INVESTIGATIONS IN PRODUCT LIABILITY

An Interactive Qualifying Project

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Abstract

This project studies the principal aspects of product liability law and the fundamentals of product safety. It investigates alleged defects in a boring machine, a minivan seat, and a tree spade. From an engineering viewpoint, opinions are developed on each case using legal documentation such as complaints, interrogatories, and depositions. The study concluded with a mock trial where both plaintiff and defendant arguments were presented. With due process, the jury rendered verdicts entitling parties to the right of financial recovery.

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1.1 INTRODUCTION

An Engineer in the Courtroom, written by William J. Lux, thoroughly outlined the important role that an Engineer plays in the legal process. The helpfulness of the book included information such as a listing of the types of accidents that an engineer may come in contact with. In addition, the book described what an engineer should expect during the discovery, deposition, and trial processes. Lux decided to write this book after a very long and well experienced career as an engineer. He is a credible resource on the subject of the legal process as it applies to the engineer. From his personal background, Lux prepared this book to teach the importance of having an understanding of the legal process as it applies to engineers. Overall, the book explicates the importance of how the engineer can best assist the attorney in the entire legal process.

1.2 THE NATURE OF ACCIDENTS

There are many types of accidents often requiring the expertise of an engineer with a sound understanding of the legal process. Some of these types of accidents are outlined below:

1.0 Collision – Two bodies trying to occupy the same space at the same time

- a. Two moving machines or vehicles
- b. A vehicle or machine hitting a fixed object
  - b.1. A vehicle or machine hitting a parked or stopped machine
  - b.2. Airplane crashes
- c. A vehicle hitting a person
  - c.1. A person running into a moving machine
- d. A person running into another person

2.0 Slip and Fall Accidents

- a. A loss of traction between the foot and the surface it was on
- b. Tripping
  - b.1. Scuffing

c. Physical malfunction of the person

c.1. Dizziness

d. An unexpected change in a level surface

e. A loss of step support

f. A loss of balance

g. A fall from a ladder or step

3.0 Loss of Control

a. Inadvertent motion

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1.3 WHY GO TO COURT?

There are many reasons why people feel the need to settle their disputes in court. Under the legal system in the United States today every citizen has the right to seek balance in justice if the person feels that he or she has been wronged in some way. Everyone is entitled to compensation for the damages they received because of an accident. These matters are settled in a court of law. The process begins when one person files a suit against another because they feel their relationship with the opposed party has become unbalanced. In the area of product liability, the unfairness felt is a result of an accident of the sort outlined above. Next, the process progresses by naming the specific complaints that the wronged party has against the opposed party or party's product. Finally, the result is a settlement where both parties arrive at a solution to the unbalance. In the event of a settlement, not being reached then the case will be decided by a jury in the outcome of a trial.

1.4 AVOIDING LITIGATION

There are many things an engineer can do when developing a product to avoid the litigation process altogether. This begins by simply designing products that take into account safety to avoid all the possible accidents that could be involved with the product. The developer of a product must first avoid the accident by eliminating all the possible hazards associated with the design. Next, the designer must protect from the accident, should it occur. This can be done with the use of guards or shields to protect from hazards that may be present in a product. There are also ways in which to make an accident safe by designing a product that will cause no injury should accidents occur. It

may also be necessary to warn operators of the product of possible hazards that may occur from its use. These warnings let users know of the dangers associated with the product and its misuse. There are many types of warnings some are labels, lights, or sounds which precaution the user. For example, the harassing beep a car makes before one buckles a seatbelt in a car. It is also very important to warn the operator of the possibility of an accident. This is an example of devices such as labels, and operator's manuals that caution users by describing any conditions, which may lead to an accident. If an accident should occur, the operator would be qualified to take the correct action having been prepped by these instructions. Finally, it is necessary for a developer of a product to protect the user and others affected by an accident should it occur. This is done with the addition of safety equipment such as hard hats that protect workers against accidents.

When designing a product an engineer should always include a consideration of all undesirable affects, which may result from the product. Especially considering safety should something unwanted occur. The engineer is required to have the foresight to see all possible uses, misuses and environments through which their product will be subjected to. It is not possible to design a product, which is perfectly safe from all accidents, but engineers are required to make reasonable and professional judgments. Engineers must document their decisions and the reasons for them. Good instructions must be provided with a developed product in order to describe its correct usage, and maintenance. Finally, engineers must warn users of hazards, which are hidden in the product and cannot be practically eliminated. Keeping all this in mind while designing a product is a sensible way for engineers to avoid litigation.

1.5 THE LITIGATION PROCESS

The litigation process can be broken down into three major parts. First there are the claims that the plaintiff has against the defendant. The claims consist of the summons of the defendant and the complaints against the defendant's product. Next are the defendant's responses to these complaints and their attempts to provide a defense of their product. The last part of litigation is the discovery process, which tends to be the most interesting and involved part. The discovery process consists of interrogatories, requests

for production, requests for admissions, inspections, depositions, and finally the trial. There are also post trial activities, which may consist of agreement in a good outcome or a strong disagreement on the outcome. It may lead to motions for a retrial, judgment notwithstanding the verdict, reductions in judgment, and a variety of other legal steps, which are entirely the territory of the lawyer and rarely involve the engineer. Overall, the goal of the litigation process is to reach a resolution or settlement of the dispute. When the transaction of payment in judgment takes place the case has been resolved.

1.6 ENGINEERS AND ENGINEERING INFORMATION

Engineering information is the data and discussion of the design of a product, which is recorded and documented. Engineering information is all the pertinent information applying to the product developed. Examples such as blueprints, computer programs, papers, letters, policy statements, memos, and all information important to the successful design of a product are considered engineering information. Those who can descriptively and efficiently explain engineering information are those actively responsible and involved in the creation of the product in question. Others who can explain engineering information are competitors who develop similar products with similar uses. In addition, an engineer with the training and understanding of the fundamentals of engineering principles can explain, using his technical skills how a product was designed. Engineers and engineering information are important in a product liability case. The interpreter of engineering information must explicitly describe to the jury how and why a product was designed in such a way, and possibly how it could have been done differently. With this in mind, jurors can then make a decision based on the information given, if an accident was caused through some fault of the product in question.

1.7 HOW THE ENGINEER CAN HELP THE ATTORNEY

Because an engineer is experienced with the technical aspects of a product and a lawyer is familiar with the legal aspects of a product, when they work together, a special relationship forms which overall leads to successful undertaking on both parts. An engineer can help the lawyer in many ways. Most importantly, engineers help lawyers by

explaining the technical and scientific things relevant to a certain product and the case in which it is involved. Engineers help by explaining things such as:

1. The design and development of the product in question.
2. The products, systems, parts, and operation of the product.
3. The processes and methods of engineering involved with a product's development.
4. How the product was developed, evaluated and tested before it was marketed and sold.
5. How successful the product was at performing its intended tasks.
6. The intended and possible uses and applications of the product being discussed, as well as misuses.
7. The relationship between the product and its user.
8. The work done to reconstruct the accident in which the product was involved and the results there of.
9. The engineering literature pertinent to the case in which the product is involved.

In addition to communicating these technical things to people, engineers must do it in a way, which the general public must be able to understand. A good engineer can translate technical information into common language to assist the lawyer and others involved in the case. Discussion of the chances of the accident's occurrence is also a very important part on the engineer's part in helping a lawyer. Evaluation of the risks involved with a certain design is also an important task an engineer can do to help the lawyer. Overall, the roll of the engineer in helping the lawyer is to assist the jury in understanding the technical aspects of a case such that they may decide on an educated verdict.

1.8 THE DISCOVERY PROCESS

The discovery process is one of the most important parts of the litigation process because it is the first time in which the lawyer interrogates the witness and finds out what they really know about the case. The discovery process is for an opponent in a lawsuit to discover information that is allowed by law to be found and possibly used in the matter being litigated. Any information about the product is useful when found during the

discovery process of a product liability case. Under the guidance of an attorney, the engineer needs to help answer questions called interrogatories about the product involved. An important tool that an attorney uses to get the witness to follow the path of questioning is by asking questions to which the answer is already known. This confirms to the jury what the lawyer believes happened during the accident. An attorney often requests certain evidence to prove the point to the jury. In doing this, the attorney often has to be very persistent in making sure the jury understands the significance of the evidence being discussed. This is often termed the "smoking gun" technique, which means that the attorney has the witness admit to certain undeniable facts, or absolute information needed to win a case. The whole discovery process consists of the general discovery where there are requests for information on the product. Then there is the admission part where the attorney tries to coax a witness into admitting that an important statement is true.

1.9 THE DEPOSITION

In addition to the discovery process, the deposition is also a very important component of all litigation proceedings. The deposition is used to establish the facts on a certain case, and determine the origin and basis for these facts. One of the most important functions of a deposition is to seek out information that will discredit the opposing witness. Depositions are also used to determine the opinions that an expert witness may offer at the trial, and to explore the basis for these opinions. Finally, the deposition is a way of learning the plans and strategies of the opposite side.

There are a few all-purpose rules that one should follow when giving a deposition. These rules help to give the best and most constructive deposition possible. First, one must listen carefully to the questions being asked. Secondly one should pause before answering a question in order to gather one's thoughts so that what is said is what is meant. Next is to answer only the question being asked and not stray from it, and answer truthfully and completely. Finally, never volunteer information, and never argue or advocate. Following these general rules will result in a most helpful deposition.

1.10 THE TRIAL

The trial process advances in a very well outlined course of action. It progresses as follows:

1. The assignment of a jury
2. The opening statements
3. The plaintiff presents their case
4. The Defendant presents their case
5. Final arguments are addressed
6. The Charge is read to the jury
7. The jury deliberates
8. And finally the verdict is read

The trial process is obviously the most important part of a case, but another important aspect of the case is the appearance and conduct in the courtroom. Proper attire must be worn, and when addressing the judge he or she is to be referred to as "your honor." The people who will be present in the courtroom will include the judge, the clerk, the reporter, the marshal, the jury, and both parties involved in the case.

1.11 QUESTIONS

The types of questions asked by an attorney take an integral role in the persuasion of the jury. Types of examples include:

1. Specific or general questions
2. Open and closed questions
3. Leading and non-leading questions
4. Formal and casual questions
5. Simple and Complex questions
6. And probing and outlining questions

Not only is the type of questions asked by the attorney important, but also how they are asked. Inflection and voice pitches can imply certain meanings to questions. The careful wording of a question or an answer for that matter may carry much more meaning than simply the words used. The most important thing to remember about the questions asked during the litigation process is to answer them truthfully.

1.12 ACCIDENT RECONSTRUCTION

Accident reconstruction is a very helpful part of the litigation process in which the engineer is most likely involved. There are six important rules that one must abide by in order to provide a valid and realistic accident reconstruction.

1. A good reconstruction must agree with the laws of physics, and rules of engineering.
2. The reconstruction should agree with the majority of information and evidence available.
3. The reconstruction should be explainable in common everyday terms.
4. The reconstruction should be as free as possible from bias and preconceived notions and ideas.
5. The reconstruction should not result in any big surprises.
6. In addition, the reconstruction must be able to withstand attacks and scrutiny.

When following these simple rules engineers should be able to reconstruct accidents and prove to be very useful tools in winning a case.

1.13 DEFINITIONS AND TECHNIQUES EMPLOYED BY ATTORNEYS

Attorneys use many special terms, which may not be often heard in everyday language. In order to simplify the court experience they are listed as follows:

Adverse Witness – A witness called to testify by the opposing attorney

Balance of Evidence – The comparative weights of the evidence used by both sides

BAR – a.) A location of legal activity

b.) A grouping of attorneys

c.) To prevent or keep out

Bench – The location, person, and authority of the judge

Breach – A failure to perform or a break in a chain of action

Burden of Proof – The respective responsibilities of the parties in the lawsuit to prove (or disprove) the claims in question

Charge – Instruct or a compliant brought up against someone

Civil Law – The part of the law dealing with the relationships between and other entities

Complaint – A formal name for the list of claims and the requests for court intervention filed

Due Process – The proper legal steps in a procedure

Evidence – Refers to the information that tends to prove or disprove matters of disputed fact

Forensic – Belonging to the law

Hearsay – Something other than what the witness experienced, saw or heard first hand

Impeach – To show the testimony of the witness to be untrue or unbelievable

Inadmissible – A piece of information is inadmissible in the case if it is unacceptable for use

Liability – The legal responsibility to pay such remedies as the court decides

Litigation – The entire spectrum of legal actions and court activities where the parties have dispute

Negligence – The failure to use the ordinary amount of care that would be expected

Puffery – The exaggeration or overstatement of a product in order to sell it

Punitive Damages – Exemplary damages that go over and above the damages intended to make the plaintiff whole

Questions of Fact – Those questions or unresolved disputes dealing with fact or information

Questions of Law – A matter of dispute concerning the process and rules of litigation procedure

Red Herring – Not logically a correct and proper part of the subject at hand

Summons – The formal legal document notifying the defendant that an action has been filed against him

Tort – A legal wrong

In addition to the special terms used by attorneys, there are also many special techniques that are used.

1. Never ask too many similar questions
2. Do not fight or argue with the witness

3. Keep the cross examination as short as possible
4. Know the answer to the questions before they are asked
5. Tell a story to paint a vivid and interesting picture for the court to understand
6. Stop when you have made your point
7. Never assume anything
8. Listen carefully to the answers to the questions asked

When following these guidelines an attorney makes the court experience flow smoothly with a much better chance of accomplishing the goal at hand.

1.14 WAR STORIES

Now that the things one should do in the courtroom have been covered, there follows some examples and tips to aid the litigation process. There was an interesting example in the reading of one witness who gave a seventeen-hour deposition. The lesson to be learned from this is do not let yourself be put in an uncomfortable situation. Seventeen-hours of deposition is quite unreasonable. One who takes a deposition, or provides a witness for deposition has an obligation to provide a reasonable environment for the deposition. Many people are afraid to use the phrase "I don't know" in a deposition, but one should keep in mind that "I don't know" is a good answer if it is the truth. One should never use the line of reasoning that "I can prove it didn't happen that way, but I can't prove how it did happen," because proving an accident did not happen one way is not a valid defense for the accident. Never assume that a judge may be biased because of where they are from. This can prove to be a fatal mistake. No one appreciates that sort of attack. At the deposition, one should always know who is in charge. This helps in the flow process and keeps things running smoothly. When encountered with an unforeseen surprise, never show any expression that it may have caught you off guard. A surprise response is often effective in aiding the opposing side. The trial is a game of presentations. If you know something that your attorney does not know, you should let them know as soon as possible, because it is not wise to hold information from your attorney. It is always good practice to be careful what you bring to court, and when the cross-examiner checks your books and records be prepared to defend your work. Finally, when the lawyer you had for a previous case is against you this time use extra caution.

These valuable techniques need to be learned most often by having experience in the courtroom.

1.15 TIPS FOR THE ENGINEER INVOLVED IN LITIGATION

1. Do not try to run the game
2. Always be truthful
3. Don't be frightened by the legal process
4. A good attorney will prepare you, listen to his direction
5. Follow instructions precisely and accurately
6. View the legal process as it is
7. Do your best work and use your best judgment
8. Offer your attorney the best technical advise you can
9. Use your special skills to help the process
10. Be yourself
11. Be aware of traps
12. If you make an error, correct it don't try and cover it up
13. Listen to advice

2.0 ART OF ADVOCACY VIDEOS

The purpose of these videos is to show the process of various legal issues.

2.1 OPENING STATEMENTS

The first words that the jury hears are from the opening statements that the lawyers make. They are an introduction to the case stating the problem, the results that they plan to obtain, and how they are going to prove their side of the case. It should be a statement of the facts telling both the good and the bad to establish credibility. The statement outlines what should have been done to prevent the accident, and deals with damages and compensation. A number of problems can arise when making these statements: they can be quite unimaginative; even though it is good to use repetition, words or phrases can be overused which wears out the subject. Being apologetic can also cause a problem, and sometimes speeches are not worked out enough or underdeveloped. During the opening statement the lawyer tells a story that has to be interesting and to the point so that it obtains and keeps the attention of the jury. The lawyer uses various tools to help the impact of the statement. Such as the style used in expressing himself, being soft spoken, and watching, the tone of their voice can have a big impact on the jury. Also having poor conduct, such as yelling or slamming things around can give the jury a bad impression, which is something every lawyer tries to not do. The lawyer must be ready to proceed with the story line and must identify the protagonist so that the jury can get caught up in the drama and see the side of the story through the eyes of the protagonist. The story told must be narrative, use dramatic devices and imagery, visual aids can also be helpful. It should take the jury to a mellow drama point and then just stop short. At the end of the statement, the initial theme should be returned to, and the jury should be told what is expected of them.

2.2 DIRECT EXAMINATION

One of the hardest things to do during direct examination is to try and keep complete control. During the direct examination people will remember best what they hear first and remember most what they hear last. They call this primacy and recency.

You want to establish what you hope to obtain from the witness, and establish the witness's credentials by using background information before asking questions. When examining the witness visual aids such as a blackboard, are very useful, and make sure that these visual aides are highly viewable to all jury members. An easel and marker are better visual aides to use because afterwards the jury can take them back to the deliberation room as evidence, where as a chalkboard cannot. The lawyer should also keep a loud enough voice for the jury to hear, and keep a reasonable pace so that the jury does not get bored or lose attention. When the plaintiff takes the stand the spotlight should shift to the witness, and the lawyer should try to get the jury to know the witness's personality. The lawyer should ask the plaintiff many questions that have unequivocal answers, and during long examinations, they need to emphasize important points by raising their voice or by changing posture. The lawyer should also make sure that they talk about things that the injured person can no longer due. When ending the examination keep in mind primacy and recency. Overall, the most important things to remember during direct examination are, making sure you set the scene both verbally and visually. Talk so that it is easily understandable. Use sodality in expression so that the jury will get the point, and describe the injuries from the injured person's perspective.

2.3 ADDITIONAL OPENING STATEMENTS

During the trial, the advocate should establish everyone's goals, and put themselves into the role of the jury so that you can visualize what they are going to think from your statement. During this additional statement, you want to discuss the product that could be held liable for this case, and its functionality. Deal with the legal issues then continue with the story line. The use of hand signals and body language to develop explanations can also be helpful. One important thing that every lawyer should do is to establish his or her credibility so that the jury knows that you know what you are talking about. When you get back to discussing the legal issues you are going to have to deal with the resolution of the injuries. This can be rather difficult. Sometimes you have to talk about negligent entrustment, which states that you cannot lease or rent anything that is dangerous without proper instructions, and then prove if this holds any ground in your case. Another difficult subject to deal with in the opening statement are damages, and

mentioning dollar amounts. When you discuss your victim, you want to discuss in detail the fact that he or she is innocent and not at fault. To help show this the lawyer can invite the jury to join in learning from expert witnesses, but before questioning the witness the lawyer has to establish the expert witness's credentials. All in all the most important part of the opening statement is to tell a good story, and make sure that it conditions the jury to accept the rendition of the facts.

2.4 CROSS EXAMINATION OF NON-MEDICAL EXPERT

In cross-examining a witness you should always make sure that you are the one in control, and ask questions that have yes or no answers so that the witness cannot say anything that you do not want him too. You should introduce the witness by showing his or her experience in the field of expertise. The witness should always keep notes on the work done for the case; the lawyer can use these notes to emphasize his point or to reintroduce some facts to the jury. While doing this, you should try to include the jury in the process, possibly by walking over to them and making direct statements towards them. You can open questioning calmly asking about the witness's past court experience, and his or her experience on this particular case. One of the best ways to advocate this is by using repetition, because we all know that the jury would be more inclined to remember something that is repeated to them. The lawyers also have to illuminate the contradictions in the case, but in the end both direct and cross-examinations should build to a conclusion and clearly state the lawyers points that he wanted to get out of the witness.

2.5 CROSS EXAMINATION

The cross-examination is used to support the theory of the lawyers' cases and to amplify testimony of the witness. While the lawyer cross-examines the witness, he must do a number of things: he has to exercise a lot of psychological control, and realize that he or she is dominant over the witness. To do this you have to make good eye contact with the witness and control the flow of the questioning, because control is the essence of successful questioning. While examining the witness, the lawyer should quote directly from the deposition, and use visual aides in stating facts and proving points. They must

also establish the fact that the witness is an expert. Most importantly, you have to keep an evasive witness on a tight chain by asking questions with yes or no answers. You can also make statements and have them either agree or disagree. You have to make clear to the jury the type of info that you are trying to derive by asking a series of questions to prove a point, and establish any kinds of code violations that may have occurred. During examination unexpected events can occur, the lawyer must be quick witted and level headed to keep up with the questioning. In the end, you want to make sure you have not destroyed the witness, which could ruin the case for your client.

2.6 DEPOSITION

Depositions do not take place in the courtroom. Instead, they are held in a conference room with you, your lawyer, opposing lawyers, and someone to record the conversation. During your deposition, you are under oath and everything you say is on record, and if the case ends up going to court anything you say can be used against you. You have to remember a few simple rules when being questioned at a deposition: never volunteer any information, keep your answers brief, and be direct; wait until you are asked to discuss the question in detail. Listen hard to the question being asked and pause before you answer so that your lawyer has time to object to the question. Watch out for those tricky questions, lawyers will try to confuse you by wording a question differently. Do not fall into this trap; if you do not fully understand the question ask the lawyer to clarify it. Make sure that you understand everything that is being asked, if you are still having trouble bring it to the attention of your lawyer. Have him clear up some points so that you do not run into trouble later on. An important fact is that you should always be honest, do not add or remove any information to make your self look better, because it can be used against you later in court. Do not be afraid to say, "I don't know." One basic rule to remember is when in doubt, ask. Interrogate the interrogator.

2.7 CONCLUSION

The conclusion is the last few statements of the closing argument, it is very important because it is the last thing that the jury hears you say and it is what they will remember the most. The jury has already heard everything about this case and in your

conclusion, you should get them interested to hear the major points one more time. The process of taking a recognizable situation and putting it into a new perspective to get the jurors attention one last time is called alienation. Using body language is very important, and your words should be well thought out so that they create a picture in the minds of all jury members. The lawyer should also take special care in making sure that personal biases do not interfere with the trial, or the jury's view on the case. It is important that when you are making you final arguments that you do not adapt to someone else's style. The lawyer should change certain methods to suit his or her own style. There are proven effective methods that are used by many, and finding the one that works best for you is important. Where basic principles should be mimicked, make sure that they are correctly used and not taken out of context. Also, make sure that you are familiar and comfortable with presenting them so that they will be effective in the case

The fact that the lawyer knows nothing about the jurors' background makes it difficult to explain the pain, horror, and the disfigurement that the injured person has occurred. The story told must be well thought out and prepared so that it is smooth and flows well. At the end of your statement, you should mention how important the jury and the job that they have to do really is.

2.8 SUMMATION

During your closing arguments, when you start to sum things up, you can either make the case or ruin the case. The lawyer must have the ability to tell a story interestingly, and not make it seem too boring. By the time of the closing argument, the lawyer has been with the jury for some time, and has become acquainted with its members. So in starting your closing argument, you need no introduction, they know you and you know them. Excitement and suspense also starts to rise, because your summation marks the end of the case and everyone starts to wonder what the outcome is going to be. A lot of times during the lawyers final argumentation there will not be any factual disputes, the lawyer just wants the jury to accept the basic principle of product liability. The lawyers can again use visual aides to compliment factual evidence, and they have the option of using a podium. Although the podium creates the impression of an authoritative power, it does create a barrier between you and the jury. It is better

many times not to use a podium because then the lawyers can interact with the jury and also have a better chance of them accepting his or her credibility. The closing arguments are where you will state to the jury some precise figures of money and damages that you hope to obtain. In doing this, the lawyer should kind of play a guilt trip on the jury talking about loses that the injured has received. You should also talk about damages that you did not consider as damages before, such as maybe a doctor's bill. This will give the impression that you are being somewhat fare. When talking about loses, you have to make the jury visualize the injuries that the person has occurred. Either by using medical terms or by maybe telling them what the injured person was like before the accident and what he is like now. The lawyer should also bring up sensitive topics, for example, how a spouse has to perform the injured persons daily necessities. When explaining these topics to the jury the lawyer should have well thought out what is going to be said, and talked about. At the end of the statement the lawyer will be faced with an awkward situation, they will have to translate to the jury the options that they are going to have to make. These options have to be worded correctly so that they will all benefit your case. At the end make the verdict that you are trying to obtain appeal to the jury, and leave them feeling that they are important and have an important duty.

2.9 A CLASSIC COVER UP

The Ford Mustang is a well reliable, safe, and respected car, but it did not always have this reputation. The old 1964-70 Mustangs were very dangerous firetraps that have a three times higher chance for rear end collisions turning into fire accidents. The mustang had a huge defect, and that was the fact that the gas tank was the floor of the trunk. When the rear end in the old Mustangs got in a collision, it would crush the gas tank causing it to be punctured and all the gas would then travel from the trunk and into the passenger area. This caused a number of injuries and even deaths, because many times when the gas flooded to the front it would be on fire and incinerate everything inside. A lot of people said that Ford new about this defect, yet denied knowing anything about it stating that their safety engineers never informed them about this problem. They said that the car met all of the government standards. The safety engineers knew that they goofed though. They held a crash test and witnessed the

gasoline flowing onto the passengers. Ford failed to report this test to the department of transportation. Probably because of the fact that businesses in those days hated recalling cars and it was the best car that Ford had on the road at that time. Many lawsuits were filled against Ford because of this automobile, but most of them ended up being settled out of court. Today a lot of these old classics are being restored and put back on the road, and the families of the victims want Ford to finally come out and say that these cars are unsafe and should have certain alterations made to them before anymore lives are ruined. The only thing that the ex-president of Ford Motor Company had to say was that "if you want a safe vehicle, trade up. It's time to dump that old mustang."

3. PRODUCT LIABILITY: IN A NUTSHELL

3.1 DEFINITION

3.1.1 PRODUCT

A product is described as physical personal property or goods. However, product liability law has gone beyond physical personal goods. A number of rules govern the process of deciding whether the liability law is applicable to a situation. The first rule states that product liability law is not limited to cases involving a product; it can be applied in very specific situations. For example, the situation could be when the defendant is in the best position to spread the loss and prevent the injury.

3.1.2 DEFECT

A defect is described as the cause for imposing liability against a product supplier, because of supplying a defective product. There are three different types of product defects. The first is a manufacturing or production error, this is usually an arbitrary error. The second is a design error, which is caused from insufficiency in the design of the product. The third type is a defective warning or instruction. When looking at these defects it is important to know the difference between a design defect and a production defect. This is because of the fact that strict liability applies only to production defects, and because misrepresentation of a warning or instruction can sometimes not easily be distinguished.

There are basic standards for determining defectiveness. The term unreasonable danger is used when an article sold is dangerous to an extent beyond that which would be contemplated by the ordinary consumer. In design cases, evidence is needed to determine defectiveness. In a case of consumer expectation, a testimony of an expert witness is usually used, whether the case is based on strict liability or negligence. Strict liability does not apply in the case of unavoidably unsafe products. In the case of a defect and unreasonable danger, proof is needed to confirm negligence, and this lies with the plaintiff. Presumed seller knowledge is a strict liability, but when based on misrepresentation it does not require a risk-benefit analysis. A risk-benefit balancing

analysis is used by the courts to determine design defects. The standard use of a risk-benefit analysis consists of seven steps:

1. The usefulness and desirability of a product.
2. The likelihood of seriousness injury from the product.
3. The availability of a substitute product that would meet the same requirements and not be as unsafe.
4. The manufacture's ability to exclude the danger without compromising the usefulness of the product.
5. The users' ability to avoid danger
6. The users' awareness of the danger.
7. The possibility of the manufacturer risking loss by pricing or insurance.

3.2 SOURCES OF DAMAGES

3.2.1 NEGLIGENCE

Negligence has to do with a number of inadequacies in the areas of inspection, processing, packaging, proper warning, design, marketing, and any manner in which the defendant fails to uphold a reasonable standard of care. The plaintiff is responsible for showing that the accident would not have occurred in the absence of negligence, and that it is the defendant's responsibility to eliminate the danger of the product. The final thing the plaintiff must do is to prove with evidence that the responsibility of the accident lies solely in the hands of the defendant.

3.2.2 STRICT LIABILITY

Some of the implied obligations that go along with purchase of a product are the warranty of merchantability. A warranty that all goods shall be merchantable is implied in a contract upon sale, unless the warranty is excluded or modified. Another obligation is that merchantability is dependent on several features. The product has to pass without question under the contract description. Exchangeable goods must be of average quality within the description. The product must function within the variations allowed by the agreement. The product must be contained, packaged, and labeled sufficiently. Lastly,

the product must be up to the expectations and promises made on the container or label if any exists. Another implied obligation would be that the merchant must not violate the Tort Law.

The Tort Law states that one who sells a defective or unreasonably, dangerous product to a consumer is liable for physical harm caused to the consumer or his property if the seller is engaged in the business of selling such a product. Abnormal danger exists if there is: the existence of a high degree of risk, the possibility that the harm will be excessive, and the extent to which the value to the community is outweighed by its dangerous features. The Tort Law also states that the seller cannot have inadequate representation of express warranties. An express warranty is a statement or promise by the seller, which relates the goods, and establishes a warranty, which the seller must uphold. The seller creates an express warranty even if the word "warranty" is not used as long as a confirmation of the value of the goods is given. Strict tort, under the Tort Law states that a seller is still held liable for harm done by a product sold even if the consumer has not bought the product under any contract.

3.2.3 DAMAGES

Under the general law, the plaintiff is entitled to compensation for any foreseeable damages, under the Tort Law or warranties. There are different opinions on whether compensation is an option for sufferers of emotional distress, assuming no physical damage. If physical damage does exist then compensation can be made under emotional distress. There are two other forms of damages that can be mentioned, punitive damages, which are hardly ever awarded in personal injury cases, and joint liability, which is imposed when the damages seem indivisible.

3.3 PLAINTIFF VS. DEFENDANT

3.3.1 PLAINTIFF

A plaintiff is a person who sues the defendant, distributor of products, for the purpose of compensation for personal injury. This plaintiff could be any person such as, a buyer, user, consumer, or any person in the presence who could be in harm's way.

3.3.2 DEFENDANT: NEW PRODUCT SELLER

There are a number of parties that can be sued under the manufacturer. The final assembler as well as any manufacturer of any component part may be sued if the part is defective. Even if the product meets all the specifications, the manufacturer may still be held liable if there is a probable risk involved with installing the component into the final product. As long as the manufacturer's name is on the product, they are responsible for any problems, which occur, even if they do not actually produce or assemble the components of the product themselves.

The retailers are not held liable for any defects in a product, unless the defect could have been found under routine inspection. This does not apply if there is any attempt to fix or rebuild the product; in this case, the retailer is considered the new manufacturer. A middleman may also be found guilty on some level, if they receive a commission from the sale of a defective product.

3.3.3 DEFENDANT: USED PRODUCT SELLER

A seller cannot be held liable for a product after it has left the domain of distribution, assuming that it is not a case of misrepresentation or a design defect. The only time that this does not hold true is in the case of a regular used product seller. They are still considered part on the distribution domain, and can be held liable for the defective product.

3.3.4 DEFENDANT: SUCCESSOR CORPORATIONS OF PRODUCT SELLERS

This section deals with the buying and selling of whole businesses, and how liability for previous manufactured parts is distributed. There are two major rules in this area of product liability, the Turner Rule, which shows how the buyer of a business can be held liable for the defective products of the previous owners. The second product liability rule is the Ray Theory, which comes into play when the successor gains control of all or substantially all of the manufacturing assets of the predecessor.

3.3.5 DEFENDANT: LESSORS, BAILORS, AND LICENSERS OF PRODUCTS

Lessors' are liable for any injury, which occurs to the customer when using the lessors' defective product. This holds true as long as the defect occurs during the rental period. A long-term lease is considered the same as the purchase of a product. In general, the lessor is held liable if he either "marketed or placed the product in the stream of commerce"

3.4 REMEDIES, JURISDICTION, AND PROCEDURE

3.4.1 RELIANCE

Proof of reliance is used expressively as a condition to recover for conscious, negligent, and innocent misrepresentations resulting in personal injury. The express warranty says that, "an affirmation merely of the value of the goods or a statement purporting to be merely the seller's opinion or commendation of the goods does not create a warranty." In order to recover for a breach of express warranty, you have to show that the consumer relied on the assurance of the advertisements when buying a product. If there happens to be an inadequate warning, and that is the basis for a case, there must be proof that the warning was relied on.

3.4.2 DISCLAIMERS AND REMEDIES

A disclaimer occurs when no solution can be given, while a limitation of remedies exists when the plaintiff is given some remedy, which may be different from that provided by law. Contractual restrictions cannot be used to avoid strict liability in the situations of negligence or warranty. The only time when contractual restrictions are valid against liability is when product liability is not applicable. Some general requirements for disclaimers are:

1. Conspicuousness and clarity, lack of these two things will invalidate disclaimers.
2. A disclaimer must be delivered before a sale takes place or a contract is signed.

3. If a contract or contract clause is found to be unconscionable, or leaves the buyer with no options, it can be denied or accepted without the unconscionable clause.

Disclaimers of fraud, deceit or negligence are not valid. A complete disclaimer of liability is, in most cases, found to be invalid assuming personal injury is involved. This is a result from the idea that in the case of personal injury, a minimal remedy is written into the sales contract. Disclaimers can also be found invalid if their purpose or result is the relief of obligation required by a statute.

3.4.3 SOLELY ECONOMIC LOSS

Solely economic loss is defined as a loss in value, loss of use, cost of replacement, lost profits, and damage to a business' reputation. If a plaintiff has suffered a solely economic loss, he or she cannot recover if it is a result of a defective product. This holds true in cases of negligence or strict liability. The reasoning behind this rule is because, "product recovery, whether in tort or warranty, is limited to foreseeable damages," and negligence and personal injury cannot be disclaimed.

3.4.4 BREACH AND WRONGFUL DEATH

If the buyer discovers a breach of warranty, they must notify the seller within a reasonable amount of time, of the breach or be denied any remedy. This is used as protection for the seller. A breach of warranty or negligence could be considered a wrongful act, and may be subject to a wrongful death action.

3.4.5 PROCEDURE

Statutory Causes of Action are found where the defendant breaches an express warranty. State consumer protection statutes give the plaintiff the right to damages and to collect attorney fees.

Inconsistent Verdicts and Erroneous Instructions are treated differently in every court. Some say that a defective product does not necessarily breach warranty. Others disagree and think that a verdict for entire damages should be issued.

If a federal law decides that its own rule is procedural, then federal law is applied over the state's law. In the case, that the venue is changed the transferor court sets the conflict rules for the transferee court, but in order for a state to imply its own law, it must have a significant number of contacts involved on the case.

3.4.6 STATUTE OF LIMITATION

During a case there can be two or more statutes applied. Either a warranty statute or a personal injury statute, or both could be applied. A statute of repose is a limitation whose period runs between two fixed dates, regardless of the situation. An accrual date is the date at which the statute of limitations takes effect. Common types of these dates would be: date of the injury, when the plaintiff had reason to know about the claim, and when the plaintiff should have known about the claim. In the event of a happening that prevents the beginning or continuing of a statute to run, a tolling exception can come into effect.

3.5 PRODUCTION AND DESIGN DEFECTS

3.5.1 PRODUCTION DEFECTS

In a manufacturing defect the plaintiff has to prove that the product is defective by proving that it does not meet up to the specifications of the manufacturer. The plaintiff also has to make sure that the manufacturer did not already determine that a certain percent of failure was to be expected, then any product falling in this range would not be considered defective.

3.5.2 DESIGN DEFECTS

There are many different points of view as to what constitutes a liability. Risk utility analysis is probably the most widely exercised standard. Risk utility analysis is where the liability of the manufacturer depends on certain standards of care. This is a matter of negligence on the part of the manufacturer, but in many courts, they would have you believe that their focus is on the product rather than the manufacturer. Design defectiveness in strict liability is whether the product did not perform under normal conditions as expected, also if the plaintiff proves somehow that the design caused his or

her injury and the defendant fails to show that the benefits of the design outweighs the risk of danger than the design would be defective. However when a product is critically needed and can only be designed one-way it should be viewed differently.

Sometimes design decisions are described as polycentric, where each point of a decision is related to all of the other ones. This can result in trade-offs, which will have an effect on safety, utility, and cost. It is up to the manufacturer to decide whether the trade-offs will be acceptable. This concept of trade-off makes deciding product liability a more difficult process. Some people think that when a manufacturer puts market considerations before product safety that is when a design is thought to be liable and unreasonably dangerous.

The failure to warn the public of an obvious danger in a product is a case of liability, but it is also just as bad to warn an obvious danger that could have been avoided through a design alteration. Even if the manufacturer has very good warnings, it can still be held liable for the safety of their product.

Whether the manufacturer is liable for a product that has obvious dangers, and is misused by the consumer to the point of personal injury depends on the product itself, if the product had adequate safe guards and if the dangers were unreasonable. A problem arises with this because the obvious danger defense conflicts with the assumption of the risk defense. To prove assumption of risk the plaintiff must show that he or she discovered the defect, understood the dangers and disregarded them to expose themselves to the danger anyway.

3.6 INADEQUATE WARNINGS, INSTRUCTIONS, AND MISREPRESENTATIONS

3.6.1 WARNINGS AND INSTRUCTIONS

During a case, the plaintiff can pursue a strict liability theory of either a design defect or failure to warn, and they may pursue both theories if both are viable. A warning is different from an instruction, in that instructions are used to secure the efficient use of a product, while warnings are used to insure safe use of the product. A warning must describe the nature and severity of the danger involved. A manufacturer may be required to warn of the absence of an antidote in case of a dangerous poison. In most cases a

warning is required to allow the plaintiff use of the product in such a way so that a concealed danger can be avoided. If a danger is obvious, it is not required for a warning to be given, but determining cases of defective design is complicated. Sometimes expert testimony is required to determine the sufficiency of warnings to a specialized group.

There is a division of authority in regards to whether negligence or strict liability is to be used in cases that involve failure to warn. The manufacturer is better equipped with the knowledge of the product and can handle with more ease, economic consequences of accidents caused by defective products. Therefore, the consumer must rely on the integrity and competency of the business community. The consumer can create an incentive for the manufacturer to invest more time and money into safety and research by imposing on them the cost of failures to discover hazards. If a known defect or hazard is believed to be known at the time of production, from applying research and scientific knowledge, then the manufacturer is liable and negligent in producing the dangerous product. The effort, time, and money applied to safety research are also analyzed to make sure that the manufacturer put up a decent effort in discovering flaws and defects in their product.

A warning is mandatory if specific dangers are present to which an expert would be unaware. Commonly experts need not be warned if the products they are using are in their field of knowledge. An intermediary is required to give warning to the consumers if they have knowledge of the defects, dangers, or past accidents.

Misrepresentation of a warning can occur when the warning is downplayed or misleading. Counteractive words that describe the product safety can make the warning more inadequate than it already was, salespersons or manufacturer's detail men can also play a part in the inadequacy of a warning. Pictures, and or the appearance of safety can be also misleading by showing how safe the product is when in reality it is not safe at all. A number of circumstances can contribute to the misrepresentation of a warning on a product; it all depends on the environment in which the product is marketed.

In some cases, a warning is necessary post-sale if a dangerous defect is discovered after the product has been sold. A negligent failure to warn can also exist at the time of a sale of a product. This can be a greater liability than one of just a warning, as in cases where the product needed to be recalled or repaired.

3.7 PROOF OF EVIDENCE

3.7.1 CAUSE IN FACT

A plaintiff must show that the defect existed when the product left the defendant's position. To do this he or she has to eliminate all other causes of the defect, but while doing this cannot attribute to the defendant's case. The plaintiff need not disprove every possible alternative explanation in a strict liability action, but instead only show that the material fact to be proved may be logically and reasonably inferred from the circumstantial evidence. Often the concept of foreseeability is used to describe occurrences that can be anticipated, while proximate cause is used to describe the result of another event.

3.7.2 PROXIMATE CAUSE AND FORESEEABLE LIABILITY

In some cases, misuse of a product is not treated as a bar to recovery unless it is considered unforeseeable. Unforeseeable misuse, when applied to the plaintiff rather than a third person is closely related to negligence and assumption of risk. The fact that the plaintiff himself is guilty of criminal conduct in his or her use of a product will not necessarily bar his or her recovery on the grounds of contributory negligence or assumption of risk.

A special problem of misuse concerns the alteration of a product. An alteration that causes the accident may be unforeseeable or barring recovery unless the alteration was foreseeable because of the characteristics of the product that encourage change. Where a defendant furnishes a defectively constructed product, it is expected that the product may be defectively modified in an attempt to correct the original defect.

3.7.3 PLAINTIFF MISCONDUCT, AND COMPARATIVE FAULT

There are three types of misconduct that can lead to the plaintiff's right of recovery. They are contributory negligence, which is failure of the plaintiff to take responsibility for his or her own actions. Another type of misconduct is the assumption of risk, which is when the plaintiff knows and voluntarily confronts the danger. Misuse, which also includes alteration of the product, is the last type of misconduct this happens in the use of a product in a foreseeable or unforeseeable manner.

When using contributory negligence and assumption of risk as a defense it will be up to the defendant to provide the proof. Contributory negligence is proven with knowledge of what the plaintiff actually knew, he or she may have been aware of one risk, but not have noticed the other risks involved.

Some courts hold that contributory negligence has no defense in a strict liability action, and assumption of risk is the only viable defense. Contributory negligence cannot be part of a defense when the negligence consists merely of a failure to discover the defect in the product or failure to protect against it.

Comparative fault has been accepted throughout either the statute or the judicial decision. Comparative fault is preferred by commentators and is the method usually chosen from judicial acceptance. When the plaintiff does recover, their recovery will be proportionally reduced by the percentage of the fault that they themselves are guilty of. Where there is more than one defendant in a case the general rule is to retain joint and several liabilities in comparative fault. There are many reasons for retaining joint liability in a comparative fault case:

1. In the instances where the plaintiff is not guilty of negligence, he or she would be forced to bear a portion of the loss, should one of them prove financially unable to satisfy his or her share of the damages.
2. Even in cases where a plaintiff is partially at fault, his responsibility is not equivalent to that of the defendant. The plaintiff's negligence relates only to a lack of care for the safety of others.

3.7.4 SUBSEQUENT MEASURES

Subsequent measures cannot be admitted to prove negligence or responsibility of conduct in connection with the event. Evidence of subsequent measures is needed when proving ownership, control, or feasibility of precautionary measures if impeached. This rule helps to exclude evidence of corrective measures only if taken by the defendant after the plaintiff's injury, and it does not exclude evidence of such measures taken before the jury. This rule does not exclude corrective measures taken by anyone other than the defendant, or by a defendant after the plaintiff's accident. Evidence of subsequent

corrective measures may be admitted even in a negligence case, if offered for some purpose other than showing negligence or responsibility of conduct.

3.7.5 OTHER PROBLEMS OF PROOF

Evidence of unsafe use and of prior accidents with similar products can be admitted for purposes such as, proof towards the notice of the alleged defect by the defendant, the severity of the danger, the probable user conduct, the defendants ability to correct the defect, and also due cause.

When a person willfully or negligently disposes of product evidence, it is called spoliation. The person who disposes of such evidence may be held liable to the plaintiff for the damages they likely could have recovered before the disposal.

An expert testimony may be essential during a product liability case when trying to establish defectiveness, causation, damage, and other issues in the case, provided they have a specialized knowledge of the product in question.

4.0 ROBERTO ORTIZ VS. B.M. ROOT COMPANY, DIEHL MACHINES AND BOSHCO INC.

4.1 BACKGROUND

On September 7, 1993 Roberto Ortiz, the plaintiff, was operating a B.M. Root vertical multiple boring machine model C-311, from hereon known as the Root machine. The subject machine can be seen below in Figure 4.1. While operating this machine, Ortiz was injured. Attempting to blow sawdust from the table; Ortiz got the middle finger of his right dominant hand caught on one of the four rotating spindles. Catching his finger in the spinning drill bit caused the machine to pull the finger from his hand. Ortiz was rushed to the hospital by his coworkers.

Figure 4.1: B.M. Root Vertical Multiple Boring Machine

Roberto Ortiz had been working for Kimball Companies, Inc of East Longmeadow, Massachusetts since the month of February 1993. Before the accident, Ortiz had been working in the Wood Production Department at Kimball. One of Ortiz's responsibilities was operating the Root machine, which he did every day. The accident in question occurred while Ortiz was using the subject machine in a manor in which the

defendant, B.M. Root could reasonably have foreseen. B.M. Root is part of Diehl Machines and Boshco, Inc is the company that sold the used Root Machine to Kimball in 1972. As a result of the accident, Ortiz developed a severe depression and has had extended medical attention including psychiatric treatment.

4.2 GENERAL ACCIDENT DESCRIPTION

The following is the plaintiff's claim, as described by his statements in the deposition. On September 7, 1993 approximately between 3:00-3:30pm Ortiz was working on the Root machine. He drilled two or three sample pieces of wood and then stopped drilling. He lifted the spindles off the table but kept the machine running so that the cycle was stopped but the spindles were still rotating. Sawdust appeared to be accumulating on the table so Ortiz picked up an air hose located next to the Root machine and attempted to blow off the table. The air hose was faulty in that the lever used to operate it was broken off. Ortiz attempted to use this hose anyway by using his thumbs to depress the piston, which the lever normally activated. When this proved unsuccessful, he put on a pair of gloves so that he could gain mechanical advantage. This seemed to work better but Ortiz had to get closer than normal to the table in order to blow the dust off. Ortiz tried to angle the nozzle but lost his leverage on the hose and his hand slipped off into one of the still rotating spindles. The glove on his right dominant hand was snagged on this spindle and caused the machine to sever his middle finger from his hand.

The Plaintiff, Mr. Ortiz, is suing B.M. Root Company, Diehl Machines, and Boshco, Inc. to pay for his expenses and the loss of his finger. He believes that these companies were negligent in the designing the Root machine. He also believes that they failed to warn operators and owners of the dangers this machine imposed upon the user, and should be held responsible for injuries obtained as a result.

4.3 INVESTIGATION AND ANALYSIS

We analyzed the scenario as described by Roberto Ortiz and it was our goal to decide if the machine in question and its guarding were defective. Originally, the Root Machine made in the 1940's and 50's did not come with a guard. The machine had a

safety guard, which was installed in 1986. On January 24, 1986, B.M. Root wrote a letter to Kimball Companies saying that in the interest of operator safety they urge owners and operators of the Root machines to guard workers from the possibility of exposure to the dangerous rotating bits. Attached to this letter was an order form from which owners of Root Boring machines could purchase an aftermarket guard and many warning signs, which were to be affixed to the machines in a place visible to the operator. Taking B.M. Root's advise, which actually seems to be a warning stating that the machines are unsafe unless there is guarding in place, Kimball Companies purchased the guarding offered for the vertical multiple borers from B.M. Root on February 3rd 1986. In addition to the complete guarding set, Kimball also purchased many required warning signs and labels for the Root machine. Many of these warning signs can be seen affixed to the Root machine in Figure 4.2. According to the Occupational Safety and Health Administration, the guarding on the Root machine did not comply with federal safety standards. The standard in reference to boring machines states that:

> *Boring bits should be provided with a guard that will fully enclose all portions of the bit and chuck above the material being worked.* (OSHA Standard 29 CFR 1910.213)

OSHA had received a complaint about the machine at Kimball Companies and followed up with a letter notifying them about the status of the guarding.

Figure 4.2: The Visible Warning Labels Attached To the Root Machine

Many of the employees and managers at Kimball had felt that the guard in itself offered more of a hazard on the machine than it did off so they decided to remove it. When Ortiz was injured, the guard was not on the machine; therefore, accidental contact occurred between Ortiz's finger and the rotating bit because there was no guard in place at the time. In response to the letter of notice OSHA had sent Kimball about the guard, Gerard Desjardins the plant manager at Kimball Companies, wrote back saying that they were dealing with the guard and in order to reduce the hazard it caused they replaced the wire mesh which obstructed an operators view of the material being worked with plexi-glass to improve visibility. It was estimated that with the wire mesh the visibility was blocked more than 50%. In fact, it was reported that many minor accidents resulted from people not being able to see their work very well. In addition to the plexi-glass shield the guard was installed upside down in order to increase the distance from the bottom of the guard to the tips of the rotating bits. A safety switch was also installed on the guard which would eliminate the hazard of a "pinch-point." This switch would lower the table of the machine if a user left his hands positioned under the guard. It is important to note however that even these improvements did make operators feel safe running this machine, and it was still preferred to use the machine without any guard, as was its condition when Ortiz was injured. It is also important to note that at the time of the accident the machine was in violation of ANSI (American National Standards Institute) standard B11.8. This standard is known as the standard for machine tools, drilling, milling, and boring machines. This machine was in violation of this standard because the guard was not on the machine. In fact the expert for the plaintiff, Igor Paul, a professor at the Massachusetts Institute of Technology, is not aware that it would have violated this standard if the guard was on. He also believed that the guard, as modified by the Kimball Companies, did not present a dangerous situation. Professor Igor Paul also believes that the machine was unreasonably dangerous when operated without any guarding, but the fact of the matter is, B.M. Root explicitly stated that fact and therefore made a warning sign tiled "Safety Rules" in which was stated that an operator was not to use the machine without all guarding in position.

In addition to the guarding, the work area was equipped with a broken air gun. A broken air nozzle is really no big deal because it could be fixed in seconds by anyone working in that department. In fact, the expert for the plaintiff Igor Paul believes the air hose represents what is called a "red herring" in this case. In other words, it is merely discussed throughout the case in order to divert those parties interested from the discussion at hand. On the Root Machine was a warning sign stating that the machine should be turned off before attempting to clean off the dust, but it was common practice from the employees to leave the machine running while doing this so long as you could stay a safe distance. This warning sign can be seen below in Figure 4.3. The air coming out of the nozzle was at a much lower velocity than normal causing Ortiz to reach into the machine to clear off the chips. This resulted in a serious injury. Had the guard been on it would have prevented Ortiz from reaching into the machine. Also had there been a properly functioning air hose the chips could have been blown away from a safe distance. It is also important to note that as the plaintiff's expert witnessed a worker demonstrate how to use the Root Machine he saw him blow chips from the table. After all this is a foreseeable task that operators would have to perform. At the time of this demonstration it was not necessary for the operator to put the hose any closer than 10 inches from the rotating bit to clean the table. Actually, the guard that was on the machine at the time prevented the worker form doing so.

Figure 4.3: Safety Rules Attached To The Root Machine

On the machine, itself is a warning sign stating that gloves are not to be worn, as shown in Figure 4.4. Ortiz was wearing gloves at the time of the accident. One accident prior to 1993 occurred in which a man had one of his fingers touch a rotating bit on the Root Machine, he was not wearing gloves and as a result sustained only minor injuries.

Figure 4.4: Warning Attached To the Root Machine About Wearing Gloves

4.4 FINAL ASSESSMENT

Roberto Ortiz is primarily responsible for the injury that he encountered on September 7, 1993. There are three types of misconduct which can bar the plaintiff's right of recovery. These are contributory negligence, assumption of risk, and misuse.

Contributory negligence is defined as the failure of the plaintiff to take reasonable care for his own safety. This is clearly the situation as far as Ortiz is concerned. He reached into the machine knowing that it posed a serious hazard. Had Ortiz taken the time to replace the broken air nozzle this accident could have been prevented. He also failed to follow the warning signs located on the machine. The warnings stated that you should not wear gloves while operating the machine and that you should stop the machine when cleaning off the chips. In addition, Ortiz violated one of the most important rules that B.M. Root felt needed to be posted on the machine, that you were not to operate the machine without all guards in position. Ortiz knowingly violated these simple rules placing him in a risky situation. Thus, Ortiz is guilty of contributory negligence.

Assumption of risk is defined as the knowing and voluntary confrontation of an appreciated risk. Ortiz had been properly trained in operating the Root machine and was aware of the inherent dangers that the machine could cause. He was also aware of the procedures to follow in order to prevent injury. This awareness should have caused him to follow proper safety guidelines and the fact that these guidelines were located in plain view should have caused him to think twice about reaching into the machine. Ortiz however chose to ignore the warnings. This constitutes voluntary acceptance of the inherent dangers of the machine, and thus assumption of risk.

Misuse is the unsafe use of a product in a foreseeable or unforeseeable manner. Ortiz is guilty of this, however misuse is not normally used as a defense in product liability cases. However, had the guard been in place at the time of the accident Ortiz would not have been able to reach into the machine as easily as he did and therefore would not have been hurt. Thus by not operating the machine with all of the guarding in place Ortiz was guilty of misuse.

5. LAFLAMME VS. DAIMLER CHRYSLER CORPORATION

5.1. BACKGROUND

On October 25, 1995, Robin Laflamme was in an automobile accident in Portland Maine. Robin Laflamme was driving a 1994 Plymouth Voyager minivan. The accident occurred when Laflamme failed to stop and therefore rear-ended Teresa Booter who was driving a 1995 Geo. The statement given by Laflamme to the police at the scene was that the driver seat in her Plymouth Voyager slid back when she attempted to apply the brake, causing her foot to come off the brake and resulting in the collision. Kevin Laflamme, Robin's husband purchased the Plymouth Voyager new on July 16, 1994 from Prime Auto of Saco Maine. The Laflammes had made three recorded complaints to the dealer about the problem with the driver seat sliding unintentionally. From these reported service invoices it can be gathered that this was an ongoing problem. When the Laflammes took their minivan to the dealer for service the dealer had trouble duplicating the problem in the parking lot, and it was the policy if Prime Auto not to fix a problem if it could not be duplicated. Not only had the Laflammes complained to the dealer but also Robin Laflamme had made a complaint on October 5, 1995 to her doctor. It was read in Dr. H. M. Chase's medical report that Robin Laflamme was having pain in her upper neck, right hip and lower back. She mentioned to Dr. Chase that while in her van the seat often slid back unexpectedly, straining her in these places. It should also be noted that after many complaints Prime auto went ahead and replaced the seat adjusting parts interestingly on the day of the accident. After the accident, Mr. Gerald Byron a subcontracted consultant spoke with Robin Laflamme and stated that there was a problem and that it was being investigated.

5.2. GENERAL ACCIDENT DESCRIPTION

While traveling west, Robin Laflamme was driving a 1994 Plymouth Voyager. In front of her traveled Teresa Booter in a 1995 Geo. They were approaching a stop sign and Teresa Booter was stopping. Behind Ms. Booter Robin Laflamme failed to stop

resulting in a rear end collision. Robin stated to police that when applying the brake her seat slid to the most rear position causing her foot to come off the brake. Failing to stop the accident occurred. See Figure 5.1 for a schematic of the accident.

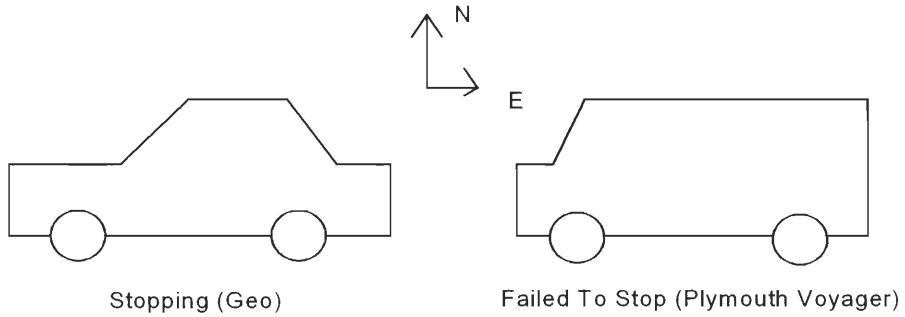

Figure 5.1: Schematic Of Accident

5.3. GENERAL INFORMATION AND STANDARDS

The course of events in this case involved many people. Described herein are a few of the most important contributors to the investigation of the 1994 Plymouth Voyager minivan seat. Also mentioned are the standards both Federal and Chrysler to which the seat adjusting mechanisms must adhere to.

Mr. Gerald Byron is a self-employed consultant. He works for Byron Associates, which is a subcontracted company of Engineering Analysis Associates. Mr. Byron is hired by the dealer and not by the automotive company itself. He has come across seat-sliding problems before on both Ford and General Motors vehicles but never before encountered them in Chryslers. Robin Laflamme had mentioned to Byron the fact that her lower back was bothering her and that she had gone to a doctor informing him about the seat sliding back. Chuck Briggs the manager of Prime Auto mentioned to Byron that the van had come in with complaints of a seat-sliding problem and that they could not duplicate the problem. Byron and Briggs looked at the car together and Byron discovered from his evaluation that there was a problem with the seat adjusting mechanism in that it would not lock in properly. He found that the problem could be

duplicated quite regularly. His procedure was to take turns with Chuck Briggs at the dealership, accelerating rapidly in the parking lot. As a result, from the hard acceleration the driver seat would slide back to the most rearward position. This happened several times. First, they would get into the van, and adjust the seat. They would then wiggle the seat to make sure that it was "locked". Then they would accelerate rapidly and the seat would slide back, all the way back in several instances. Byron determined that something was definitely wrong with the seat. While at the dealership Byron had one of the service men look up in Chrysler's database any problems that mentioned a seat sliding back. They did not find any that explicitly mentioned this action but they did find one in which it was stated that one side of the adjusting mechanism would not latch completely and consistently. In the Technical Service Bulletin found, the fix for this problem was to file the floor pan mounting holes such as to elongate some of the holes. The Technical Service Bulletin found numbered 23-23-94 applied to Dodge Caravans and Plymouth Voyagers from 1991-1994, and was dated March 18, 1994. Nowhere in this Technical Service Bulletin did it mention that the seat would slide back. They also discovered that there were other Technical Service Bulletins stating the same thing about the adjusters not latching, which applied to earlier vans of the same model. One of these was Technical Service Bulletin number 23-32-93.

It is interesting to note here on some chronology. Technical Service Bulletin number 23-23-94 was released on March 18, 1994. The van was sold on July 7, 1994. And the accident occurred on October 25, 1995. It seems as though the problem should have been fixed way before this accident occurred.

Mr. Joseph Ozdowy is an employee of Daimler Chrysler Corporation. At the time that the 1994 Plymouth Voyager was being produced, he was the Director of Manufacturing for the Windsor Ontario Plant. Basically, he was in charge of creating the proper processes that are required to build a vehicle. His job entailed auditing these processes to ensure that a specific procedure was followed for the manufacturing process. At the Windsor Ontario Plant, their specialization was in the production of minivans. The first time that Ozdowy was introduced to the seat movement problem was in March of 1993. He first became aware of the problem do to a customer dissatisfaction complaint. He found out that one side of the seat adjusting system would not latch

completely, so he began testing seats at the plant. He would go to the end of the production line and sit in the vehicle. Then he would adjust the seat and try to lock in place both the inner and outer mechanisms. He found by sitting in the seat that is was necessary to twist one's body in order to get the second adjuster to latch. At first thought, Ozdowy hypothesized about whether someone had installed the wrong parts. Therefore, from this point Ozdowy had to follow Chrysler's procedure of determining the root cause of this latching problem. He went to the process in which the holes in the floor pan were made to attach the seat. This procedure was done using a punching machine, which would punch the two inboard holes and then the two outboard holes. This same machine was used from 1991 to 1994. The adjusters themselves were eliminated as being the potential problem when it was discovered that by adjusting the holes the problem could be fixed. From Ozdowy's evaluation of the hole punching process Chrysler issued a 100% audit and repair procedure at the end of the production line. Ozdowy stated that if the Safety Office had called him and mentioned a safety concern about the seats then he would have halted production until the problem was isolated and fixed, and since there was only mention of a "customer dissatisfaction issue", and not a "safety issue," he continued the process. In his testing of the seats, he did not include an acceleration or braking test at this time. After receiving more complaints about the seat condition, Ozdowy discovered that the process of realigning the holes, which he conducted, was not satisfactory and so he began testing the condition under acceleration and braking. He discovered that his auditing procedure was not solving the problem. He changed the procedure of putting the holes in the floor pan from all being punched to punching only the two inboard holes and manually drilling the two outboard holes. He then implemented a quality control procedure, which verified the holes 100%. As of July 14, 1993, the plant had already produced 100 vehicles, and not one of these 100 vehicles was released until every one of them was "fixed" using the procedure of elongating the floor pan holes, which is outlined in the Technical Service Bulletin number 23-32-93. During Ozdowy's new procedure for making the holes in the floor pan body-in-white engineers verified the holes every two hours, at least ten to twenty vehicles would not be inspected between these two hours intervals.

Another important person involved with the seat problem in the 1994 Plymouth Voyager minivan was Mr. Dan Dammar. Dammar at one point in his career was a safety test engineer for Ford Motor Company. Now he works for Daimler Chrysler as a specialist in the product analysis group. He mentioned that 80% of his work involved six to seven cases dealing with minivan seats. None of which he stated dealt with the sliding back of a seat. He was aware of the fact that the current equipment used for making holes in the floor pan of minivans was not adjustable. Because of this machine, a problem was detected on vehicle models P655H and P657H. He found that if the outboard side, the side with the lever, did not latch completely then it kept the inboard side from latching securely. He also believed that the term "ratchet back" meant that the seat would incrementally move backward and not slide smoothly.

In addition to the many people and engineers involved in this case there are as in every case standards to which certain parts of a product must comply. In this investigation, we are obviously concerned with the driver seat of the 1994 Plymouth Voyager. There are many standards to which the automobile seat must adhere too, both Federal and Chrysler's own engineering standards. Still a very broad list of standards apply to the seat of a motor vehicle, so we have narrowed down the most important standards which apply to the seat and its adjustment.

First and most importantly, the seat must comply with Federal Motor Vehicle Safety Standard 207. This standard deals with the seating system. This standard establishes requirements for seats, their attachment assemblies and their installation. The purpose of the standard is to minimize the possibility of failure of the seat system. The standard states that:

> *Once engaged the restraining device for a forward facing seat must not release or fail when a forward longitudinal force, in Newtons, equal to 20 times the mass of the hinged or folding part of the seat in kilograms, multiplied by 9.8 is applied through the center of gravity of that portion of the seat.* (S4.3.2.1.a)

Another Federal standard to which the seat of a motor vehicle must adhere to is Federal Motor Vehicle Safety Standard 207 section number S4.3.2.2. This standard states that:

> *Once engaged the restraining device shall not release or fail when the device is subjected to an acceleration of 20 g's.* (S4.3.2.2)

In addition to these federal standards, Chrysler developed a set of their own safety standards. Many of these standards developed by Chrysler are the same as the federal

standards, specifically Chrysler Performance Standard PF4814. Standards that Chrysler developed besides ones which are similar to federal standards are Chrysler Performance Standard number 6. This standard states that:

> *The latching mechanism must engage positively without hesitation and in a consistent manner without any external force other than the latch return spring.*

The purpose of these additional standards is to ensure product integrity. Also Chrysler developed a Manufacturing Assurance Standard Safety and Emissions which states that when dealing with Front Seats of an automobile then they must:

> *Check the function of seat systems installed with manual adjusters.* (MASSE 1.c)

All of these standard are developed for the safety of the operator and the integrity of the product being manufactured. It will be investigated whether the seat in the 1994 Plymouth Voyager complied with these standards.

5.4. INVESTIGATION AND ANALYSIS

From the materials provided and our own measurements, we have performed an investigation of the 1994 Plymouth Voyager minivan. All of the aforementioned people involved in the case have contributed to our investigation from there testimony in depositions.

First, we looked at the chronology of the events and publications that led up to the accident. We noticed that the first Technical Service Bulletin number 23-32-93, which was published regarding the inefficient latching of the seat adjusters, was made available May 14, 1993. The second Technical Service Bulletin number 23-23-94 was made available March 18, 1994. The publication of these two Technical Service Bulletin on the same exact problem rises to suspicion of whether or not the problem was actually fixed. It seems as though it was ignored. Next, we looked at the date of purchase of the Plymouth Voyager. Kevin Laflamme bought the van on July 16, 1994. Then we looked at the date of the accident, which occurred on October 25, 1995. It seemed to us the problem must have been fixed do to the fact that these Technical Service Bulletin's were available well in advance of the automobile's purchase, never mind before the accident occurred.

Secondly, we considered the testimony given by all the consultants and engineers involved in the case. Mr. Gerald Byron gave his opinion that during his evaluation of the

seat he discovered that there was a problem and it was that the seat adjusting mechanism was not locking properly. Mr. Joseph Ozdowy found the same problem with the van's seats as they were coming off the production line. He initiated a fix for the problem that he believed resolved the fact that the holes were not square in the floor pan. A Coordinate Measuring Machine that found them to be three to three and a half millimeters off square verified the fact that the holes were not square in the floor pan. Mr. Ozdowy identified the fact that the holes were not square as the root cause for the adjuster not latching securely. He identified the machine making the holes in the floor pan to be faulty in that it made holes that were not square. Because of Mr. Ozdowy's investigation Daimler Chrysler issued a 100% audit and repair procedure at the end of the assembly line. Ozdowy also stated that the problem was only occurring at the Windsor Ontario Plant, as he was not aware of any problem of this nature occurring at the St. Louis Plant, the other plant whose primary production was 1991-1995 minivans. Mr. Dan Dammar also verified the fact that there was a problem detected on vehicles P655H and P657H, and this was do to the fact that the current equipment being used to pierce the holes in the floor pan was not working properly. In addition, as did all of the other investigators involved, Dammar attributed the unsecured latching to the root cause of the holes being out of square. The inboard latch did not securely fasten the seat in position once adjusted. The Laflammes had the same model van that Dammar identifies here with a problem.

One engineer who was not mentioned before worked as a Safety development Engineer on the Chrysler Minivan Platform. Mr. Mark Crossman focused on aspects of vehicle development when he worked in this department at Daimler Chrysler Corporation. In 1993 he became aware that the Chrysler minivan seat moved forward during frontal flat barrier crash tests. The results of a crash test occurring on April 21, 1993 were reported in the Chrysler crash test VC4822. The results herein stated that during the test the front driver seat manual adjuster released allowing the seat to move forward to its most forward position. This allowed the crash test dummy's knees to collide with the dashboard in the minivan. The impact results from the test dummy's femur were much higher than expected. As a result, the test was considered unsuccessful. After the test it was discovered that the current seat adjusters for the driver

side were not current production level. Mr. Dan Turkovich a member of the Seat Engineering Group "apologized" for the failure and suggested that to prevent this sort of thing from happening they needed to "Scrap all old adjusters." The root cause of this was identified and it was do to the holes in the floor pan not being square. This was not something that the Seat Engineering Group had expected, for the femur load did not comply with Federal Motor Vehicle Safety Standard 208. Mr. Mark Crossman stated that he "would not design a vehicle, and we as a company would not design a vehicle to have seats shift during crashes."

Additionally, there was a Minivan Issue Tracking System Detail Report issued #86818, which reported the minivan diver side seat as not fully engaging when adjusted. Resulting, the seat "ratchets" backward when the vehicle is moving forward. This problem was detected on vehicles P655H and P657H, one of which was the same model that the Laflammes owned. The purpose of a Minivan Issue Tracking System Detail Report was to identify issues prior to the deployment of a new minivan. These results were to be filtered back to the Engineering Department to make them aware of the condition.

While much of this gathered information was complete in isolating the problem with the 1994 Plymouth Voyager, we conducted our own physical investigation of the seat and the vans floor pan. It can be seen in Figure 5.2 below how the inboard adjuster would look when not fully engaged.

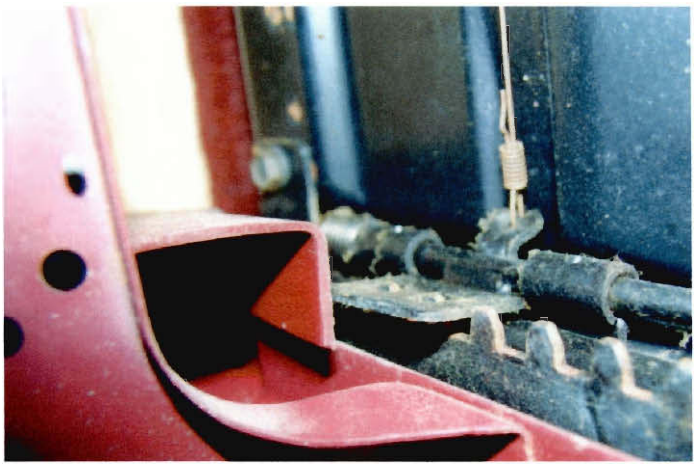

Figure 5.2: Adjuster Not Fully Engaged

This investigation was done on a 1994 Plymouth Voyager seat and floor pan. The extracted seat and floor pan are from the same make and model as the Laflamme's

minivan. Below in Figure 5.3 it can be seen how the adjuster would look if it were fully engaged, or securely latched.

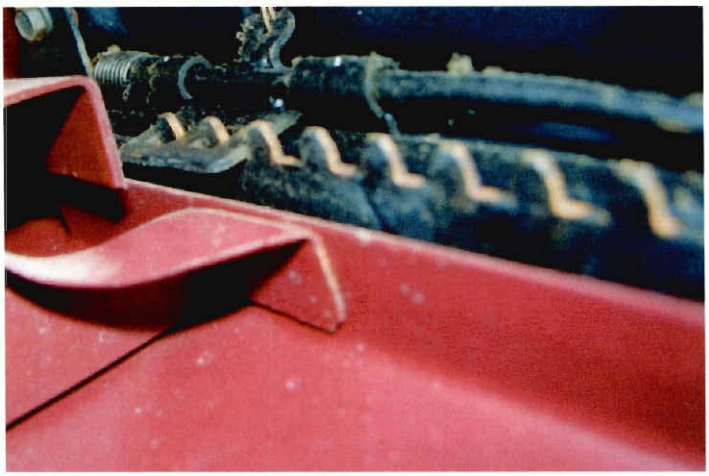

Figure 5.3: Fully Engaged Adjuster

Now that we had an understanding of how the adjuster behaved and what was meant by engaged and not engaged we decided to investigate the accusation of the holes not being square. The holes in the floor pan are identified in Figure 5.4 below.

Figure 5.4: Four-Floor Pan Hole Marked By Red Arrows

Upon measuring with a tape measure, we found the holes in the floor pan to be one sixteenth of an inch off square. This was done without using precision equipment such as a Coordinate Measuring Machine. One can only assume that the results would have been

more accurate had we access to such a device. However, with the simple measurement we were able to verify that the holes were not square just as many of the previously mentioned engineers had stated. For a schematic of our recorded measurements, see Figure 5.5 below.

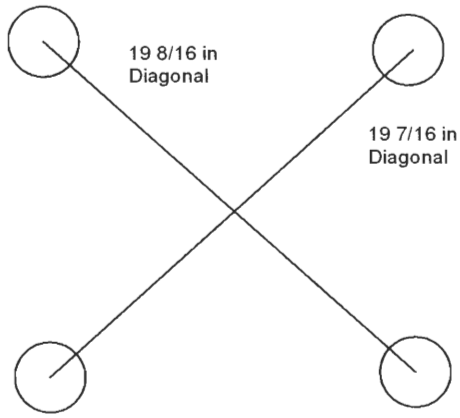

Figure 5.5: Measurements Taken On The Floor Pan Holes

5.5. FINAL ASSESSMENT

From a thorough investigation of the case materials and a physical floor pan and seat of the same make and model minivan, we have drawn some reasonable conclusions. It seems clear from the material presented that the defendant Daimler Chrysler Corporation is at fault for the accident in which the plaintiff Robin Laflamme was involved on October 25, 1995. The fact that the engineers from Daimler Chrysler had identified the root cause for the malfunctioning seat adjusters was a foreseeable and preventable manufacturing defect. This production defect could have been fixed properly after being discovered. Daimler Chrysler knew about the holes and they knew that the fact they were not square was causing a problem. The problem should have been fixed before any of the vehicles were available to consumers. Instead of trying to fix the problem in their production, they tried to fix it once all the vehicles were manufactured with the deflect. Since the problem was inherent in many of the Plymouth Voyagers from 1991 to 1994, they had enough time to redesign the process and if need be the seat mechanisms themselves. As a comment, why hadn't their Manufacturing Assurance Standard Safety and Emissions standards called also for a check on the latching reliability

and not just the function of the adjusters themselves? The design of the seating system in the 1994 Plymouth Voyager was tested in crash test in which the vehicle failed because of the femur results on the crash test dummy. The fact that the system was not redesigned so that safe and reasonable results were obtained is the negligence of the Daimler Chrysler Corporation. They offered a vehicle to consumers, which had known defects in design and manufacturing. Had Daimler Chrysler accepted the expense of fixing the problem's source completely then Robin Laflamme's accident would not have happened. Daimler Chrysler violated both their own and federal safety standards when they decided to keep producing the Plymouth Voyager with these know defects. They violated their own Chrysler Performance Standard number 6, which stated that:

> *The latching mechanism must engage positively without hesitation and in a consistent manner without any external force other than the latch return spring.*

Had this standard been met then this accident would not have occurred. The Federal Motor Vehicle Safety 208 was violated when the crash test dummy's femur experienced a load over the allowable limit. This violation was the negligence of Daimler Chrysler because they had the unsuccessful results and yet they chose not to fix the problem.

6. HEATH VS. VERMEER MANUFACTURING COMPANY

6.1 BACKGROUND

On April 1, 1996, the plaintiff, Michael Heath was injured on the job while working with a tree spade in Deerfield, Massachusetts. At the time he was under the employment of Stewarts Nursery. This accident occurred during the routine operation of "The Diggin' Dutchman TS-40S" tractor style tree spade. (Model #485, Serial #338) Mr. Heath was assisting the operator of the machine when his left hand was caught in a pinch point as spader blades were being raised. He was rushed to the hospital, and because of this accident, a portion of his left hand was amputated. The Vermeer tree spade is a roughly square structure with four blades in the corners. The spader attachment can open and close in order to rap around a tree for the purpose of digging it up and re-planting. During operation, a small tree is placed in the center of the spader. The four blades move down together by a hydraulic actuator. Piercing the ground, they engulf the root ball of the tree. The operator manipulates the controls so that the spader is lifted in order to remove the tree from its planted location. The tree is then lowered into another hole or basket depending on its intended use. Vermeer Manufacturing Company is a foreign corporation with its principle place of business located in Pella, Iowa. The plaintiff Michael Heath alleges that Vermeer was negligent and careless in the design, manufacturing, selling and distributing of the tree spade. The plaintiff also accuses Vermeer of negligence for failing to warn him about the foreseeable dangers of the machine. The model TS-40S was manufactured and sold from 1985 to 1989. In the design of the machine, Vermeer places the area where Heath was injured higher than a foreseeable zone of reach. In addition, while testing the machine Vermeer could not foresee the combination of concurrent actions that are required to bring about the described hand injury. The man who is primarily responsible for product safety at Vermeer is Mr. Ivan R. Brand. Ivan Brand is the product safety manager for the Vermeer Manufacturing Company. It is his opinion, that the location of the pinch point is out of the reach of the 95^{th}-percentile person, and therefore there is no way for inadvertent

contact to occur. The Diggin' Dutchman model number TS-40S can be seen in Figure 6.1 below.

Figure 6.1: "The Diggin' Dutchman" In Operation

6.2 GENERAL ACCIDENT DESCRIPTION

According to Michael Heath, at the time of the accident he was standing in front of the machine with his right hand on the trunk of the tree. He was holding the tree with his right hand to keep it up straight while putting it in the basket. As the spader blades were retracted, his left hand was on top of the blade. The blade approached the top of its stoke and Mr. Heath's hand was caught in the pinch point between the spader blade and the frame. After realizing that his hand was caught, he got the attention of the operator so that the blades could be lowered. While the operator was digging the tree, Mr. Heath was the tree handler. The tree handler centers the tree such that it can be accurately placed in a basket for storage and transportation. Once the tree is centered, the tree handler is supposed to move away. In accordance with Heath's statement, the tree was being lowered by the operator while he was standing on the ground holding the tree. Heath claims to have been on the ground outside of the square platform when the accident occurred. The person operating the tree spade was raising the blades so that the tree would fall off into the basket placed underneath. At the time of the accident, Heath

said that the bottom platform was two and a half feet off the ground, and that he was not standing on any part of the machine. He also says that he was aware of the pinch point but was unaware of the placement of his hand at the time of the accident. He claimed that he did not realize that his hand was moving up with the blade because he was concentrating on centering the tree. The pinch point that Michael Heath's hand came in contact with is at the top of the tree spade's towers. The pinch point can be seen below in Figure 6.2.

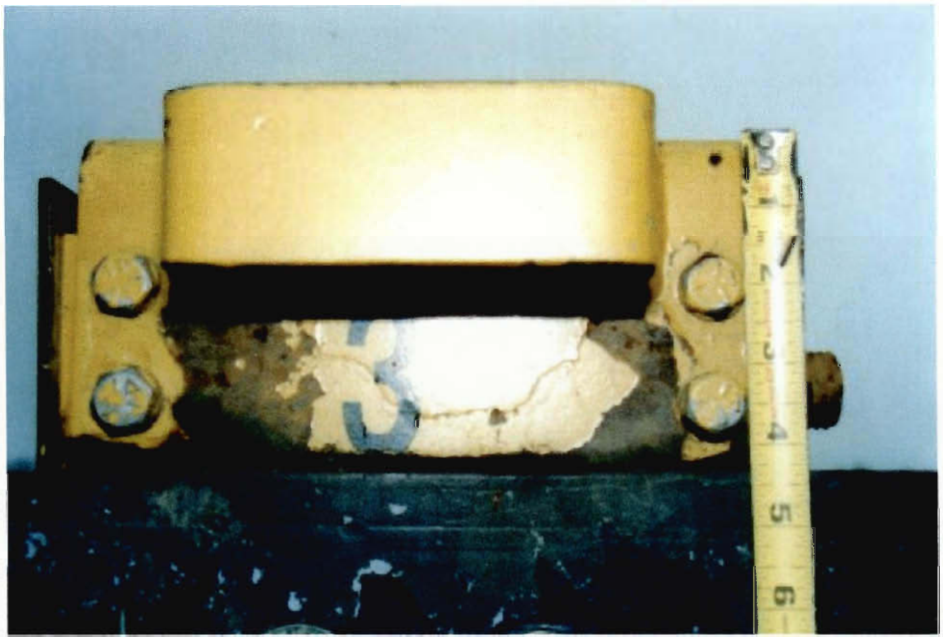

Figure 6.2: Pinch point On Top Of The Machines Tower

6.3 GENERAL INFORMATION AND STANDARDS

There are many important details and standards, which apply to this case. First, it is the opinion of the plaintiff and Wilson Dobson, the expert supporting the plaintiff's claim, that the pinch point could have been eliminated in many ways. The first way would be to prevent the blades of the spader from reaching the part of the tower that creates the pinch point. The design could have been altered so that there was a space left between the blade and the tower. Another option would be to use a proximity-warning device to alert the user of the present danger. Dobson also believes that the user could have been alerted to the danger of the pinch point by placing a warning sign, which illustrated its hazard.

According to Vermeer, the operator's manual provides sufficient information about the safe use of the tree spade, and how to avoid foreseeable dangers. Within the operator's manual, it states the instructions that demonstrate how to properly prepare a tree to be put in a basket. The instructions state that the tree handler should stand behind the tree spade near the gate lock and steady the tree as needed. The instructions also state the tree handlers should keep all hands and feet away from moving parts. In fact, there is a warning sign posted on the machine's tower that makes clear the dangers present and how to avoid them. One such warning sign can been seen in Figure 6.3 below.

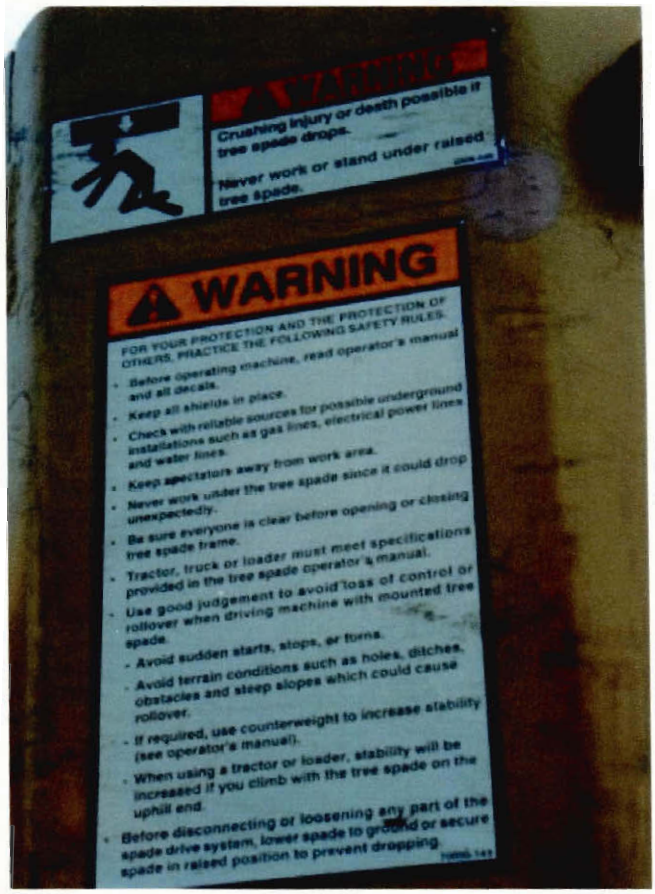

Figure 6.3: Warnings And Precautionary Instructions

The proper and everyday use of the tree spade was demonstrated at Stewart's Nursery in a video taken by Ivan Brand. During his inspection, Ivan Brand had a tree handler demonstrate how the machine was used and how the tree is placed in a basket. The video shows how the machine was intended and designed to operate. Below in Figure 6.4 the worker is demonstrating how the basket is used. He is being cautious as to stay clear of all moving parts.

Figure 6.4: Basket And Machine Demonstration

As you can see, the machine's blade tips are just above the ground and the base of the machine's platform is approximately two and a half feet above the ground. This demonstration describes the intended use of the tree spade. Michael Heath was allegedly performing the same task when he was injured.

The standards, which apply to the Vermeer tree-spading machine, are ANSI standards, specifically the ANSI Standards for Mechanical Power Transmission Apparatuses. The standard explicitly states the general requirements for safeguarding hazards on a mechanical power transmission device such as the tree spader. It affirm that:

> *All motion hazards associated with the operation of mechanical power transmission apparatuses shall be eliminated by design of the equipment, or protection by a guard, safe distance or safe location.* (ANSI Standard B15.1-1984 section 3)

According to ANSI standard B15.1-1984, guarding by safe distance can be accomplished by placing the hazard out of foreseeable reach. The standard describes that the hazard must be at an elevation of sufficient height above the floor or other working surface. In this case, the mechanical power transmission apparatus is the reciprocating blade and stationary tower that provides the digging ability required to pull up a tree from the ground. This mechanical power transmission device should be at least 96 inches above the surface to be considered as safeguarded by distance or location. Guarding by location

is a valid way of safeguarding. It will be our job to determine if the pinch point on the Vermeer model TS-40S is at sufficient height above the tree handler's reach. ANSI standards are the most universally applicable standards for safeguarding mechanical equipment.

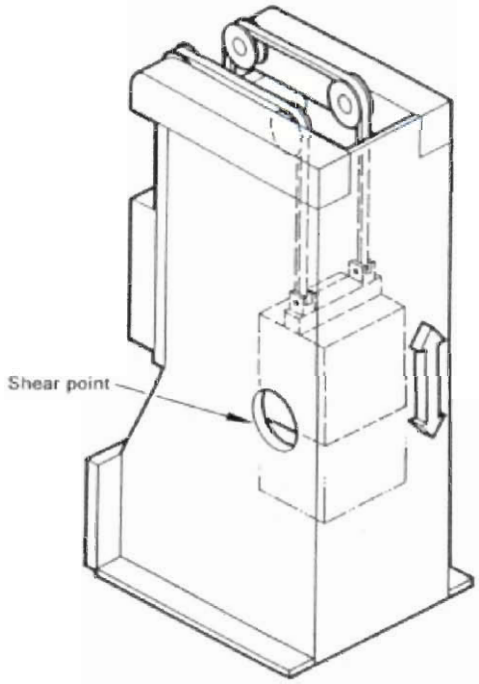

Figure 6.5: ANSI Reciprocating Motion Figure

In the figure above, there is a point that has potential for sever injury. Such point is call a shear point or pinch point. This point is to be guarded, eliminated by design, or placed in a location such that no one can have inadvertent contact resulting in injury. This point is similar to the pinch point created by the tree spade blade and the tower.

In addition to ANSI standards, OSHA (Occupational Safety and Heath Administration) has standards that apply to this case. According to OSHA document number 3067:

> *To safeguard a machine by location, the machine or its dangerous moving parts must be so positioned that hazardous areas are not accessible or do not present a hazard to a worker during the normal operation of the machine.* (OSHA 3067)

It is our job to determine if the Vermeer tree spade presents a danger at any point to the operators during normal operation. The normal operation is demonstrated by Ivan Brand's video inspection of the tree spade.

6.4 INVESTIGATION AND ANALYSIS

During our investigation of the case materials provided we discovered many details. We witnessed the normal operation of the Vermeer tree spade, subject in this case, through Ivan Brand's video demonstration. According to Ivan Brand's deposition the pinch point in question was out of reach if the plaintiff was doing his job from the ground as he said he was. Michael Heath is 5'10" and according to Ivan Brand, the distance from the ground to the pinch point is 94". There is no possible way that Michael Heath could have had his hand crushed in the top of the spader if he was standing on the ground. The height of the pinch point is just to high for his reach. Figure 6.6 shows the height requirement needed to reach the top of the spader's blade.

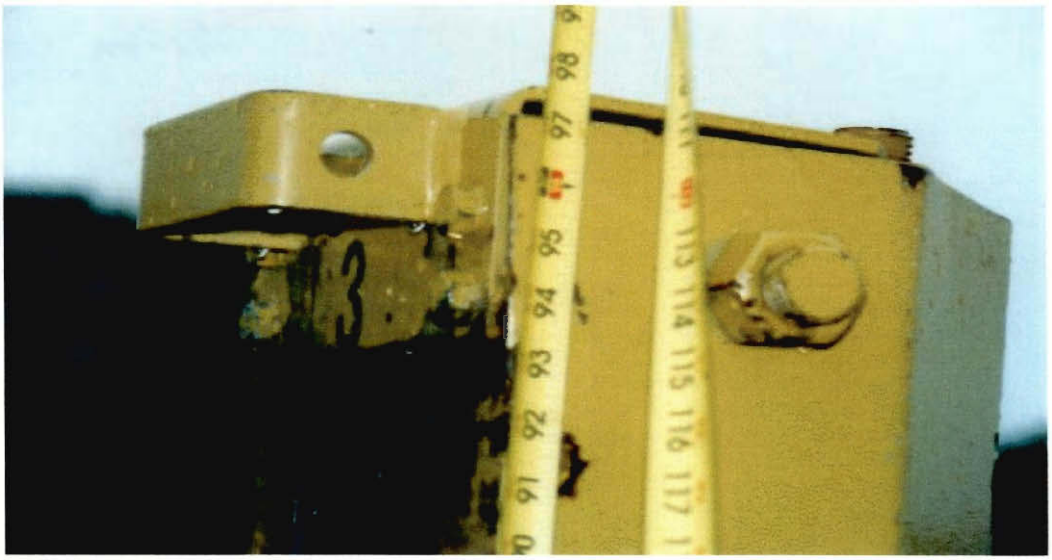

Figure 6.6: Shows The 94" Needed To Reach The Pinch Point

In the design of this machine, Vermeer looked for places that presented a danger to people working with this machine. As part of the safety analysis conducted by Vermeer, the location of the interface of the blade and the frame was found to be out of reach during any kind of work where tree handlers could be foreseen around the machine. Vermeer believed that the pinch point in question was guarded by a safe distance, and they felt that this method was more than adequate. The location of this point is out of reach for 95% of the human population, and therefore there is no way for inadvertent contact to occur. It is just too high, you would have to climb up on the machine and stand on the platform in order to reach the interface between the blade and frame. When the platform is placed flat on the ground the height requirement to reach the top of the

frame is only 77" and although this is not an acceptable distance no secondary operator is suppose to be anywhere near the machine at this time. According to Vermeer's Operator's Manual, the only acceptable time when a secondary operator should be present is when the root ball is being knocked flat on the bottom. The orientation of the interface is also designed to account for inadvertent contact. The interface is orientated so that you would have to bend your arm around the frame in order to encounter the pinch point. In other words, the pinch point is not facing the worker, but it is inside the machine's frame. If you look at Figure 6.7 below you will notice that you cannot see the interface of the blade and the top of the frame from the front view.

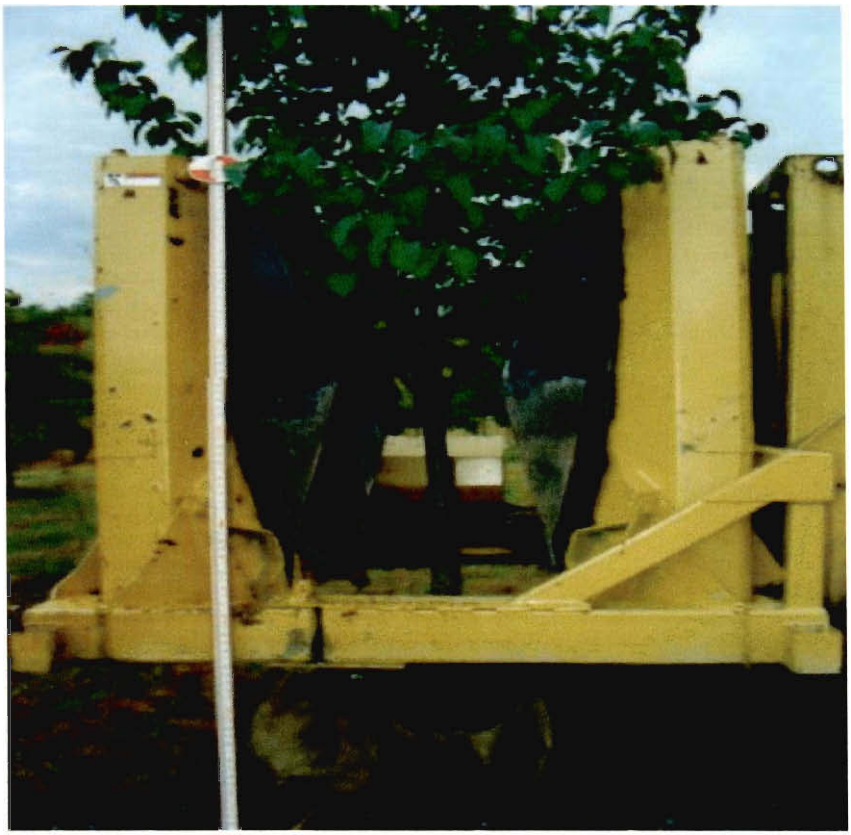

Figure 6.7: Front View of Tree Spader

This is how Heath would have seen the machine had he been standing in front and on the ground as he stated. The interface that causes the pinch point is literally inside the machine, and the only way Heath could have crushed his hand in that location would be if he were on the machine or even the root ball of the tree. You will also notice that the pinch point is indicated by the red marker on the measuring pole, this marker was placed at 8'.

6.5. FINAL ASSESSMENT

It is our conclusion that this accident was not the fault of the defendant, Vermeer Manufacturing Company. We feel that the safe distance guarding was more than enough to protect the worker from danger. Mr. Heath was working around the machine in a way not intended by the Operator's Safety Guidelines. Although Dobson disagrees with safe distance guarding, and thinks it is "bogus" we believe that the pinch point was high enough where the average man could not inadvertently contact it. Figure 6.8 shows a man of average height trying to reach for the interface between the blade and the frame. The position of the machine in this figure is the same as when the accident occurred, and if you notice the man in the picture cannot reach the pinch point.

Figure 6.8: Demonstrating The Reach To The Height Of Pinch Point

We do however agree with Dobson's ideas on how this machine could be improved. Preventing the blades from reaching the top of their stroke is a good design concept. However, this design was not implemented and the improvement would not have contributed to preventing the accident. The evidence supports the conclusion that there is no possible way that Mr. Heath could have reached the pinch point if he were standing on

the ground. Heath is clearly being untruthful as to how he states the accident occurred. Mr. Heath is 100% responsible for the accident, which occurred to him while working at Stewart's Nursery. There are three types of misconduct which can bar the plaintiff's right of recovery. These are contributory negligence, assumption of risk, and misuse.

Contributory negligence is defined as the failure of the plaintiff to take reasonable care for his own safety. This is clearly the situation as far as Michael Heath is concerned. Heath was aware of the pinch point and the danger it imposed, as he stated in his deposition. He chose to somehow ignore the warnings that were present on the machine and that is why he became injured. Whatever Heath was doing, he was not acting in the way that he described the cause of his injury. The video demonstration presents the normal operation of the spader, and no one was injured or even put in danger during that operation. The pinch point was shown as unreachable while the tree handler stood on the ground. Therefore, Heath is guilty of contributory negligence for in turn he caused his own accident.

Assumption of risk is defined as the knowing a voluntary confrontation of an appreciated risk. Heath had used this machine before and from his varying interaction with this machine throughout the years, his awareness should have caused him to follow proper safety guidelines. Heath however chose to ignore the warnings presented on the machine. This constitutes voluntary acceptance of the inherent dangers of the machine, and therefore assumption of risk.

Misuse is the unsafe use of a product in a foreseeable or unforeseeable manner. Heath is guilty of misuse, because as the normal operation video demonstrated, there was no possible way for the pinch point to inadvertently be exposed to the tree handler's hand. He was doing his job in a way which violated the instructions and warnings posted in clear sight on the machine. For if he were following the warnings he would not have been injured. Heath is guilty of misuse, however misuse is not normally used as a defense in product liability cases.

7.0 The Mock Trial

To conclude our Interactive Qualifying Project, a mock trial was held for the three cases:

Robert Ortiz Vs. B.M. Root Company, Diehl Machines, and Boshco Inc

Laflamme Vs. Daimler Chrysler Corporation

Heath Vs. Vermeer Manufacturing Company

These matters of litigation were presented before a jury, made up of our student peers. Each IQP group decided whether to support the defendant or the plaintiff in each of the three cases. Then each group presented their side of the argument to the objective jury.

The presentation took about 3 hours to complete. In the end the jury laid down the following verdicts:

In the case of Roberto Ortiz Vs. B.M. Root Company, Diehl Machines, and Boshco Inc, the jury found that the B.M. Root machine was not defective and that Robert Ortiz contributed to his own accident. They awarded him no money. The actual outcome of this case was that it settled out of court for an amount of $80,000, of which Boshco paid $10,000.

In the Laflamme Vs. Daimler Chrysler case the jury did indeed find the mini van seat to be defective, and that Robin Laflamme did not contribute to her own accident. She was awarded $100,000 to be split up 70%, 30% respectively between Chrysler and the dealer, Prime Auto. The actual outcome of this case was that it settled out of court in favor of the plaintiff, the award was kept secret.

In the case of Heath Vs. Vermeer Manufacturing the jury found that the tree spade was not defective and that Michael. Heath did in fact contribute to his own accident. They agreed with the opinion that Heath's account of the accident was untruthful, and they awarded him no money. The actual outcome of this case was that it settled out of court for $80,000.

This project provided an introduction to the general workings of product liability law, and basic notions of product safety. It allowed us to experience the inner workings of a trial and how to go about running a smooth and successful product liability investigation. As a result, the project presented us with a rewarding and useful engineering experience.