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PRODUCTS LIABILITY

An Interactive Qualifying Project Report

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by

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Abstract

The purpose of the following Product Liability Interactive Qualifying Project Report is to present our conclusion of three liability cases using the analysis of the law accompanied by our engineering knowledge. We concluded that engineering plays just as big a role as law in product liability cases. We show the facts of the cases and descriptions of parties involved, while including our engineering background provided by Worcester Polytechnic Institute and law provided by the books: An Engineer In The Courtroom and Products Liability In A Nut Shell.

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An Engineer In The Courtroom

By: William J. Lux

A Summary

The following is a summary of An Engineer In the Courtroom. This is meant to pass on the main themes and ideas of the book. By condensing the thoughts of the author, we are able to focus on the main objectives, which are to give information on the litigation processes involved with product liability and accident cases. Not only does the book give a preview of what may happen in a courtroom; it also sheds light on what can be done to avoid such a situation.

During the career of an engineer, many problems can come about. A design can be rejected, specifications changed, projects can run out of money, and in the worst scenario, a court case can occur. Without the knowledge of what to do, or even expect, in the courtroom one can be at a huge disadvantage. In this book we are shown what might happen in a liability case and what can be done to avoid them.

When looking at the design of a product, the engineer must think of who will be involved with that product. For instance, the owner may want a machine that can clear three acres of forest in a day, while it is only practical to clear two. Still, an operator may only be able to run the machine for so many hours a day at such a rate that only one acre is feasible. For this reason, compromises must be made in the design of a product. The following is a list of what an engineer should be looking at while an item is being designed.

- Must meet owner expectations as much as possible
- Should not be unreasonably dangerous
- Should not be grossly defective
- Should warn of unexpected dangers to operator
- Should be made to expectations
- Should not be misrepresented
- Should have proper instruction

By paying attention to the above statements, the engineer can avoid accidents, problems with the owner/purchaser, and make an efficient and effective product. If one or more of

these are not addressed or ignored, problems can arise. Solving these problems is the next goal of the engineer.

The first step to resolving a conflict between an engineer and other party is to try and avoid the problem altogether. By designing for possible accidents that can happen the engineer can make those accidents less severe and therefore make the resulting injuries, if any, non-serious. By placing warning labels on let's say a grading machine used in construction, the designer can protect the operator from accidents by making sure the operator knows the limits of the machine. Also, equipment should be furbished with all necessary instruction manuals and the owner at the least and all operators of that equipment should read these. This insures that if an accident occurs during misuse of the machinery, the designer cannot be held accountable. The designer, however, should not overdue these instructions and warnings. If there are twenty warnings on a machine an operator is less likely to pay attention to them than if there were only two warnings. A backup warning beep should only should when the machine is backing up, not whenever it moves because the "warning" would not alarm anyone. All of these steps can help an engineer design to "avoid the accident" but if one takes place, there can be other things the designer can do.

If, say, a grinding tool is being used to shave a piece of metal, some kind of shield should protect the operator form flying metal shavings. In automobiles, airbags have increased the safety of the vehicle during collisions. Both of these are examples of how an engineer can look ahead to possible accidents that may not come from faulty machinery, bad design, or operator error. These "accidents of chance" will occur and the engineer should do as much as possible to protect against these if they cannot be avoided.

When all of these measures fail, the involved parties will want to hold someone accountable. Since in most cases, the person will not blame themselves, the next likely candidate would be the designer or manufacturer of the equipment. By taking the responsible party to court, someone is looking for redress for damages suffered. Whether this is money, replacement of lost goods, or other means is up to the plaintiff. Sometimes the plaintiff's decisions of what to seek, and who to seek it from, comes from who can afford it; whoever has the "deepest pockets". By bringing in different types of independent researchers can help learn how a products failure will be perceived. These different viewpoints can also help design the product for different people who think in different ways. Although a design can never be perfect for everyone who is going to use it, the designer can try their best to conform to the wants and needs of everybody.

Again, an owner probably wants to have a product that can do the most work in the least amount of time, but an operator probably wants something comfortable and workable. By balancing the following aspects for designing a machine, the engineer should be assured that all parties would be satisfied with the product.

- Owner specifications
- Performance
- Reliability
- Serviceability
- Costs
- Safety

As Doctor James O'Toole asked, how fun is efficiency? While a product might be the fastest on the market, operators might have difficulty using it, or may come to dislike using it. This would lead to the product becoming inefficient and therefore a burden on the owner. By attempting to make a compromise and design a machine that is easy to work with but also does a good amount of work, is the best way to go. A designer that can consistently do this will gain acclaim and praise from all parties involved with that product. Again, by failing to comply with the initial specifications, or to make a product that is inherently poor in design and productivity, a lawsuit may come about. Knowing what will happen and how to react can be a huge advantage on the part of the defendant and may even lead to a favorable decision at the resolution of the conflict.

In the first steps of litigation, the plaintiff(s) will summon the defendant(s) and express their complaints with the product and/or against the defendant(s). Next are the claims of the defendant(s) and their attempt to defend against the claims being held against them. Finally, in the discovery process, the trial will be held, in which interrogations will be held, documents requested, tests conducted, and a resolution found. If the defendant(s) has/have a strong case and all necessary steps in defense are taken, a favorable decision can be reached. If not, bad things can happen to the engineer. The following are the main parts of a trial:

- Picking a jury
- Opening statements
- Plaintiff presents their case

- Defendant presents their case
- Final arguments
- Charge is read to the jury
- Jury Deliberation
- Verdict is read

During a deposition, the facts of the case being looked for. To do this questions will be asked of all parties involved and the engineer especially. The engineer is being questioned to find problems in the design, liability, or manufacture of the product in question. During this deposition, the lawyer will ask questions, which the engineer is able to answer, and the engineer has to answer these to the best of their knowledge. By being truthful at all times is key to establishing honor in a person and therefore leaves no room for contradiction later. Honesty is the only way to go when being interrogated during the litigation process.

Because a lawyer is versed in the legal aspects of the trial and the engineer the technical ones, each should stick to their own field. The lawyer and engineer must form a relationship in which they can work together but not step on each other's toes. By helping the attorney understand the design process, design, evaluation, testing, production, and so on, the engineer can increase their chances of winning a case. The lawyer will take care of the courtroom jargon, but the engineer should be ready to step in and help out when the attorney drifts into uncharted waters. During a trial the engineer must become a "translator" while testifying. They must make it easy to understand the technical aspects of the case. The engineer must also be able to answer technical

problems in a way that shows they have an understanding of the issues at hand. During accident reconstructions, the engineer must be able to explain what happened, why it happened, and if anything was done wrong by anyone to cause the accident. These reconstructions or used to make a point so things should be explained in layman's terms so everyone can understand what happened. By "knowing their role" the engineer makes their job, as well as the attorney's, easier.

"Knowing one's role" is something that may not always be easy for the engineer while being questioned in a legal aspect. People can become nervous, fidgety, unnerved, or even angry. The engineer must keep their cool and not become flustered by an attorney's line of questioning. Lawyers use their voices as a major part of questioning; pitch, tone, and volume are used to throw off the defendant and make them lose their bearings and become confused and seemingly ignorant about what they are talking. Another thing to remember is to answer only those questions that are asked. By elaborating on an answer, the defendant may unknowingly give information not needed or even harmful to their testimony. Sticking to the simplest answer usually makes questioning better for the defendant. If the engineer is honest at all times, keeps their cool, and answer the questions asked, the interrogation will go smoothly. During interrogation there are a few main things that should be remembered. They are as follows:

- Do not try to do more than you need to
- Always be truthful
- Don't crack under pressure

- Follow directions
- Tell the truth

With the above kept in mind along with the engineer's knowledge teamed with the lawyer's expertise, the interrogation process will be very smooth and simple.

Chapter 2

Video Summary Report

The purpose of the following video summary is to familiarize ourselves with the main procedure and strategy within a courtroom during a case. The videos explained the importance of exposing credibility, the strength of the opening statement, the presentation to jury, and the strength of the cross-examination. They also emphasize the importance of the closing statements because the jurors will remember most the last thing they hear.

While the engineer has to know his way around the courtroom, the lawyer must know all the techniques and methods of winning over the jury. It all stems from the opening statement. The opening statement made by the lawyer must be trite and to the point while maintaining a tentative manner throughout. He must be apologetic, since no juror wants to be there and must be made as comfortable as possible. Also, the opening statement must not be imaginative. A jury is not going to believe an imaginative trial. The jury wants to hear facts backed up with truths, not something theoretical or thought up.

The opening statement has been known to have a stronger affect on the jury than the actual evidence. In order to do this; the lawyer must establish a connection between the victim and the jury. He must build a picture of events and reiterate the important issues using words of imagery and a narrative type of storytelling. While drawing a picture in the jury's minds, the lawyer must be careful of being melodramatic or too sympathetic. He must ask the questions the jury wants to hear. For example, why is the defendant responsible? All evidence and facts placed before the jury must be followed by an explanation and the degree of importance must be made known. The lawyer must explain everything to the jury, and if it still isn't understood it must be explained again. Argumentative statements are mostly used by the defense unless the prosecution can use them and shoot them down.

Another very important aspect is credibility. Once the lawyer has established credibility he must then move on to liability. He must start getting to the point of who is responsible. This brings about the hardest part of the trial, the direct examination. Jurors tend to remember best what they hear first and remember longest what they hear last.

Traditionally the lawyer establishes credentials. They expose background, credentials and use them to make the transition in to the case.

The lawyer must make sure all jurors can hear and see any visual aids. Once again, taking care of the jurors needs is key. When working with numbers, and/or values, the lawyer must outline each formula and sum it up quickly and present final figure. The lawyer cannot lose the jury's attention. While the plaintiff is being examined the lawyer must let them carry the case and set the pace. The lawyer must follow the plaintiff and make any necessary corrections. After the setting has been made, lead up to the occurrence of the accident. Emphasize by physical stance, volume of voice, pauses, or other body language. The lawyers cannot let themselves be misunderstood. They should ask the victim to explain how the accident has affected them, but don't take it too far as to let the plaintiff breakdown. Always show injuries last.

The cross-examination follows the direct examination. Once again, introduce witness. The lawyer must make the case go how they want it; they have to reveal the facts that help them. The trial lawyer must establish his presence with the jury through cross-examination. During the cross-examination they must point out flaws, and show he has control over witness. They must use the witness to reaffirm the facts crucial to their case, while using body language to emphasize these facts. In order to have a successful cross-examination, they lawyer has to adopt a style of interrogation that best suits the case. They never use open-ended questions unless they are sure of what the answer is going to be. However, when getting to know a witness open ended questions are fine to use. The lawyer will try to ruin the witness's credibility. They must remain patient with facts crucial to their case, while repeating these facts and drilling them in to the minds of

the jury. Contradictory information is the best type to make stick in the jurors' heads. They point out information the jury does not know, and build up towards a conclusion. When cross-examining a non-medical witness, most of what they witness says is not backed by medical truth. Therefore, the lawyer can either amplify, or destroy the testimony of that particular witness. They obtain psychological control by questioning the truth. They attack the professional conduct of the witness and contradict their testimony. When dealing with a professional, the lawyer utilizes the witnesses' expertise to help their own case. The lawyer must once again stick with leading questions rather than open-ended questions. An easy technique to obtaining crucial statements is by giving in to the witness in another aspect. The lawyer must not be hostile and must amplify what they need to emphasize importance.

Since the last thing that jurors hear is remembered the longest, the conclusion is a crucial part of the testimony. Five or six statements at the end of the closing argument still using body language, words of imagery, and alienation. Alienation is the method of taking a similar situation and giving it new context. The jury's importance is shown at very end of conclusion. The lawyer cannot let his own biases interfere with opportunity in the courtroom. A lawyer needs to adopt their own methods of closing arguments. Basic principles can be applied to closing statements but only if they correctly apply and help to the case. The closing arguments bring everything together, sometimes with excitement and suspense. In liability cases, they show how the injuries were avoidable and question if more safety measures could have been taken. In this case it would help the prosecution an advantage if they present the jury with the product liability laws relating to the particular case. Defense continues on by emphasizing why the victim

should be compensated. If product liability is found, then the victim must be compensated. If it is ruled that general losses occurred, the victim has lost a limb, use of a body part, loss of a sense, etc., then an amount of compensation must be decided.

In the case of Grimshaw v. the Ford Motor Company (1981), the 1971 Ford Pinto had a problem with the gas tank. It had to be decided if the gas tank explosions were due to driver error or faulty gas tanks. A man was driving a Ford Pinto in the rain and was rear-ended. The man was killed. Ford claimed he died on impact, but the family said he burned to death. Ford said that the explosion was due to speeding, and should be the fault of the driver. When made in '71, Ford said there were no known problems, and back that up with the fact that there are still many pintos on the road today. However, engineers who have looked at the tanks, have reported flaws with the gas tank. Ford's Crash test 1616 shows problems with gas tank explosions. Ford engineers said that a fuel tank explosion during a rear end collision would result in gasoline within the vehicle. If gasoline were to be injected in to the car during a collision, then the victims would be burned to death. Back in the 60's and 70's, rear-end collisions were not the same. Cars did not go as fast and the impact was not as great. However, Ford knew about the possibility of explosion from results of crash test 1616 in 1971. Ford was found guilty of negligence in design and placement of the pinto gas tank.

Chapter 3

Products Liability In A Nut Shell

Book report

The purpose of the following book report is to provide us with a definition and better understanding of product liability. With a better understanding of product liability we can now analyze cases and fully understand the whole process. Since we have read An Engineer in the Courtroom and Product Liability in a Nutshell, we understand the engineering and research work that goes in to a product liability case.

Chapter 3.1

The definition of a product is mostly thought of as a tangible object. For example a car, tool, appliance, boring machine, etc. It has most recently appeared that products can be intangibles such as electricity. In a case of an accident in which someone is hurt seriously injured, they can sue for loss of happiness. Natural things can also define the term product. In the case of Sease v. Taylor's Pets, it was Taylor's skunk that was the problem. Intangibles such as personal works can be classified as products. Personal works include drawings, paintings, sculptures, writings, etc. The product liability law is not interpreted by whether there is a product involved, but if the defendant could avoid an accident or in any way keep the plaintiff from harm. Defective products bring about many liability cases. It is automatically assumed that when a product is defective, the manufacturer supplies it that way. A product could be damaged during delivery and assembly. A used product could also be altered along the way for a specific job. Then when it is sold again it is not in the same working order as when it was originally manufactured. Some defects can be traced to the design of the product. For example, a toy action figure can be designed; manufactured and then when taken off the shelf by a youngster the action movement doesn't work properly. Parts could be designed too big, too small, or forgotten all together. Since design is the first step in producing a product, it is critical to cover all the bases meticulously and repeatedly. Manufacturing could still then be the source of the problem. Parts could be cut too big, too small, or once again forgotten. For instance, in the case of a tie-rod in the steering of a car. If the ball joint is not manufactured properly, the life of the person driving the car is in jeopardy.

Sometimes, production standards are kept to a minimum to keep to cost down. This short cutting could result in big problems and may end up costing the manufacturer a lot of money. As far as product liability goes, strict liability is placed upon the production defects rather than design. There are many reasons for taking shortcuts and measures to reduce cost during production. These measures will be discussed in chapter two.

Chapter 3.2

One of the major problems of production and design is that of negligence. Since there are many phases of production, there are many possible occurrences of negligence. Negligence can occur in inspection, processing, packaging, warning, design, and marketing. Because we are all human, and we are not perfect, negligence will always occur. A worker can be negligent in packing a product and it may arrive damaged and/or altered and not in proper working condition. This negligence is not necessarily on purpose, but does happen. During the packaging, the worker may become distracted and forget to follow proper procedure. This distraction causes the product to come off the line in a condition which was unintended by the designer and manufacturer. However, though not intended to be defected, lawsuits can be brought against the manufacturer. Another case of negligence is the sale of a product to one who is not fit for proper use. In the actual case of Monig v. Alfono, Alfono sold a slingshot to a minor who was unaware of the harm it could cause. Alfono was negligent in his sale of this slingshot and responsible for damages caused by the child with the slingshot. Another possible point where negligence can occur is that of repair. If a product is not repaired properly, harm

can come to the consumer. In this case, the one repairing is at fault. Blame can also be put upon the distributor. If the distributor distributes a product that they know is defective or altered in any way in which was not intended by the manufacturer, then they (distributor) are at fault. In the case of Grimshaw v. Ford Motor Co., Ford was held liable for reckless misconduct. Ford tried to make an economy car, the Pinto. They placed the gas tank in such a way that when involved in a rear end collision, the gas tank would cause fires inside the cabin of the car. Ford knew this and neglected to recall the Pintos and so suffered major losses in lawsuits. That type of negligence is called reckless misconduct. Cases of this type are also called concealment and deceit. Along the same lines of deceit comes the next reason one can be held liable. Misrepresentation can cause major problems within the consuming world. Any way the manufacturer, distributor, and/or advertiser present the product, they are indirectly promising the consumer it will live up to the presentation. If the product does not live up to the promise, misrepresentation has occurred and problems arise. The plaintiff (consumer) is entitled to collect for all damages done. They are to collect compensation for all medical, psychological, emotional, and punitive damages. For example, in the case of Ortiz vs. B.M. Root (discussed later in IQP report), Roberto Ortiz sued for permanent physical damages along with the emotional scars he suffered from the accident and for years to come. He was able to sue for emotional scarring for years to come based on the fact that he lost fingers and could not enjoy all the regular little things for the remainder of his life.

Chapter 3.3

The plaintiff may sue for any product, in which they can show how the product caused injury. Providing the plaintiff is injured in some way, they have reasonable cause to sue. Damages can be paid in full for physical injuries as well as emotional scars. However some have tried to sue for emotional distress when no physical harm was sustained. Some courts have ruled that physical injury must accompany emotional distress, but still others have ruled that emotional damage is enough grounds to sue. Not all plaintiffs are the direct consumers of the troublesome product. They may be workers, passengers, witnesses, etc. Anyone some way involved in the accident can press charges. These charges however are not limited to the manufacturer and the designer. The defendant can also be the distributor. The manufacturer holds much responsibility in any product they make. After the part leaves the manufacturing plant it goes to assembly. The assemblers can also hold much liability for mistakes. If they receive the parts, all to specification, and they foul up the procedure or attach a section wrong they are in trouble. However, if they receive any part in a defective or damaged state they are not liable. In that case blame either goes to the manufacturer or the deliverer. After assembly, the next division to be held liable is the seller. If the retailer however is unaware of problems or defects, then they hold zero responsibility. The product must be inspected before it is sold, but as long as the retailer covers all of that they are in the clear. On the other hand, if the retailer knowingly sells the defective product, they can be held accountable for injuries sustained by the plaintiff. In the case of the distribution of a used product the seller may not be at fault at all. Jurisdictions are not sure about this type of liability. If

the seller of a used product were held liable, then it takes some liability off of the manufacturer, distributor, assembler, and designer. For example, in Peterson vs. Lou Bachrodt Chevrolet Co. the plaintiff was trying to sue the Chevy car dealer. Therefore the seller is obligated to do some inspection on the used product. If they then sell a damaged/defective product then they are at fault. Product line liability is a very gray area. It is not easy to find the responsible party of the damage/defect of the product. When investigating, one would have to go through the whole manufacturing process step by step starting with design and finishing with retail. Each step must be broken down and analyzed to make sure the correct party is at fault.

Chapter 3.4

Reliance is a mandatory factor of recovery for conscious misrepresentation, negligent misrepresentation, and innocent representation leading to personal injury. The Plaintiff is not required to prove reliance, but then he must provide evidence showing he relied on the defendant and/or the product. Misrepresentation is a false example o9f what the product really does or how it works. To prove reliance in cases of misrepresentation, one has to prove they relied on the false portrayal and bought the product for wrong reasons, and because of this they were injured. Disclaimers on some products offer distributors/manufacturers some sort of safety against a lawsuit, but it must be conspicuous and clear. Should a disclaimer be on the back of a purchase form or hidden in the tiny print of a contract then the disclaimer becomes ineffective because it is not conspicuous. In the case of Henningsen vs. Bloomfield Motors, Inc. the disclaimer in no way disclaimed liability for personal injury claims. That particular disclaimer only

applied to replacement of defective parts. Another guideline to that of disclaimers is that of time. It must be delivered as part of the contract to be credible. Any disclaimer sent to the consumer after the contract is signed is null and void because it was not seen and read before the contract was signed. The recovery of monetary loss due to defectiveness can only happen if the remedy is in the warranty. When a breach of contract has occurred, the plaintiff must notify the defendant immediately or the breach will not be remedied. The purpose of the notification is so that the defendants can offer a settlement and save themselves from a lawsuit nightmare.

Chapter 3.5

When an accident occurs during usage of a product, it may not always be due to a design defect. Production defects are also very common in product liability cases. It may not always be easy to discern between these two types of defects and it is the job of the jury and court to determine which party is at fault, the designer or the manufacturer. A design defect can be defined as something in the design of a product that lead to an accident because of a non-obvious danger. A production defect however, can be characterized as something that was built without conforming to the designer's specifications. It is more common to see design defects though, because a flaw that might be seen as a manufacturing defect is actually a design defect.

For instance, a lack of an automatic warning system, such as a back up alarm on a construction vehicle, could be construed as the fault of the manufacturer but should have been design into the machine by the designer. If a backing vehicle hits a person, the warning may have alerted them to move, but because there wasn't one, the person was unaware of any danger. Sure, the manufacturer may have known that a backing alarm was needed, but since it wasn't called for in the design it was not included. Blame could be placed on the manufacturer because it should have known better but ultimately, the design engineer would be to blame. In another case a guard may have been designed to cover a blade on a saw, but in the manufacturing process, the guard was made too short and therefore the manufacturer would be to blame. Also, if faulty materials are used in the making of a product, or a faulty weld is made for instance the designer would not carry any blame.

Sometimes, design defects are hard to convince a jury or court of. A problem may be described as "polycentric", or very complex. By having polycentrism, a design has many things that need to be considered before a design can be put into practice. These problems are likened to a spider web, where if one strand is pulled, the whole web deforms. In the design process, if one aspect is held higher than another, the whole system must be adjusted for that one aspect. For example, it may be desirable to design a lighter, more fuel-efficient car. If this is the case, some safety may be sacrificed. A lighter frame may not provide as much safety for the car's passengers but it might be more fuel-efficient. These tradeoffs are difficult to address and often juries or courts lack the knowledge to make a decision about the blame. If a problem or design flaw is too complex for a layman to comprehend expert testimony becomes very important.

Polycentricity is a common problem in cases and this is where an expert's testimony is very important. Sometimes, however, an expert's testimony may not be needed at all.

In cases of obvious danger, any person is able to see where an accident might occur. While most people know that an airplane propeller turns very fast and poses a danger to those nearby, the designer cannot be held accountable for a person walking into that propeller. Cases like these demonstrate how some inherently dangerous products cannot be made foolproof. An operator must know that the piece of equipment may have some hazards cannot be guarded against and they must take some precautions themselves. If a circular saw is spinning then the designer or manufacturer cannot be held responsible for someone who touches it. Some dangers cannot be warned against or guarded against. Designers and manufacturers are not responsible for making a product that has no danger whatsoever; some things are just dangerous by nature.

Crashworthiness is another aspect that must be designed for. Crashworthiness is explained as the ability to design a product to be safe in the event that another product causes the accident. In the 1960's it was found that a designer did not have to do this and therefore could not be held responsible at all for a mishap occurring which was not do to its own product. Later on, however, this was rejected and modified to say that a designer must design for foreseeable accidents. If, for instance, a car is involved in a collision with another vehicle, the car must be designed to handle that crash. This incident would be called a foreseeable danger but not all types of accidents can be designed for. If a meteor falls from space and crashes into a car causing injuries, the designer or manufacturer cannot be held responsible for that accident. Negligence on the part of the operator cannot be completely designed for either. If someone falls asleep while running

a boring machine, it is not the manufacture's fault that the person got hurt but if someone left a machine running and left, the designer may be held accountable for not having an automatic shutoff device. A court or jury must decide this level of incompetence but in general, common sense and experience of foreseeable accidents governs the design process.

Chapter 3.6

Warnings and instructions can be a spot in which much confusion and blame can occur. Not only can a product and its designer be held accountable for having no warnings, but also for failing to warn of accidents which may happen or for even labeling a product in a manner that can lead to a mishap. Generally, when a case is brought up due to warnings or instructions the plaintiff will blame warnings and/or a design defect. This is because if there is found to be sufficient warning on a product there may have been a design defect that lead to the accident.

If in fact the warnings are to blame, the plaintiff must show that more warnings or more extensive warnings would have in some way changed his/her behavior and would not have resulted in the accident occurring. For instance, if someone claimed that a warning on a car saying that the clutch must be released while starting the car or it may lurch, they prove that they would have read that warning and done it every time they started the car for the claim that the warning was needed before winning their case. Plus, a need for the warning to be in place must be shown. There is not a reason for a warning on a car saying that if you crash it into an oncoming vehicle, damages and injuries may

occur. The reason this is not needed would be because the danger is so obvious that anyone driving the car would know this. Anything so apparent does not need a warning and does not have to be designed for. As stated earlier, the designer and manufacturer are not required to make a product that is fool proof.

Instructions are an issue related to warnings in many ways. While instructions need not be so specific that every step of every product is laid out but they have to explain ways in which the product should be used so that safety is achieved. In some cases, instructions only explain how to use a product effectively and efficiently and this is wrong. The instructions must shown how to operator, dispose of, and store a product so that no harm comes of the use of the product. These not only should be in writing, but illustrations should be used for those that are illiterate or cannot read English or the language in which the instructions are written. In many cases this applies the most to chemicals. Not only are the labels and warnings on a product important, the packaging itself is a very significant detail. If a package does not fit the product, it can be construed as misleading and harmful. If a label states that a gallon of paint should not be stored near an open flame because of fire hazard and the package shows the can sitting next to a fireplace, this is a gross misrepresentation of the warnings. The labels, pictures, or packaging should not overshadow written warnings or instructions. A can of bug repellent should not be packaged in a whipped crème container. Granted, these are extreme examples, but the principal still applies to all products and their packaging.

Chapter 3.7

Often missed in the discussion of a product liability case, is the fact that it still has to be proven that the defect occurred not because of anything they did but is the fault of someone involved with the design or manufacturing process. The plaintiff must show that the product was used correctly, maintained in good working condition and that no major damage has occurred while in their possession. Usually, the newer a product is, the easier it is for a plaintiff to prove that the product was defective to begin with.

Plaintiffs must also prove that if the accident happened from their own doing, something could have been done to prevent it. This includes things such as proving a handrail would have prevented a fall or a warning would have sufficiently changed their behavior. Joint liability can also be inferred from a judgment. This can occur when a manufacturer fails to warn of the inherent danger involved with a product and the retailer also fails. Although it seems obvious that someone buying and using an inherently dangerous object they would know of the danger, but all parties involved with the design, sale, and manufacture of the product must still warn of any dangers.

There are tings that can absolve designers and manufacturers from liability such as misuse or alteration. Misuse is defined as doing something with the product that it was not intended for. For instance you wouldn't use a corrosive liquid as a hand cleaner or throw a knife to someone who needed to use it. A special case of misuse is alteration. This is when a product is modified from its original state. If any modification is performed almost any accident that occurs thereafter could not be blamed on the designer or manufacturer. If the product is in good working order when leaving the seller's hands, someone alters it in some way; the seller is not responsible for any accidents that happen.

Even if a consumer is aware of some of the dangers associated with a product, they may not be aware of them all. It is the job of the dealer or manufacturer to make sure that the consumer knows of all of the dangers. If something is broken, and someone continues to use it, it should have been warned that using the product while it is broken. At all times the consumer should know when it is safe to use the product in question.

Comparative fault is a way in which blame can be shared. In general, there are three kinds of comparative fault, the plaintiff more than the defendant, defendant more than the plaintiff, or equal blame can be shared. All in all, there are many types of blame a many factors that can affect this blame. By stepping back and looking at all of these factors together, one can get a better picture of who is at fault and why they are. It can be difficult to discern this but by looking at the guidelines provided in this chapter, we can figure out who is responsible, in what capacity, and the reasons why they are responsible.

Chapter 4,5,6

Case Study 1: Ortiz vs. B.M. Root

Case Study 2: Laflamme vs. Daimler-Chrysler

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IQP/MQP SCANNING PROJECT

The goal of the following three case studies Ortiz vs. B.M. Root, Laflamme vs. Daimler-Chrysler, and Heath vs. Vermeer are each very different cases. In each case however we are able to study the accident, the parties involved, and the working condition of the machines used. In Ortiz vs. B. M. Root, Ortiz was significantly impaired by a boring machine. This machine was the responsibility of B.M. Root and because of a guarding error caused injury to Ortiz. In Laflamme vs. Daimler-Chrysler, Laflamme was involved in a rear-end collision which appeared to be her fault. She claimed the seat slid back making it impossible to hit the brakes. Chrysler had to defend their side and show it wasn't their fault. In the case of Heath vs. Vermeer, Heath had his hand caught in a tree spade while operating the machine. The question was whether he was operating the machine properly or if the pinch point was too easily accessible. Questions were raised in each of these three cases whether operator error or defectiveness of product were at fault. The goal of these studies was to analyze each case from the side of the operator, from the side of the manufacturer, and from an engineer's point of view.

Chapter 4

Case Study #1: Roberto Ortiz vs. B.M. Root, Diehl Machines, and Boshco Inc.

On September 7, 1993 Roberto Ortiz was involved in an accident that caused him to lose the middle finger on his right hand. Needless to say, Ortiz felt that someone other than him was at fault. The following pages describe the background leading up to the accident, the parties involved, and finally, who is responsible for the incident. These claims will be supported with facts and first hand accounts of what happened.

Involved in this case are four main parties; Ortiz, his employer, Kimball Company, the machine's manufacturer, B. M. Root, and the machine's distributor, Boshco. Ortiz has brought charges against Boshco, B. M. Root, and Diehl Machines, saying that there were all, in some way, responsible for the accident. In June of 1992 Root merged with a company named Diehl so the case is actually brought against the Diehl Company through Root. The machine in question is a multi-head boring machine used to drill holes in wood. This particular machine was made by Root and sold to Kimball by Boshco. Ortiz claims that Boshco knew that the machine did not measure up to national safety standards but they sold it anyway, therefore making them responsible. He also says that Root failed to foresee future safety problems.

There were measures taken to make the machine safe however. In 1986 Kimball installed a safety guard to protect workers. This guard was placed in front of the boring heads, which allowed work to be completed without interference. This guard was removed in 1992, however, because of complaints from workers that the guard obstructed the view to the boring heads. This guard was not in place when the Ortiz incident occurred. Also, there were signs warning of the dangers from the machine. These signs warned of the high-speed spindles, how to clean the machine, and that gloves should not

be worn while using or cleaning the machine. Ortiz says he did not see any of these, or that he can't remember ever reading or seeing them.

The charges against Root include being negligent in designing, assembling, and distributing the machine. Ortiz claims that they knew the machine was dangerous but they went ahead with putting it into circulation. Also, there are claims that when Diehl merged with Root, they should have audited all of Root's old machines and retrofitted them with safety measures to protect against accidents. These are only the first of many charges Ortiz brought against the designer, manufacturer, and distributor of the boring machine. Boshco is under fire for selling a machine they knew was defected and dangerous.

Figure 1: Unguarded boring machine showing highly exposed spindles.

Kimball addressed these concerns for safety later on, however. They initially installed a safety guard, but it was later removed. There was signs posted as well, helping to increase the safety of the machine. After this accident occurred another guard

was installed, this one with a clear line of site so as to not interfere with the work being conducted. The actual work being done on the machine is questionable, though, because there are no witnesses.

Ortiz says he was cleaning the spindles of sawdust with an air hose. Pushing a lever to turn on the air operates this hose. On this hose, however, the handle was broken forcing Ortiz to use two hands to operate the hose. His hand slipped off of this hose and fell into one of the spindles, causing it to rip off the middle finger of his right hand. At the time this cleaning was being performed, there was no guard on the machine and Ortiz was wearing gloves. Although it was posted and known that gloves were not supposed to be worn while working with or cleaning this machine, Ortiz said it was common practice to wear gloves. The spindles themselves were not supposed to be running while the cleaning took place. The boring cycle was to be stopped but the machine was not to be turned off. Those working with the machine were trained by a supervisor on how to use it and knew these instructions. Ortiz says he was verbally instructed on how to clean the machine but was never given written instructions.

According to the department of Labor some general requirements must be met for the safe operation of all machines with rotating parts and flying debris. Two examples of these are barrier guards and two hand-tripping devices. The Department of Labor states that guards should be affixed to the machine wherever possible, which makes the machine safe if used properly. There must be point of operation guarding to guard the operator from the actual work surface. Any machine with a potentially hazardous exposed work area must be guarded. Boring bits should be equipped with a guard that will enclose them completely. Universal bits on such machines should also be enclosed

completely to avoid contact with the operator. According to the American National Standards 3.2.1, an awareness device and warning signs must be installed. An awareness device is a warning system that, through some sort of sound and/or light, warns the operator of an approaching or present hazard. The warning signs must warn the operator when guards and/or awareness devices can do no more. One example of a sign warns against wearing gloves. Another is a sign warning against the dangers of the machine. The American National Standards also call for emergency stop buttons, which must be red and easily accessible. The employer must provide training to maintenance personnel to ensure original and continuing maintenance of the machine. These guidelines along with proper employee operation and the following employer responsibilities should ensure safe operation of the machine.

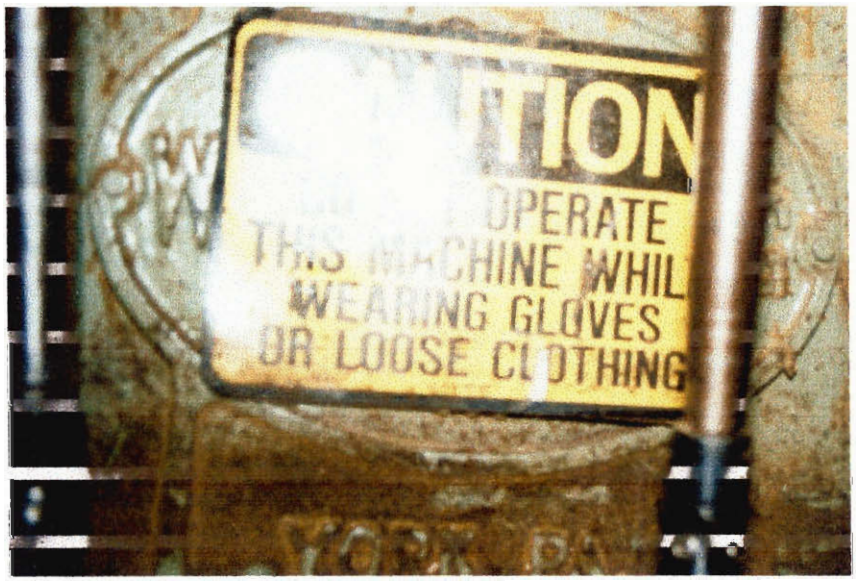

Figure 2: Warning sign cautioning against wearing gloves.

The employer must make sure proper guarding is installed when rotating/cutting teeth are exposed on a machine when in automatic/semi-automatic mode. The employer must properly train the operator in all aspects of running the machine. They must train

the worker how to properly start up, shut down, clean and run the machine. As long as the employee is properly trained, guarded, and warned against hazards no accidents should take place. In this case however, Ortiz was wearing gloves, the cleaning hose was broken, the guard was removed, the machine was running, and there were no supervisors to correct wrong procedure. All of these are wrong procedure for operating/cleaning the boring machine. Because of all of these hazards, the probability for an accident was greatly increased. Therefore, an accident did occur and left Ortiz mentally, physically, and emotionally scarred.

Ortiz claimed that the lever on the air hose was broken so he had to use two hands to use the hose, he lost balance and his hand slipped catching his glove in the machine. He told his supervisor the condition of the hose two weeks before the accident. There was also no guard to protect from slippage. He also claims that he was never properly instructed on operation of the machine. Ortiz said the machine was leaking oil and he doesn't remember any safety rule signs.

Gerard Desjardin, the plant manager, said that with the guard on the workers could not see properly and the wood was constantly hitting the guard making it difficult to operate. He also said that workers opened the guard to get work done because it was a nuisance. Gerard never called Root to report the guard problem and took the guard off himself. Gerard stated that all proper warning signs were on machine at time of accident. He also stated that Ortiz was wearing gloves and he never shut off machine when he cleaned it. Along with Gerard Desjardin, Robert Dialessi, the wood department production manager stated that the guard made it hard to operate machine. The guard made it hard to hold wood in place, but Robert also said visibility was not hindered. He

also said the machine was left on while Ortiz was cleaning, but Robert was not aware of the broken hose. Although the hose was broken, Robert said the nozzle was easily replaceable. He claims that standard operating procedures were explained to Ortiz verbally. Like Robert Dialessi, Dan Mackenzie, the wood cutting group leader, did not know about the hose problem. Dan also stated that all warning signs were in proper place at the time of the accident.

From the above evidence we feel that Roberto Ortiz and the Kimball Company are at fault for this accident. All parties involved can be held responsible for some aspect of the problem, but ultimately it was the failure of Ortiz to follow instructions and the failure of Kimball to report problems with the machine. From the depositions, we see that all warning labels were in the proper locations at the time of the accident and that the machine was running properly. There was blatant disregard for proper procedure by Ortiz, however.

Because Ortiz knew that he was not supposed to be wearing gloves and cleaning the spindles while it was running, and that fact that he was using a broken air hose, makes him a very responsible party for his accident. Also, Kimball knew that the hose was broken and easily repairable, yet did nothing about it. They failed to report the removal of the defective safety guard to Root or Boshco or that the guard was faulty in the first place. All of these factors combined to make Kimball and Ortiz the ultimately responsible parties for this accident. Boshco and Root/Diehl should not be responsible for problems that occur after modifications were made to the machine while it was out of their possession. Once Kimball started fiddling with the boring machine, the changes

they made and the way in which the machine was dealt with, became their own responsibility.

Chapter 5

Case Study # 2: Laflamme vs. Daimler-Chrysler

On October 25, 1995, Robin Laflamme was involved in a two-car accident in her 1994 Plymouth Voyager in which she suffered injuries leading to pain in her neck and shoulders. The inability of miss Laflamme to stop at an intersection caused her to rear-end a car stopped at the intersection in front of her. Ultimately, though, the cause of the accident can be found within the Laflamme vehicle itself. The driver's seat slid back when Robin Laflamme depressed the brake pedal, causing her to be unable to apply pressure to the brake and stop the car. This was not the first time, however that this phenomenon had occurred.

According to Robin Laflamme and her husband Kevin, the seat slid back multiple times before this accident. Usually this would occur when a person driving the car pushed back on the seat to get leverage to apply the brake pedal. This usually only happened to Robin, though, because her husband moved the seat all the way back on its track before he drove it and Miss Laflamme had the seat further up the track. As with most cars, the seats must be jiggled a little bit to ensure it is locked in place on the track it slides on. Robin contends that every time she drove the van, she did this and the seat would still slide back on its tracks.

These problems were brought up to the Chrysler dealership where the vehicle was purchased but no major repairs were performed on the vehicle. The Daimler-Chrysler Company's policy on fixing vehicles is that if the situation being complained about cannot be duplicated, no measures are taken to repair the vehicle. On this van, the sliding back of the seat could not be induced at first so nothing was done about it. Later on, however, this action could be duplicated and the seat was repaired according to the specifications in the Technical Service Bulletin numbered 23-23-24. These Technical

Service Bulletins or TBS's are sent out periodically when new problems arise with vehicles. They address problems and describe how to remedy them. In the case of a seat sliding on its tracks in a 1994 Plymouth Voyager, the seat itself was to be removed from the vehicle and was to have the mounting holes extended and then the seat was to be replaced. This procedure was performed on the Laflamme's van but apparently did not fix the problem of the seat sliding on its tracks.

By all accounts, we find that the seat did indeed move on its tracks. According to Robin and Kevin Laflamme, a mechanic at the Chrysler dealership named Dirk, and Gerald Byron, a Chrysler representative; the seat did slide on its tracks. During his deposition, Byron stated that, "Seat did not latch all of the time."[1] After looking at all these points of view, we have concluded that the seat was faulty and Robin Laflamme was telling the truth about the cause of her accident. From this point we need to move on and see whose fault the seat's failure was and who was responsible for its repair or lack thereof.

Employees of the Chrysler dealership in Portland, Maine acknowledged that there was a problem with the car seat in Robin Laflamme's Chrysler Voyager Minivan. They also stated that there was a TSB that explained what the problem was and how it was to be repaired. This TSB explained that by removing the seat assembly and elongating a mounting hole, the problem would be fixed. Because the failure of the seat locking mechanism was the cause of the accident, someone associated with the faulty mechanism should be held accountable; but who? Either the mechanics for incorrectly repairing the problem or Daimler-Chrysler for making a faulty seat locking mechanism are to blame.

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[1] Byron Deposition, 82

However, Daimler-Chrysler sent out a memo to all dealers on January 8, 1987 telling the mechanics to check the installation and function of seat systems installed with manual adjusters. It was stated that all seats must travel full forward and full rearward without binding. It was also stated that in all dual latch mechanisms, each latch must fully lock into place in the same position without hesitation or additional adjustment by the person in the seat. Safety standards say that the latching mechanism must engage positively without hesitation and must latch by the return spring itself. John McKibben, a mechanical and automotive engineer, deposed that all components were installed and working correctly. He also said Chrysler was in no way negligent in the design and production of the vehicle to contribute to Robin Laflamme's accident. Daimler Chrysler sent out the Technical Service Bulletin (TSB) 23-23-24 on March 18, 1994 stating the problem of the sliding seat and how to fix it. The Laflamme's complained several times to Prime Auto about their seat sliding, but Prime Auto said they could not duplicate the problem so they wouldn't fix it. Since Prime Auto knew about the problem through Daimler-Chrysler's TSB and through the complaints of the Laflamme's, they should be held accountable. All the blame should fall on Prime Auto, since Chrysler did what they could to correct the problem. Unfortunately Prime Auto's policy was to see a duplication of the problem then too fix it. Because of this, an accident occurred and this lawsuit came about.

Chapter 6

Case Study # 3: Heath vs. Vermeer

In the Heath versus Vermeer Manufacturing Company, Michael Heath is suing the Vermeer Company for injuries his suffered while using a tree spade. This piece of equipment is used to remove trees from the ground with the aide of a blade on a machine that is attached to a tractor. Mr. Heath lost a portion of his left hand when the blade and part of the frame of the machine pinched it. This resulted in "extreme physical and mental pain", which the plaintiff will continue to suffer from in the future. He is seeking over $5,000,000 in damages and judgment against the plaintiff. Heath is claiming that Vermeer's negligence in designing, manufacturing, and selling this machine led to his accident.

Figure 3: Professor Hagglund trying to reach to pinch point.

The defect in question is a pinch point created by the frame and the blade of the machine. Mr. Heath's hand was pinched at this point while he was operating the tree spade. He is claiming that there should have been a guard at this point to protect against these kinds of accidents. This is the first such case that has been brought against

Vermeer and OSHA and ANSI regulations are a hazy subject in this matter. OSHA only applies to the employers themselves so they are at no fault for any reason; they were using a machine they thought was safe and that met regulations and requirements. ANSI standards do not seem to exist for a situation like this one. The only premise that comes into play here is guarding by location. This is a concept that says that a hazard may exist on a product but as long as it is not within reasonable reach, or access, by anyone, the hazard does not need to be guarded against.

With the Vermeer machine, the pinch point was approximately ninety-eight inches off the ground and thus deemed guarded by location. The only way someone was able to reach this point was to be climbing on the machine. This is strictly cautioned against in the operator's manual. There is no reason to be on the machine itself while in use. Mr. Heath claims he was on the ground with his hand on the frame when this accident occurs. The defendants claim there is no way he could have been standing on the ground with his hand on the machine because he stands five feet ten inches tall and can only reach up to ninety-two inches, not the ninety-eight inches needed to reach the top of the machine. This leads us to the foreseeable belief that Heath was climbing on the machine while it was running. As was stated above, this action was cautioned against in the manual and on the machine itself. There were warning signs on the machine warning against being near the blade while the machine was running.

The plaintiff says that Vermeer knew of a hazard on the machine and did not correct it. This led to his injuries and because of this, Vermeer is responsible. Vermeer's defense statement says, "Vermeer Manufacturing Company could not foresee the combination of concurrent actions required to bring about a hand injury at the top of the

tree spade". A designer or manufacturer cannot protect against every single situation in which an accident can occur, however in this case it is foreseeable that an operator could climb on to the platform and eventually get a hand caught in the pinch point. Since the circumstances that led to Mr. Heath's injuries were foreseeable but against proper procedure, warning signs were properly placed to prevent such injury.

The deposition of Ivan R. Brand, a product safety manager for Vermeer Manufacturing Company includes many points, which are devastating to the plaintiff's case. Ivan is not a licensed professional engineer, but Tom Chesser took care of the safety engineering. Ed Kucinski at the time of the accident was a testing manager and tested the product. He since has become a licensed product safety engineer. In Ivan's deposition he states that the top of the tower is out of reach during any kind of normal operation in which two workers would be located near the tree. Because it is out of reach, the machine is guarded by location. The tower measures 89.5 inches from the ground. There is a nip point at the top of the machine frame, but based on our evidence, it is impossible to reach while standing on the ground. In order to reach any harmful part of the machine, one would have to climb on the machine. The operating manual states that workers must keep hands and feet away from moving and/or power driven parts. There is no reason to climb on the machine during operation. The machine is equipped with warning signs. One states: FOR YOUR PROTECTION, KEEP ALL SHIELDS IN PLACE AND SECURED WHILE MACHINE IS OPERATING. MOVING WITHIN CAN CAUSE SEVERE PERSONAL INJURY. Another states: NEVER WORK OR STAND UNDER RAISED TREE SPADE.

Figure 4: Warning sign for proper procedure while using tree spade.

Michael Heath, the plaintiff, claims the blade and frame of the machine were defective. According to Michael, if you inadvertently put your hand on top of the blade it would get caught between the frame and the top of the blade when it was raised. Since proper procedure states not to touch any moving parts, Michael is at fault. He shouldn't be catching his hand up there because he shouldn't be able to reach it unless he was standing on the platform. Since Michael was standing on the platform he put his hand on top of the machine to balance himself, and so caught his hand. Michael also claims that could not see the operator's signals that the machine blade was being raised. According to Michael Heath, after the tree was lifted out of the ground, he was walking forward while the machine was moving forward to put the tree down. Michael was guiding the tree with his hand and the blade came down and caught his hand between the blade and the frame. Dr. Thomas Echeverria says that because of the crushing injury the plaintiff is left with significant functional and sensory loss as well as severe scarring. Michael's grip

strength has gone from 120 to 45 in his left hand and he has sustained huge medical expenses. His total medical bill came to $37,224.57. Michael's history of being stupid doesn't help his case at all. He had his license taken away for neglecting to pay a speeding ticket. He was busted for possession and distribution of cocaine. The platform was two and a half feet off the ground and Michael claims that when his hand was crushed, it was at head level. In order for his hand to get crushed at head level, Michael would have to have been standing on the platform, which is prohibited. He says he was never taught to put his hand on the tree blade, and he doesn't know how it got there to be crushed. Michael completely neglected instruction and warning. If he would have obeyed all instructions he would not be in this situation. The machine is in proper working order; the fact that Michael is negligent led to this injury.

Chapter 7

Mock Trial Conclusion

On Sunday April 29, 2001, the Products Liability IQP groups came together to perform a mock trial on the cases presented above. Each group presented their defense of a party in each case. In the case of Ortiz vs. B.M. Root, the jury concluded that the boring machine was not defective and that Robert Ortiz's negligence contributed to his own accident. He was awarded no compensation for damages. In the real world the case was settled and Ortiz received $80,000 for damages.

In the case of Laflamme vs. Daimler-Chrysler, the verdict was for the plaintiff. The jury concluded that the driver's seat was in fact defective and Robin Laflamme was to receive $100,000 for damages, hospital bills, and time off from work. The jury ruled that Prime Auto be responsible for thirty percent, while Daimler-Chrysler pay the other seventy percent. The real case was also settled for $200,000 going to the Laflammes.

In the case of Heath vs. Vermeer, our jury ruled that the tree spade was in proper working condition with no defects and that Michael Heath contributed to his own injury. They ruled that Heath be responsible for paying his own damages. The real case settled for $80,000.

Our report states that we chose to represent B.M. Root, the Laflammes, and Vermeer. Our findings on all three cases were true according to the jury of our mock trial. We have no way of knowing how the cases would have turned out in the real world because they all settled. By analyzing the all the evidence provided and by using our current engineering knowledge, we used our best judgment in each of the three cases to produce the correct results. We feel that by combining the analysis of law practices with those of engineering we came away with a very lucrative IQP experience.