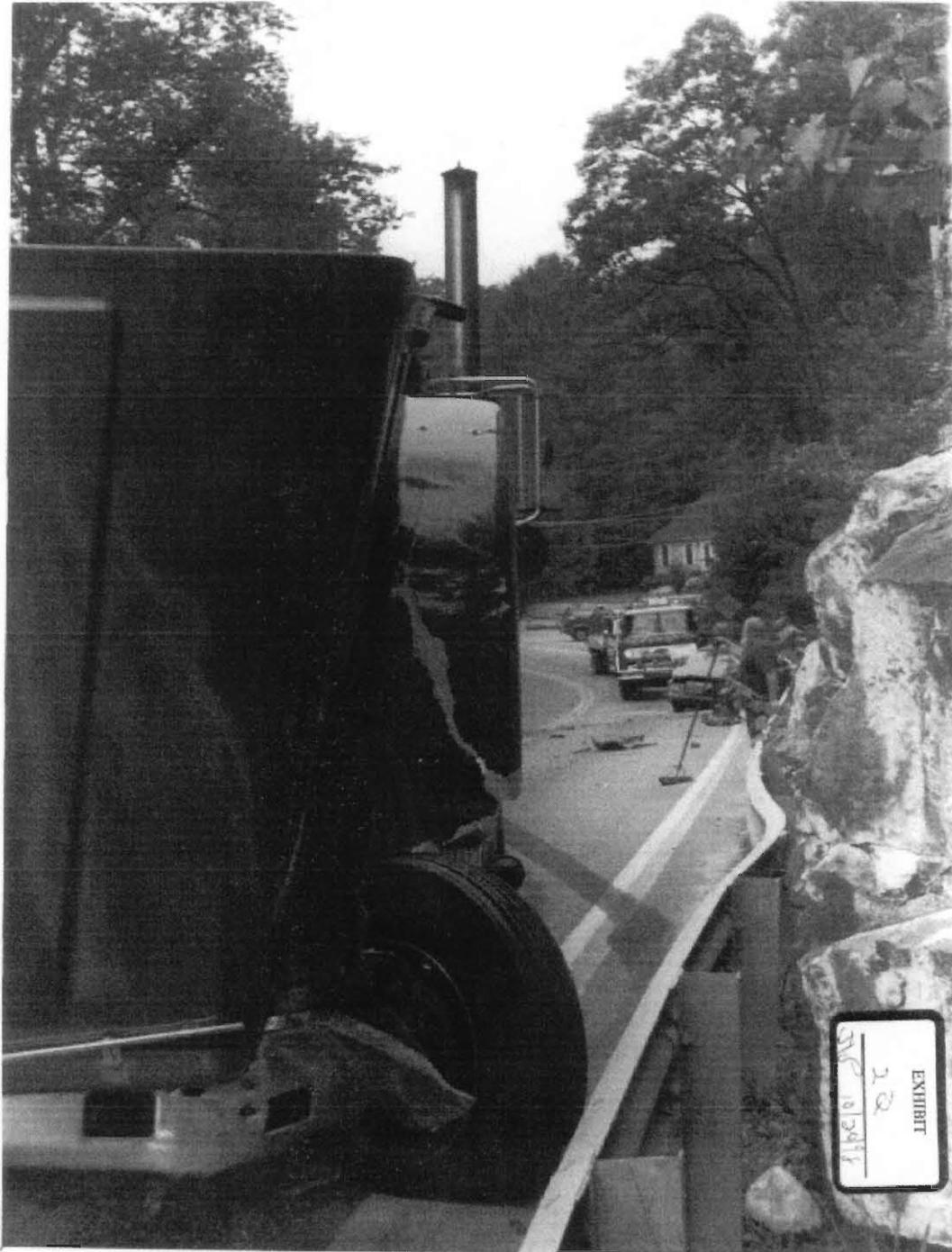
1b.

# Appendix B

2a.



2b.



2c.



2d.

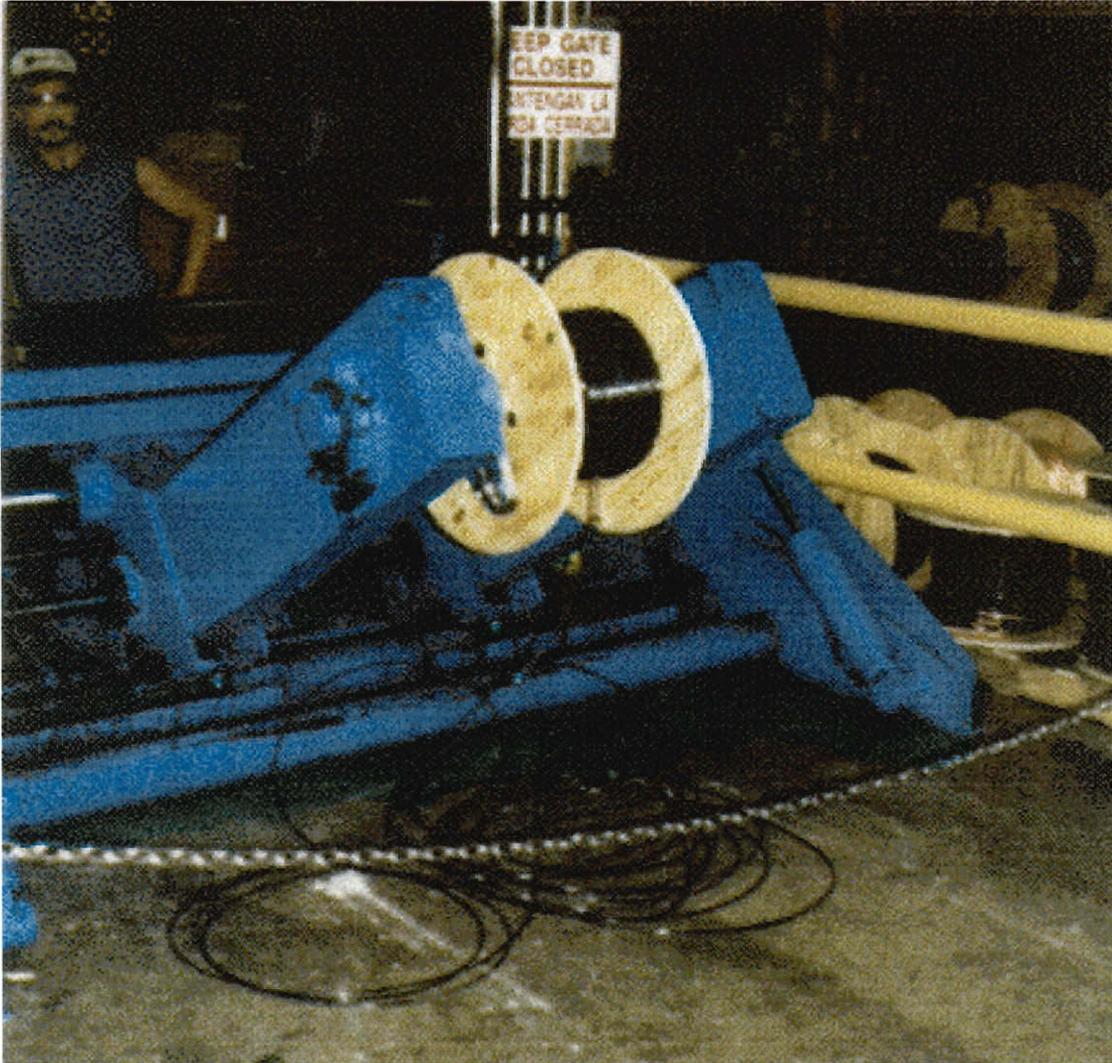


2e.

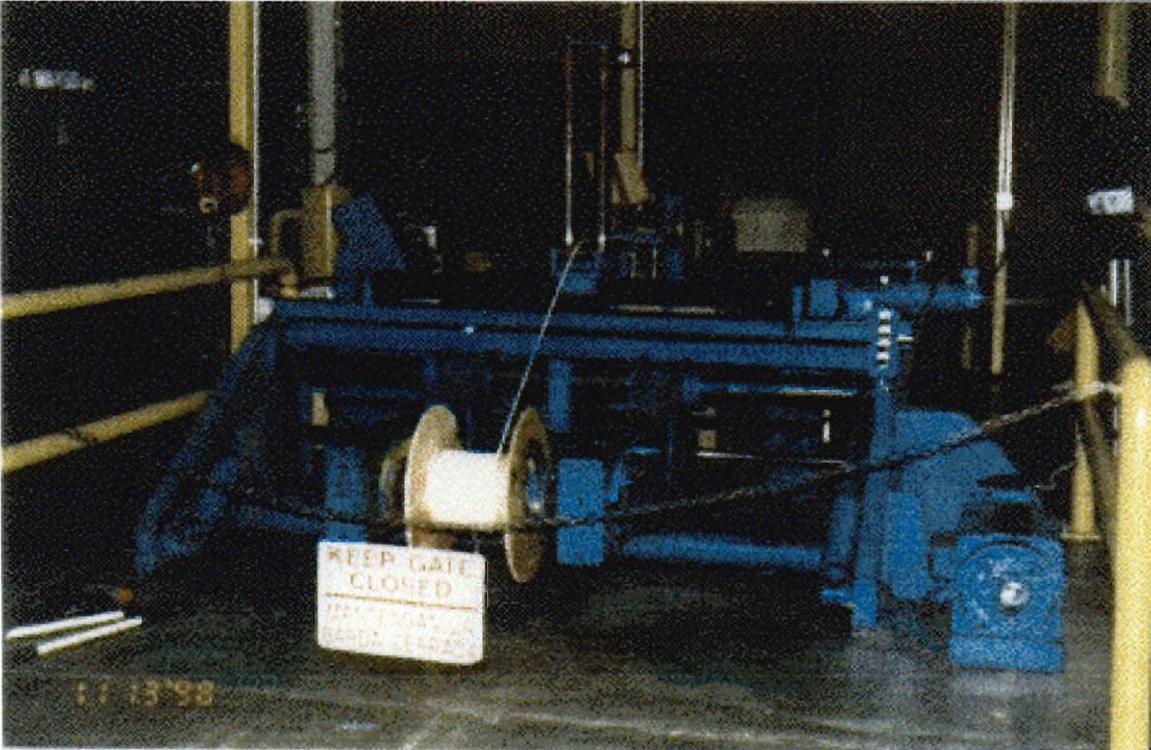


## Appendix C

3a.



3b.



3c.

