PRODUCT LIABILITY

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1 Abstract

The focus of this Interactive Qualifying Project is to investigate engineering product liability and its various applications to court cases. Extensive resources were drawn upon to exhibit the role of an engineer in the courtroom. To further expound upon this issue, four ambiguous product liability cases were analyzed. Each case was dissected to determine who was at fault based on engineering standards, and an indisputable verdict was established utilizing the evidence presented.

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2 Introduction

Although the law appears to be straightforward and trite, this is not always the case, especially when it is applied to a specific instance. Situations occur every day that fall between the lines of the law, which results in a dispute of which party is liable. To solve these situations, it is up to the lawyer to fully present the situation at hand, and then the jury decides where the blame lies. Thus, current law needs to be interpreted for each specific case, because it is not possible to define rules and regulations to classify any possible situation.

How does an engineer act in the courtroom? Or, on a more basic level, what is an engineer? An engineer can be utilized by the lawyer as a tool to aid in interpreting the law and how it should be applied to a particular case. The engineer is used to make sense of the so called "gray areas" that exist. By using his or her technical expertise, they can understand and present a part of the case that is foreign to the audience. An engineer is not concerned with trivial aspects of the case. They are needed when there exists a non-trivial aspect, where the only person who can make sense of the gray area is an expert in the field. It should be noted that an engineer does not interpret the law himself; rather he presents the evidence that proves or disproves any claim made by the plaintiff or defendant. It is the lawyer that uses his expertise to try to sway the jury or the judge in favor of his or her case.

2.1 Presenting the Case to the Court

To explain the court process in general and the impact that a lawyer's successful or failure to capture the audience has on the case as a whole, we draw from the novel An

Engineer in the Courtroom and nine videos which detail the court process completely. The layout of this paper first presents a summary of An Engineer in the Courtroom. We put this first in order to define what an engineer is, how an engineer is related to the court case as a whole, and how an engineer does his analysis of the case. The first five chapters of the book provide a general introduction to the court process and the issues that are at hand. The next few chapters get into the details of how an engineer specifically can impact a case. And the final chapters, such as "Accident Reconstruction" describe what an engineer specifically does for the case and how an attorney utilizes his presentation.

Next, we present a description of nine videos which detail the different parts of the actual court process. The opening statement, direct examination, cross examination, deposition, and summation of a trial are all described in detail. This is done to tie in the definition of an engineer and to explain exactly where and what impact he has on the court process as a whole.

2.2 Case Analysis

Drawing on the knowledge provided to us in An Engineer in the Courtroom and the nine videos, we next examine four specific cases. The first case is Sandsbury vs. Ranpack Co. In this lawsuit, Timothy Sandsbury is suing the Ranpack Co. for injuries he suffered as the result of using a machine that they fabricated and marketed. Timothy Sandsbury suffered this injury as he attempted to clear the machine of what he assumed to be a jam. For this case we analyzed the facts presented to us in the case summary and used the testimony of the plaintiff, and the OSHA standards that apply to this particular machine. From these resources we concluded that Mr. Sandsbury suffered injury as the

result of an improperly safeguarded machine. When Timothy Sandsbury attempted to clear what he thought was a jam, his arm should not have been able to reach the cutting area of the machine where the blade was located. If this safeguard had been in place the accident would have been avoided.

In the second case that we examined, an accident occurred on Dudley Oxford Road in Dudley, Massachusetts. The collision involved a motorcycle and a truck; the motorcycle struck the side of the truck as it was making a left turn across the lane the motorcycle was traveling on. In this case, the role of an engineer is quite different from the first case: this time the engineer has to reconstruct the accident based on physical evidence at the scene to determine who is at fault.

The third case, Lapenta vs. JM Equipment Co., involved Mr. Lapenta, who was working on his house at 66 Deerwood Rd., Tolland, Ct. He was working with two friends and they were putting up trusses above the master bedroom. While lifting the truss, the Lull that Mr. Lapenta was operating began to tip over, and he jumped out of the operator's cab. While running away, he slipped, and the boom of the lull struck him to the ground. The engineer's role in this case is similar to that of the first case: it is to determine if the machine was improperly designed and dangerous to be used, or if it was misused out of ignorance.

In the last case, Jeramiah Johnson, a worker at the Grafton County farm, was working with an Ag-Bagger Model G-580 bagging machine. The machine became clogged, so, Mr. Johnson was attempting, with a fence post, to clear a clog in the machine's intake throat. He died after falling into the open throat of the machine and subsequent contact with the rotor mechanism that is responsible for pushing and packing

the chopped hay material backward into a large elongated plastic bag. For this case, the engineer needs to determine if the machine was at fault, if Grafton County prison was at fault, or if the machine was simply being misused.

As can be seen from the above four cases, the role an engineer plays for each case is completely different. But, his or her analysis is a necessity in order to adequately solve the case and determine who was truly at fault. Without the engineer, the case can not be resolved.

3 An Engineer In The Courtroom

This was adapted from: Lux, William J. An Engineer In The Courtroom. Copyright 1995; Society of Automotive Engineers, Inc.

3.1 Chapter 1: Introduction

The main focus of this book is to explain the legal system and the process of litigation to an engineer. This book prepares an engineer for the courtroom experience. Through the book an engineer learns what to problems to expect and how to avoid these problems, both inside and outside of the courtroom. The other major focus of An Engineer In The Courtroom is to shape the engineer into a valuable tool for his clients by making him more appropriately versed in the courtroom system.

3.2 Chapter 2: The Nature of Accidents

"An Engineer In the Courtroom" defines an accident to be an occurrence that is unexpected and causes loss or injury, which can be expressed in some form of economic terms.

Many different accident examples are detailed below:

Collision – Two bodies trying to occupy the same space

- Two moving machines or vehicles.
- A vehicle or machine hitting a fixed object.
- A vehicle hitting a person.
- A person running into another person.

Slip and Fall Accidents – Victim involved with a surface on which they were moving.

- Loss of traction between the foot and the surface.
- Tripping.
- Physical malfunction of the person.
- Unexpected change in surface level.
- Loss of step support.
- Loss of balance and/or support of the body.
- Fall from ladder or step

Loss of Control – The loss of control of a machine by an operator.

- Inadvertent motion

Hit By Falling Object – Operator or machine are hit by falling object.

- Hit by rolling object

Suffocation – When a person is deprived of oxygen.

- Drowning

Electrocution – Contact with electric power.

Poisoning – Contact or ingestion of substances that can cause bodily harm or sickness.

Shock and Vibration – The effect of sudden changes of force acting on or against the human body for any period of time.

Entanglement – When operator gets something caught in a machine, such as body parts, clothes, or equipment.

Cuts and Abrasions – Result from partial involvement with machines, touching a surface or an edge just briefly.

Fire – Combustion of any kind.

- Chemical burns
- Explosion
- Radiation
- Burns from contact with hot surfaces

Mechanical Failure – A machine fails which results in injury to someone.

Struck by Moving Projectile – Being hit by something that has become airborne.

- Firearms and other such devises
- War

Natural or Environmental Factors – Broad classification for accidents caused by natural and environmental events.

- Heat
- Cold
- Lack of water

- Animal attacks

Homicide – The killing of a person.

- Suicide
- Legal intervention

Other Accidents – Accidents that do not fit in any of the above categories.

3.3 Chapter 3: Why Go To Court?

Everyday there are problems in society. There are many types of problems that cannot be settled without the help of the legal system and cannot be solved without going to a courtroom. For litigation to ensue, one individual must take one these problems and file a suit against another person or persons, the suit is filed against the person, or persons that they believe to be at fault for the problem. The person believed to be at fault is the person believed to have caused the problem or the person that is liable for allowing the problem to happen. If a suit is filed and the problem cannot be settled, and an agreement cannot be made, then the suit moves to the courtroom, and the problem is presented to a judge. The courtroom is designed to keep the work environment safe, by enforcing machine design safety regulations and protect the companies from unsafe and untrained personnel.

3.4 Chapter 4: Avoiding Litigation

To avoid litigation, an engineer must build a safe product. To build a safe product the engineer must design the product with all safety standards in mind. These standards

allow an engineer to address many of the potential problems and accidents that may occur with the product, before they become actual or realized problems.

1. Avoid the Accident

   If the accident does not happen or take place then it is very difficult for a person to file suit against the product. Trying to prevent possible accidents is the first step in designing a safe product.

2. Protect from the Accident

   Protecting the operator from the machine itself with cutting guards and shields is a good way to prevent accidents thus has led to numerous safety standards concerning shields and guards. The simply addition of guards and shields to a product also allow for a much more safe product without changing the entire design of the machine.

3. Make the Accident Safe

   Making the accident safe for the operator is a way to forgive the operator for involuntary misuse of the product. A roll bar is a good example of this; it is very seldom the purpose of the product to roll a machine over. With the addition of a roll bar; however, in the event that this rollover does occur, the operator is not crushed or serious injury is avoided.

4. Warn of an Impending Accident

   The next step to make the accident safe would be to alert the operator that an accident is about to occur. This would allow the operator time to correct the impending problem, or to evacuate the area to a safe distance and stay out of harms way.

5. Warn of the Possibility of an Accident

   To further make the accident safe, a warning device that can alert the operator that an accident is possible, could be installed. This can be a warning light or simply a decal, informing the operator of the consequences of certain actions, or misuses of the product.

6. Protect the Operator from the Accidents if it Should Happen

   If and when an accident should occur, then things such as hard hats, roll bars, work gloves, and steel toed boots, can protect the operator from the accident and minimize the injuries to the operator.

7. A Balanced Product – Dr. O'Toole's a general list of objectives for designing a product.

   - Specifications – Measurements that can be taken on a product such as power, size, weight, etc.
   - Performance – The amount of work and the speed at which the machine completes it.
   - Reliability – The dependability of the product and how often the machine fails.
   - Serviceability – How much routine schedule service and unexpected service will affect the operator.
   - Costs – The amount of money needed to build the machine. This is very important to the user and the designer. The cost has to be affordable, yet enough so the designer can make a quality product.

- Safety – How safe is the product and what, if any, hazards does it present.

3.5 Chapter 5: The Litigation Process

When a person believes that he/she has been wronged, they will seek an avenue by which to see if someone else is responsible and to demand repayment for the damage or injury. When a person sues another person the litigation process is used to determine if someone else is at fault.

1. The Claim

When a complaint is filed and a request for the plaintiff to appear in court the litigation process has been started. This claim will include in it, the reasons that the defendant is responsible for the accident or injury to the plaintiff. A claim does not have to be precise at first, because investigating the claim further can reveal more specific reasons for the lawsuit, but this can backfire as a judge can dismiss any case he/she deems to be to vague.

2. The Response and Defenses

When the claim is filed, the defendant is notified and they are given a generous amount of time to respond to it. If the defendant responds with a Yes, then this means that the claim can be settled and an agreement can be reached. The more common answer is No, which means that there is a dispute about the claim, or a complete denial of the claim.

3. The Discovery Process

The discovery process is the period of preparation. This process includes the defendant and the plaintiff, gathering information about the other. It is during this period that the defendant can learn about the aforementioned accident, and the steps that led up to the accident. Such information is obtained by inspections, investigations, interrogations, and requests for information concerning the product. A good engineer would utilize all methods necessary to gain a complete understanding of the accident and the lawsuit.

4. The Trial

The trial is the point where all the information gathered in the discovery process is presented to the judge, a jury if one is elected. A trial follows a certain order that is pretty constant.

- Choosing the jury
- Opening statements
- Presentation of evidence and witnesses for the plaintiff
- Presentation of the defendants defense
- Final arguments
- The jury charge
- Jury Deliberation
- Verdict

This is the litigation process.

3.6 Chapter 6: Engineers And Engineering Information

Engineering information can be significant to the success of a products liability matter. Normally, engineering information is not reasonably known nor understood by the jurors. This is why many times engineers are needed to assist the court in understanding the technical and scientific details of a matter. An engineer may testify as either a fact witness or as an expert witness. As a fact witness, he testifies to what he knows to be true about the incident. As an expert witness, he has the ability to testify his opinion. That opinion will assist the judge and/or the jury in understanding some technical information, or detail that is not common knowledge.

3.7 Chapter 7: How The Engineer Can Help The Attorney

An engineer and an attorney may not always agree on all matters, but if they cooperate they will be considerably more successful. Attorneys tend to need broad information and knowledge in doing their work. Since they have to concentrate on the law, they seldom have time to become sufficiently expert in one area. Therefore, attorneys will turn to engineers to discuss the suitability of a product or machine, and to explain why the design is or is not satisfactory. The same engineer will describe the processes of successful design and product development.

Engineers can help attorneys in many ways. The engineer can describe the technical processes and methods used in designing and making design choices. He also knows why designs are made the way they are. The stated legal reason for using an expert witness is to "help the court and the jury understand information and matters not generally understood by an average lay juror." The engineer can explain products,

systems, parts, and operation of a machine. He can also talk about how the product is developed, evaluated, and tested. The relationship between the machine and its operator is often considered to be a factor in accidents. This relationship can be understood and explained by the engineer. The engineer is technically equipped to conduct accident reconstruction. Engineers can summarize engineering literature for the court. They can also help the attorney find useful information, data, demonstrations, examples, and references in literature sources. The attorney wants to know as much information as possible beforehand, so they can determine which way the opposing side will go with their argument. The engineer is there to help the attorney, so he can gain an advantage on the opponent.

3.8 Chapter 8: The Discovery Process

Discovery is an important part of the litigation process. Presenting a case requires information no matter if it for the plaintiff or the defendant. Both sides of a case want to know what their opponent plans to present at trial. The methods of discovery are interrogatories, Requests for Production, Requests for Admissions, and the deposition. Interrogatories are questions that need to be answered. The engineer can help prepare the answers to be written under the guidance of the attorney. It is important that the attorney direct and guide the handling of matters involved in discovery, for the law spells out the rules and procedures for the discovery activities. It is important to avoid words that are inflexible or infinite during interrogatories or requests for production. Rather than ask thousands of interrogatories to discover information, attorneys may file a Request for

Production of Documents. By doing this, the attorney is discovering lots of data and information all at once.

3.9 Chapter 9: The Deposition

The discovery process described above includes a very important tool for the attorney, the deposition. A deposition gives the attorney the opportunity to question witnesses before the actual trial. The questioning involved in the deposition is less formal than in the courtroom trial, but it is still very serious. The deposition could be taken at any time in the litigation process; however, it is usually conducted when the matter is getting close to trial.

There are several reasons that depositions are utilized. The first and most obvious is for the purpose of discovery, which we learned in the previous videos. Depositions are also taken to establish facts. The attorney can use a deposition to determine the opinion that an expert witness might offer at the trial. If the information and opinions the witness offers are damaging to the case of the questioner, he will want to use the deposition to seek information and bases to impeach the witness. Last, the attorney may use the deposition as a means of learning the plans or strategy of his or her opponent.

3.10 Chapter 10: The Trial

Trials frighten most people and most engineers: they are serious, and of profound importance. The parties involved cannot agree on a suitable resolution to the matter on their own. Thus they each submit their claims to the justice system, hoping to resolve the conflict in their interest. The early beginnings of a trial include the interrogations,

requests, depositions, inspections, and all other pre-trial activities. The trial does not occur until all of these have been concluded. Each side is ready to present its case to convince the court why its position is correct. Trials are guided by rules and procedures set up by the court. The following are the general steps of a trial.

- Picking a Jury (consisting, usually, of 6 to 12 people)
- Opening Statements
- Plaintiff Presents his Case
- Defense Presents his Case
- Final Arguments
- The Charge to the Jury (They must now decide on the case)
- Jury Deliberation
- The Verdict

During a trial, the judge is in charge of the court. The judge has many different assistants in the room, the most important being the court clerk. There is a court reporter who records the actions of the trial. A marshal, deputy, or police officer is also present at the case to ensure both security and order. The jury sits in the jury box, and the litigants and parties to dispute sit with their attorney's at tables facing the court. The audience sits behind all of this, separated from the rest of the court by some type of railing.

In regards to the role an engineer plays: they usually serve as an expert witness. Presentation of self is crucial: it is important to dress in a suit, dress shirt, and tie. This presents the engineer as a professional. The engineer should always conduct himself in a quiet, dignified manner. In the trial, the direct examination comes first. This is when questions are asked by the attorney that is representing the client. This is done to

describe the story from his or her point of view for the court and jury's information. The witness is also cross-examined by the other attorney, which is the more difficult part of the trial.

3.11 Chapter 11: Questions

In a sense, the job of the lawyer is to ask the right questions, and to know when to ask them. This is so important because the way questions are asked and the responses to them are what sway the jury. As defined in the book, questions can be general or specific, open or closed, leading or non-leading, formal or casual, polite or serious, rhetorical or interrogating, simple or complex, and probing or outlining. All these forms of questioning are essential to the case being built by the lawyer. A lawyer can also ask the questions in certain fashions, such as rapidly to get you to fall into a pattern of answers. Another method of questioning is changing the pitch or the emphasis placed on certain words or phrases. Careful phrasing and timing of questions is vital to the attorney's case. It is essential to know how to answer these questions to your best ability using the truth. Delicate inflections and voice pitches, and careful wording of a question or an answer, may carry far more meaning than the actual words used.

3.12 Chapter 12: Accident Reconstruction

In most cases, the dispute often includes a difference in belief or understanding about the scenario or accident. Therefore, accident reconstruction can be very useful in a litigation case to solve the dispute. The claims that are made by both sides can be supported or destroyed by testimonies of the witnesses. When the dispute is unable to be

decided due to the confusing nature of the accident, an accident reconstructionist is often hired to give his expert advise. The reconstructionist uses scientific explanations to tie together the details of the case. By doing so, the most accurate description of what happened can be found. Should there be scientific proof that something claimed could not have happened, it is important for this to be noted.

Thus, the reconstructionist needs as much information regarding the accident as possible. Information can be learned throughout the various parts of the court case. Once all of the information has been gathered, the reconstructionist finds the true nature of the accident by applying scientific proofs. Once the accident has been completed, the scenario given is considered an expert opinion.

3.13 Chapter 13: Definitions and Techniques Employed by Attorneys

In this chapter the author gives his definitions and rules of common use to guide attorneys, which relate from his own experience. These definitions are in the words of the author.

Adverse Witness: A person who is called in to testify by the opposing attorney.

Answer: A formal term used interchangeably with the term "Response".

Appearance: This means that someone has appeared somewhere in the litigation process of a certain case.

Arbitration/Mediation: These are "alternate dispute resolution" methods. A mediator is a person who works between the two parties to arrive at an agreeable conclusion. Arbitration is a more formal resolution method that involves an arbitrator who makes a decision following a set of rules agreed upon by the parties.

Balance of the Evidence: This refers to the information before the jury when they deliberate on the case.

Bar: In a legal sense, it has three meanings: location of legal activity, grouping of attorneys in a certain area of jurisdiction, and to prevent or keep out.

Bench: The bench is technically where the judge sits. It is essentially the location, person and authority of the judge in the courtroom.

Breach: Is a failure to perform or a break in a chain of action.

Burden of Proof: The respective responsibilities of the parties in a lawsuit to prove (or disprove) the claims in question during the trial.

Care: Is the responsibility to conduct oneself according to the accepted levels of performance.

Charge: When a judge charges a jury, he gives them specific instruction as to how it must proceed during a case.

Civil Law: Is the part of law that deals with people and relationships with people.

Complaint: The formal name for the list of claims and requests for the court intervention.

Due Process: This refers to the proper legal steps in a procedure.

Duty: Duty is, simply, what someone is supposed to do.

Evidence: Information that tends to prove or disprove matters of disputed fact.

Exhibit: Evidence that is presented at a trial.

Expert Witness: A person who, because of their background training and experience, can assist the court in understanding the technical aspects of a case.

Facts: Are things that have happened or matters that truly exist.

Forensic: An engineer who applies engineering principles to the resolution of legal actions.

Foreseeability: The ability of a matter, situation, action, or condition to be expected sometime in the future.

Hearsay: The admissibility of something a witness says, meaning a witness can only discuss what they have experienced through their own five physical senses.

Hidden Defects: A hidden defect is one hidden from view or one that is not easily detectable through common inspection.

Hostile Witness: A witness that demonstrates a hostile attitude towards either attorney.

Hypothetical Question: A question that is presented to a witness in which a statement of conditions and facts are assumed.

Impeach: To show the testimony of the witness was not made in truth.

Inadmissible: Information or evidence that is outside the rules of litigation and will not be considered during a trial.

Insurance: In general, a word not to be used. The cased should be determined on facts and the responsibility of the incident without taking into account the money aspect.

Irrelevant: Relevancy is determined by the court, and it is a legal question.

Judicial Discretion: The power of a judge to make judgment on gray areas that arise during the trial which have little precedence.

Jury Trial: A trial that involves a jury of people that decide the final outcome. This is what most cases are in the United States.

Lay Witness: An expression for a witness for the facts.

Liability: Liability is a legal responsibility to pay or provide such remedies as the court decides.

Litigation: The total process of filing a lawsuit, pursuing the discovery and trial.

Mistrial: If the judge determines that a fair and proper resolution can on longer be reached a mistrial is called.

Negligence: The failure to use the ordinary amount of care that would be expected from a reasonably prudent person under the same or similar circumstances.

Oath: to swear to "tell the truth, the whole truth, and nothing but the truth".

Privileged Communication: The transfer of information by the opposing side that would not have been generally known or covered by their testimony.

Proximate Cause: It is the cause in which the incident would not have happened without it.

Prudent Person: A prudent juror is one who does what a typical juror would do.

Puffery: Talk that is an overstatement or exaggeration that is not necessary.

Punitive Damages: exemplary damages, over and above the damages intended to make the plaintiff whole, which arises in special cases and under certain circumstances.

Question of Fact: A question of fact is a question that deals with facts or information.

Question of Law: This is the other type of question that is a matter of dispute concerning the applicable statutes.

Reasonable Care: The care that should be used when performing the work.

Red Herring: A method of diversion or interruption.

Side Bar: Conferences held when the judge wishes to hear the reasons for and against the objection from both parties, which is away from the hearing of the jury.

Summons: The formal legal document notifying the defendant that an action has been filed against him/her.

Testimony: The testimony consists of the answers to both the questions asked by one's own attorney and the opposing attorney.

Tort: A legal wrong committed or perceived to be committed against a person or other legal entity, a products liability case is a tort.

Warnings: If you cannot avoid a hazard or protect against a hazard, you should warn against it.

Weight of the Evidence: The decision is based on the weighting of evidence towards a particular case.

Work Product: This refers to the method the attorney uses to present and develop his case.

Techniques That Should be Used by Attorneys

- Never ask too many questions
- Don't fight or argue with the witness
- Keep cross-examination short
- Know the answer before you ask the question
- Tell a story – paint a picture for the court and jury
- When you have made your point – STOP
- Don't assume anything
- Listen to the answers
- Plan, plan, plan
- Don't try to fool the jury or the judge

3.14 Chapter 14: War Stories

Often times, when people get together, they exchange exciting stories together. Attorneys often tell stories in this fashion of things that have happened to them or someone they know. These stories are all true, but are sometimes exaggerated slightly to make their story better than the last story told. The importance of a "war story" is the lesson learned by the listener. Furthermore, they are humorous and entertaining, which helps to keep the attention of the audience. These stories are given because the lesson learned is of importance to the listener. They are useful for an engineer because they help him to understand the litigation process in general. In the chapter, the author presents different war stories. They are all used to tell of a different lesson learned by him. For example, the author stresses that there are no surprises: neither the judge nor the jury wants to be surprised. Another example is to make the plaintiffs know you share their loss: it affects you as well.

3.15 Chapter 15: Tips for the Engineer Involved in Litigation

Below is a list of some of the important tips given in the book for an engineer. Although this list is not completely comprehensive of all the tips given in the book, it is meant to be a guide for this paper. The most important tips are detailed and should be kept in mind throughout the course of this paper:

- You are assisting the attorney. Do not try to run the game.
- Always be truthful to everyone, especially yourself.
- Don't be frightened by the legal process, the attorneys, or the courtroom.

- A good attorney will prepare you for your deposition and testimony. Listen to his direction; he is in charge.
- Follow instructions precisely and accurately.
- View the legal process as what it is: flawed but still and excellent and effective way for people and companies to get a good measure of equity in a dispute.
- As a professional and engineer, always do your best work and use your best judgment.
- Offer the best professional engineering advice you can.
- Offer all of your skills as they are needed, such as creative brainstorming and expressing technical information in common language.
- Be yourself, but do so in a professional way.
- Beware of traps.
- Think before you answer, even if you think you know the answer.
- If you make an error or misstate something, correct it.
- Listen to advice, and use all of it that applies to your situation.
- Above all, and most importantly, tell the truth.

4 Video Summaries

4.1 Video 1: Opening Statement

The first impression that a lawyer makes on the jury is crucial, and leaves a lasting impression in their minds throughout the whole trial. Thus, the opening statement

is essential to the lawyer's success in the case. When giving his or her opening statement, the lawyer must be careful to include the fundamental elements that both capture the jury's attention and gets them to trust him. Thus, the lawyer must form a personal relationship with the jury. A lawyer should establish his integrity and credibility in the minds of the jurors. And, most importantly, the lawyer needs to get the jury to connect on a personal level with the victim(s). This forces the jury to feel for the victim(s) and to relive the case as if they were the victim. In order to get the jury to do this, the lawyer must tell the story of the victim in an artful, descriptive, and persuasive manner so that the pain the victim faces can be seen by the jurors. Once a lawyer has swayed the jury to his side, the rest of the case will be much easier for the lawyer to obtain the jury's complete trust and loyalty. Without achieving this in the open statement, the lawyer has made the case much more difficult for himself.

Before the power of the opening statement was realized, the cases started off extremely dry and emotionless. Lawyers would merely present what happened to the jury in a statement by statement manner that lacked persuasion completely. As can be seen, the lawyer needs to use the opening statement to his advantage, instead of being boring and unimaginative. Although it may seem easy to do, it is difficult for a lawyer to capture the jury's attention and to hold it throughout the entire opening statement. It is difficult, but it is also essential to the lawyer's success. The lawyer can achieve this by using descriptive words that convey the situation without using words that they wouldn't understand in order to try to impress them.

The opening statement needs to clearly depict everything that happened. Thus, the lawyer needs to give the jury a full picture of the event, such as by describing where it

happened, who was there, and what the conditions of the situation were. Then the lawyer needs to introduce the protagonist to the jury. Once this has been done, the lawyer needs to sway the audience to feel for the victim and to become angered at the protagonist. This is the underlying theme of the opening statement.

During the opening statement, the strong parts of both sides must be shown: those of the victim as well as those of the opposition. This is done so the jury is not surprised by facts that the defendant brings up. They will be prepared for them, and since the lawyer gave a valid explanation of them, they will be able to dismiss them altogether. By doing this, the lawyer can easily rebut an argument before the jury has heard it. Thus, exposing the weak part of the case that the lawyer knows will be brought up, the jury will feel informed and they will have a trust for the lawyer that otherwise can't be established.

After the case has been presented to the jury, the lawyer must present why the client is not liable. Furthermore, the damages and losses that have been endured by the client need to be addressed so that the jury fully understands what was imposed and what is at risk.

4.2 Video 2: Opening Statement Part 2

As shown by the title, this movie further examines the importance of the opening statement and how crucial it is to the success of a case. The approach this video uses is to further examine additional opening statements and to point out the relevant parts. The different examples convey the different approaches that can be used when giving an opening statement. It further stresses how crucial it is to establish a relationship with the jury and to be received as an honest person. This can be done through many different

approaches, such as changing voice patterns at the right time, stressing certain facts or ideas, using hand movements or gestures, and utilizing his or her physical presence and location in the courtroom.

The first video is of an opening statement where the lawyer is too vague when discussing the client's case and the injuries suffered. The lawyer briefly explained the character of the victim to the jury to try to get the jury to relate to the victim. The lawyer efficiently explains the events before, during and after the accident. The purpose of the opening statement is to bring the jury up to speed with the case while keeping their focus and attention. Finally, the lawyer discusses the financial situation because he wants to make sure the jury understands why the victim is asking for money and that his client has every right to that money.

The second opening statement takes a different approach to tell the story of the case. The lawyer followed the basic steps of the opening statement, but he instead goes deeper into the story by using descriptive words to get the jury to see through the eyes of the victim, a young boy. The lawyer also changes his tone of voice in this statement. He speaks very softly to create mood of sorrow in the courtroom. Then he goes into the events that occurred before, during and after the accident.

Following the lawyer's explanation of what happened, he continued to discuss the injuries suffered to the boy. He emphasized how these injuries will affect the boy for the rest of his life. This is a good technique to make the jury realize the seriousness of the accident. Once the injuries are presented, the lawyer explains the damages his client deserves. He continues to do this by explaining compensatory damages and punitive damages.

4.3 Video 3: Direct Examination

During this part of the trial both lawyers get the opportunity to question witnesses to help defend their version of the truth. A witness is usually prepared for the stand before trial. This preparation allows the lawyer to get the full effectiveness of the witness. It is also critical for the lawyer to once again grab the jury's attention and hold it even when he is questioning the witness. This can be done through questioning, visual aids, pace and flow of the case, etc. The lawyer then extracts all the information from the witness that is pertinent to his version of the truth. After the lawyer has attained all the information that is relevant, the lawyer must conclude and move on. This also includes introducing and displaying evidence. If a lawyer is not prepared with an organized and quick approach to showing the evidence, the jury will lose interest. Keeping the jury's attention is fundamental to winning their trust. If they're not listening to the lawyer, they will not trust him. Very often in liability cases expert witnesses are brought in to give their opinion on the case. Such experts can be used for reenacting an accident, calculating monetary damages, etc. The background and expertise of the expert should be established right away to the jury. When large sums of money are involved in a case, it is crucial that the jury knows there is solid reasoning behind the large claim. In these cases, usually financial experts are brought in to justify the reasoning for such a large claim and why the defendant deserves that amount of money.

When questioning the defendant, it is best to use "yes" and "no" questions. Thus the witness will not have a chance to provide an explanation to the jury. The lawyer wants to use the witness as a medium to portray his particular version of the truth. This is

an effective method because the lawyer only allows the jury to hear what is pertinent to his version of the truth.

A totally different method of questioning should be conducted when the victim is on the stand. The lawyer wants to make sure that jury feels the pain of the victim while he or she is on the stand. The effects of the injuries and damages on the victim are important to display to the jury, but it is best to save them to the end of the examination because they will leave a lasting impression on the jury.

4.4 Video 4: Cross Examination

As defined by the video, cross examination is when the lawyer gets to question the opposition's witnesses. Before the lawyer asks any questions, he first introduces the witness to the jury. When doing so, if the witness is an expert witness, who specializes in a particular subject that is relevant to the case, the witness will be introduced as so. Then, in this case, the lawyer should show how the witness is working for the opposition. Furthermore, it is important for the lawyer to make a note to the jury if the witness has had previous experience as being an expert witness.

Once the witness has been introduced, the questioning follows. If the lawyer is trying to inform the jury by asking questions, then it is common to ask questions that require only a "yes" or "no" answer. This allows the lawyer to easily get to the point he is trying to make. The lawyer can also take a different approach by asking open ended questions, in which he hops for the jury to learn from the explanation of the witness. It is common for this to be in favor of his employer. Since the witness is an expert, any faults should be explored and pointed out in detail for the jury to be aware of.

There are multiple ways to point out that the expert witness has faults. The easiest way is to determine any facts that the witness is unaware of. Another way is to question the witness on the adequacy of the research conducted. The most effective way to handle an expert witness of the opposition is to find holes in the witness's testimony or to provide facts tat discredit his expertise. In order for the cross examination to be thorough and effective, it is essential for the lawyer to control the pace, witness, and the content that is relayed to the jury.

4.5 Video 5: Cross Examination of Non-Medical Experts

Many times expert witnesses are utilized in products liability cases. These witnesses could be from various backgrounds such as doctors, economists, inspectors, engineers etc. Most of these witnesses have experience on the stand and are very good at swaying a jury. Cross examination of these witnesses is essential to the opposing side. During cross examination, the lawyer cannot be tentative or hesitant and must exercise psychological control. He should dominate the witness by exercising good eye contact, keeping a good pace, and creating a presence in the court room. The opposing lawyer cannot allow this expert to sway the jury because the case will be that more difficult to win.

There are several ways a lawyer can have a successful cross examination. The lawyer will want to compare the answers of the witness to his deposition. The main purpose of this is to try and get the witness to contradict himself. Pointing out contradictions of the expert can provide a very destructive cross examination for the opposing side. To discredit an expert witness, lawyers could attack the professional

nature of the witness. For example, you would want to mention if the witness did not prepare a report or take notes on the case.

The main goal of the opposing side should be to use the expert to draw support for their theory. If this is achieved, the cross examination will be successful. In the example case in this video, the lawyer accomplishes this feat. He is not hostile toward the expert. In fact, he is rather passive and non-confrontational toward the witness. He uses mostly statements that the witness affirms to get the expert to point out code violations and violations of normal operations allowing the lawyer to draw support for his theory.

4.6 Video 6: The Deposition

As defined by the video, a deposition is a testimony made by a witness. The testimony is both under oath and either hand written or recorded by a court stenographer. A deposition usually takes place in a conference room or somewhere outside of the court room. Although it does not occur in the court room, it is considered valid evidence in trial.

Depositions are made by lawyers to establish facts about the case and to both determine the origins of and the bases for those facts. Often times, just the phrasing of a question and the answer that follows cause arguments during a trial. The purpose of a deposition is to narrow down and to help understand a testimony. If either the information given or the opinions offered by the witness are damaging to the questioning lawyer, he will try to use the deposition to impeach the witness. Thus the deposition is a very powerful tool that can be used in the courtroom.

As noted above, the deposition occurs under oath: a person must be honest during a deposition. In order to avoid having their words twisted, it is important for them to listen carefully to the questions asked by the lawyer. This ensures that the questions are understood before making an answer. Furthermore, it gives the person time to think before answering.

The most important thing to do during a deposition is to maintain composure. They are examining with the hopes of breaking down the person and getting information they did not already have concerning the case. Thus, no information should be given up voluntarily. All answers should be clean and concise. In regards to answering the question, if you know the answer, then give it. But do not be afraid to tell them that you are unsure. All answers should be well thought out.

4.7 Video 7: Summation II

This video focuses the transformation from the closing argument to the conclusion. Closing arguments are crucial because they are the final opportunity attorneys have to persuade jurors. Unlike opening statements, attorneys know what evidence is before the jury, and they are able to use their persuasive skills and techniques in to win over the jury one last time.

An effective closing statement uses several devices. The successful lawyer in a closing argument will have to be a good story teller. Telling a good story involves creating colorful images in the minds of the jury. When describing something intimate to the jury, the lawyer may want to step away from the podium and move closer to the jury.

The lawyer gets the jury more involved by getting closer to them, and in turn has their full attention.

A products liability lawyer is often required to convey to the jury the extent of the pain and suffering of his client. In the example case, a young woman was severely burned in an explosion. In this case, the lawyer chose to show how the woman will longer experience beauty. The lawyer tries to show the jury how his client's life will be drastically changed forever. How she is perceived by people from now on will be totally different. As a lawyer, you will know when you get a good result from a closing argument. Trying to use that same method on another case, however, could be a big mistake. The underlying principles to why the argument got you such a good result are the things you need to take with you to the next case.

4.8 Video 8: Summation

The summation occurs at the end of a case. It is, in essence, a summary of all the important facts presented during the trial. It is similar to the opening statement in that the lawyer needs to present important facts in an interesting manner. Since it is the end of the case, the jurors and the lawyers have truly gotten to know each other. Due to this, they should be comfortable with each other, because everything is out in the open. Due to the argumentative nature of the trial, there is a lot of excitement and suspense associated with the closing arguments.

The video depicts a summation that clearly was well thought out by the lawyer. The lawyer begins by asking the jury a question. This question was posed by the lawyer

at an earlier time in the case. He brings it up now in support of his client being awarded the money.

During the summation in the video, the lawyer uses some of the noteworthy tactics that had been pointed out. First, he doesn't use factual information to summarize the case, because it would cause his summation to be repetitive and dry. The facts have been analyzed throughout the entire trial, so the jury is quite familiar with them and there is no need to remind them of the facts. Secondly, he is trying to get the jury to accept the concept of product liability and how it applies to the victim of the case. This helps to ease the jurors in their decisions. And, lastly, he again paints a picture of the incident, from the victim's point of view, in the minds of the jurors. This helps them to once again experience the situation as if they were living it.

Although visual aids can be important during the trial, none are used by the lawyer when presenting the summation. He must be adequately informed of all the information of the case, and he must recall calculations and numerical figures strictly from his mind. In the case depicted, he made a point to tell the jury of one element of the trial that he was not asking money for. This is helpful because it makes the lawyer look to be more of a fair person. Furthermore, it helps to make the jury aware that he is only representing the case on behalf of his client.

In the summation, the lawyer utilizes his storytelling skills to make the summation both interesting and effective. He is faced with the problem of expressing to the jury how much the injuries of the client will affect him for the rest of his life. In order to accomplish this in a climactic way, he brings the story from the past tense and

relates it to the present tense. This not only helps the jurors to relate even further, but it gives them an idea of the effect the consequences had on the victim.

4.9 Video 9: 60 Minutes II: A Classic Cover-Up?

On July 15, Harold Gielow was driving his beloved 1966 Mustang in the rain. The car hydroplaned and spun across the center line into the other lane, where an oncoming vehicle hit the Mustang in the rear. Gielow's car exploded into flames. Craig Jackson, a professional firefighter, was driving behind Gielow and swerved around the skidding Mustang. Mr. Jackson has seen many car fires and was startled by the size of the exploding fireball in the Mustang.

Harold Gielow was burned to death in the Mustang fire. The police say Harold was going faster he should have in those conditions. Ford says Harold panicked and was killed on impact. Harold's parents were troubled by the coroner's report saying their son was burned to death in the Mustang fire.

The Gielows looked into the accident and learned a secret about 1964 to 1970 classic Mustangs. Fires that erupted after crashes in the trunks of some classic Mustangs have spread into the passenger compartment. All across America there are up to 1.5 million Mustangs still on the road. "Every one of them carries in the trunk a potentially deadly defect", says San Francisco attorney David Rand. He's representing the parents of Harold Gielow. The top of the Mustang's tank is also the floor of the trunk and terrible car fires can erupt after even small rear-end crashes.

Ford has been sued more than 70 times by people burned in rear-end collisions in classic Mustangs. Most of the suits have been settled out of court. Ford refuses requests

to appear on 60 Minutes to discuss the fires in classic Mustangs. Ford says these were all high-speed crashes and insists that "the fact that there are so many registered Mustangs is evidence of the design integrity of this car." Lee Iacocca, a former president of Ford and the father of the Mustang, did agree to appear on camera. He says that safety was not a major concern in the 60's and that fuel tank safety was never discussed. He claims that "to say that the Mustang had more problems or severity of problems than any other car in its class to me is poppycock.".

However, some of Ford's own safety engineers concluded early on that there was a problem with the Mustang's fuel tank design. One of those engineers is Peter Bertelson. Ford was the only American manufacturer to use a drop-in fuel tank before abandoning the design in 1971. "It's not a safe way to put fuel into an automobile," Bertelson says. He also says that he is absolutely sure that all of Ford's executives knew of the problem in 1966.

Rand, the lawyer, discovered film of an old Mustang crash test, Ford Crash Test 301, which he says shows gas spewing onto the dummy's head. If the gas was ignited, everyone in the vehicle would have died. The family has not sued Ford yet, but is on a safety campaign to get people out of classic Mustangs.

5 Case 1: Sandsbury vs. Ranpack Corp.

Sources used in this case analysis: The video of machine operation, (OSHA) Concepts and Techniques of Machine Safeguarding, Accident Prevention Manual for Industrial Operations, ANSI/ASME B15.1 – 1984; Safety Standard for Mechanical

Power Transmission Aparatus, Photo Album, and Autopad Cushioning System Operator Manual.

5.1 Introduction

The first case is Sandsbury vs. Ranpack Co. In this lawsuit, Timothy Sandsbury is suing the Ranpack Co. for injuries he suffered as the result of using a machine that they fabricated and marketed. Timothy Sandsbury suffered this injury as he attempted to clear the machine of what he assumed to be a jam. Mr. Sandsbury placed the machine control mode selector switch into the EDS mode (Electronic Delivery System). Mr. Sandsbury then reached into the discharge chute to remove jammed materials and the knife subsequently cycled on his fingers.

5.2 Description of the Accident

5.2.1 Important facts from notes taken during investigation of accident:

1. 7 inch opening under guard that operator could reach into.
2. Mr. Sandsbury put his hand in machine without pressing E stop.
3. The machine was jammed from previous shift, so Tim was asked to fix the jam because he had fixed jams on the other machines.
4. These other machines did not have an EDS (Electronic Delivery system) switch, so it was Tim's first time using a machine with this option.
5. There was a warning label on machine saying, "Danger! Keep Hand Clear." (See Appendix 2)
6. Another warning on chute with finger bandages/cut (See appendix 5) (Tim did not see warning on chute because it can't be seen when standing)

7. He did not press e-stop because he didn't think the machine would cycle because it wasn't cutting when he pressed the cut buttons (i.e. not knowing how to properly use the machine)
8. He did not look at any manuals before attempting to fix so called jam.
9. Did not use reverse switch(see Appendix 7)
10. He had no training on this new machine with EDS mode.
11. If output chute were longer, he wouldn't have been able to reach the cutting blades (See appendix 4).
12. There was no guard at output of the chute (See appendix 5).
13. There were no instructions on machine indicating that cutting would occur if light beam was broken (See appendix 1).
14. Date of accident was Jan 24, 1997

5.2.2 Process that Timothy Sandsbury followed:

- Pressed e- stop button
- Opened up chute cover
- Cleaned out paper
- Turned e-stop button off
- Hit reset button
- Pressed two cut buttons, but no sound
- Tim thought something else was in machine
- Lifted plastic cover in front of the chute
- Put hand into chute, but didn't press e-stop this time

- Didn't think machine would cycle in EDS mode
- Broke light beam
- AUTOPAD Cushioning system cycled and cut his fingers

5.3 Description of the Machine

5.3.1 General Description

The machine is the "AUTOPAD" Cushioning System. It is used to create packing paper. This machine takes a large roll of paper approximately thirty-six inches wide, folds and crumples it, reducing it into a mass of paper that can be used to cushion objects inside a packaged box. It has valuable uses in the shipping industry to protect the contents of boxes to be shipped, while being a product that is bio-degradable, recyclable, and reusable.

The user's manual describes specific checklists for operation. BEFORE servicing the machine, the following need to be checked:

1. The cutter arm is up in the REST position (See Appendix 8).
2. The machine is plugged in.
3. You have reset the machine by depressing the ON-OFF switch fully.
4. The POWER switch is on.
5. The paper loading door and discharge chute are properly closed.

There is a danger notice: "Disconnect all electrical power and air supply (if applicable) prior to any servicing or repair (See Appendix 1).

5.3.2 Movie Description

The movie showed the machine in three different operating modes. The first mode of use was the AF-AC mode (Appendix 7 shows the operating console). This is the automatic mode of the machine (Automatic Feed – Automatic Cut). When the machine is put into this mode, it continuously feeds and cycles the paper. It does this regardless of the cut buttons being pushed, and only stops when the machine is taken out of this mode.

The second mode is the AF mode. In this mode, the machine only cycles and feeds when the cut buttons are pressed. Thus, in order to have the machine cycle and cut the paper, the cut buttons need to be pushed. Both cut buttons need to be pressed at the same time in order for the blade to cycle. When the buttons are pushed, the machine first cuts the paper that is loaded into the machine and then feeds more paper into position that can be cut by pushing the buttons again. If the buttons are not pushed, then nothing happens.

The third mode was EDS (Electronic Delivery System). In this mode, the machine cuts only when the paper is removed from the paper feed. When the paper is removed, the machine cycles more paper into position to be cut. If the cut buttons are pushed, nothing happens with the machine, even if both cut buttons are pressed simultaneously. No noises and no movements occur when the buttons are pushed. The only way the machine cuts is if the paper currently in the chute is pulled out.

5.4 Discussion of Applicable Standards

According to OSHA, a good rule to remember is that any machine part, function, or process which may cause injury must be safeguarded. Where the operation of a machine or accidental contact with it can injure the operator or others in the vicinity, the hazard must be either controlled or eliminated. One of the basic areas that requires safeguarding is the point of operation. This is defined as the point where work is performed on the material, such as cutting, shaping, boring, or forming of stock (OSHA, 1). As can be seen by this definition, this closely applies to the case, because the blade used to cut the paper is the point of operation.

Safeguards must meet general requirements. The first of these requirements is to prevent contact. As quoted from the text, a safeguard must "prevent hands, arms, or any other part of a worker's body from making contact with dangerous moving parts." (OSHA, 7) This applies to the case because the hands of the victim were not prevented from making contact with the point of operation.

The most important aspect of safety is training. This is so important, because even the most elaborate safeguarding system cannot offer "effective protection unless the worker knows how to use it and why." (OSHA, 9) Training of the operator should cover the following details:

1. A description and identification of the hazards associated with the machine.
2. The safeguards themselves and how they provide protection.
3. How to use the safeguards correctly.
4. How the safeguards can be removed.
5. What to do in the situation of a safeguard being damaged or removed.

5.5 Statement of Final Opinions

After investigating the case, we have come to several conclusions. First and foremost, as we showed in the previously stated OSHA standards, the machine should have been designed so Mr. Sandsbury could not reach the cutting blades. The machine was poorly designed and the blame lies on the Ranpak Corporation for not following the OSHA guidelines.

Secondly, Mr. Sandsbury should not have attempted to repair the machine himself because he is not a certified technician that is trained to repair these types of machines. Also, it is known that he was not properly trained on the machine, but even so the opportunity for injury is apparent because he was not familiar with the operation of the machine. By putting the machine into EDS mode, he set himself up, in a sense, to have his fingers chopped off when he broke the light beam (See Appendix 5).

The machine is simple to operate which was evident in the video. Mr. Sandsbury was wrong to assume that this machine performed like all the other previous machines he was worked with. It is clear that Ranpak Corporation is not completely to blame; but according to the OSHA standards, they are to blame. In the court of law, Mr. Sandsbury can not be held accountable for his lack of experience. Those standards state very clearly that he should have been properly trained and shouldn't have had access to the blades at all.

Personally, we feel that Mr. Sandsbury's poor decision making is a major part of this case. It is one of the main reasons this accident occurred. Unfortunately, that will not have much relevance in the court room. Ranpak designed a machine that did not

coincide with the standards set for machinery. We are in no way stating that Mr. Sandsbury deserved this unfortunate injury, but he could've prevented it from happening.

This incident could have been prevented in several ways. The machine could have been designed according to the OSHA standards. For instance, the chute should have been longer and there could have been guards over the blades. Also, Mr. Sandsbury said the warning labels were not visible when he was in front of the machine. They could've been positioned differently. Also, which we think is very essential; Mr. Sandsbury should have been trained on this machine.

In closing, it is obvious that there are several reasons that contributed to this accident. However, for our overall decision, the blame lies on the Ranpak Corporation for producing a poorly designed machine. Despite Mr. Sandsbury's lack of experience, the accident could have been prevented if the machine were designed correctly.

6 Case 2: Eric Roemer vs. Thomas Mirabella

Sources Utilized during case analysis: Engineering Mechanics and Dynamics (8th Edition), photo album, Court Depositions, Professor Hagglund's notes, and Crime Scene Investigations.

6.1 Introduction

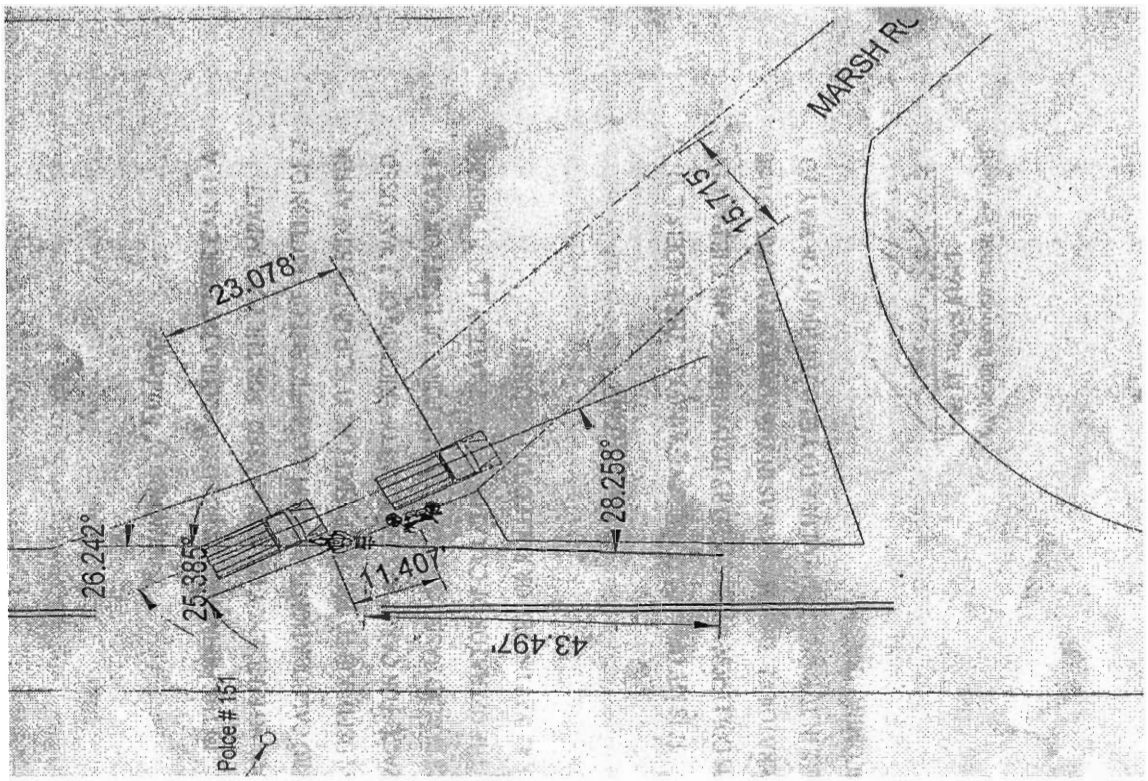
On December 21, 1999 at 3:20 pm on Dudley Oxford Road in Dudley, Massachusetts, a collision between a motorcycle, operated by Eric Roemer, and a truck, operated by Thomas Mirabella, occurred as the truck made a left turn across the lane the motorcycle was traveling on. (See Appendix 9, 10 and 11 for scene pictures). The only serious injury that occurred was to the operator of the motorcycle, who was wearing a

helmet at the time of the accident. Neither of the operators tested positive for alcohol or drugs, and there was no evidence of tiredness for the operator of the motorcycle.

The motorcycle was a black and red 1985 Honda MC, and the truck was a 1990 red Chevrolet pickup. The motorcycle was traveling south in the southbound lane, and the truck was traveling north in the northbound lane. The truck proceeded to turn across the northbound lane and in front of the motorcycle in order to enter Marsh Road. The motorcycle applied his brakes and skidded into the right side of the truck. The motorcycle came to a rest on marsh Road, and the truck was driven to rest on Marsh Road facing east.

6.2 Accident Information

6.2.1 Road Description and Skid Marks



-Figure 1

The road is a two lane, undivided, tar paved roadway (See Appendix 11). Both the southbound and northbound lanes are approximately ten feet wide. At the time of the accident, the road was dry and undamaged from defects or weather erosion. The speed limit is unposted at 40 miles an hour.

The measured coefficient of friction used in the accident reconstruction was .7, as measured by a drag sled. The only skid mark was from the rear tire of the motorcycle, which continued until impact with the truck. The distance of this skid mark was 43.497 feet. There was a front tire scuff at impact and a rear tire side scuff at impact. The motorcycle came to rest 11.407 feet after the impact. There were no pre-impact skid marks found for the truck.

6.2.2 Preimpact Mechanical Defects / Impact Damage

The motorcycle, after a post crash inspection, revealed no preimpact mechanical defects. Damage to the motorcycle was to the front fork assembly, which was pushed rearward and to the right. There was also some damage to the right side of the motorcycle. The truck, after a post crash inspection, also revealed no preimpact mechanical defects. The damage was to the right side of the vehicle at the front door area (See Appendix 12).

6.3 Accident Reconstruction

6.3.1 Angles of impact / Departure

As described by the police reconstruction, the approach angle of the motorcycle was 0 degrees, and it departed at 205 degrees. All angles were adjusted to the motorcycle. The truck approached at 208 degrees and departed at 220 degrees. These angles, along with the weights of the vehicles, which were 650 pounds and 2500 pounds for the motorcycle and truck respectively, were used to calculate the approach speed. The approach speed for the motorcycle, as calculated by the police reconstruction, was 27.86 mph, and the approach speed for the truck was 25.57 mph.

6.3.2 Police Evaluation of the Evidence

For the motorcycle, a braking efficiency of .4 was used, and for the impact speed calculation, a coefficient of friction of .7 was used because it slid on its side after impact. For the truck, a coefficient of friction of .7 was also used. This evidence is based on an estimated point of rest for the truck, which is 15 feet before the car was driven or rolled to a rest.

6.3.3 Findings of the Police Report

Due to the concluded impact speeds, the police report found that the collision was caused by an error of the truck operator. They claim that he failed to use care in turning and failed to yield to the right of way to oncoming traffic.

6.4 Analysis

6.4.1 Importance of the Police Report

The reconstruction of the accident presented in the previous section has a substantial bearing on the outcome of the case. If found guilty, Mr. Mirabella will go to jail and will be sued in a civil case. We have closely examined the evidence presented and feel that the police calculations are not correct based on the large amount of damage done to the truck. This will be explained in detail in subsequent sections.

6.4.2 Truck Damage

It is apparent that the motorcycle was traveling faster than 28 mph by looking at the accident photographs. There is extensive damage to the front passenger side door done by the collision. When analyzing this information, it is important to remember that the collision was not at a 90 degree angle (See Figure 1 above). Instead, it was at a 28.258 degree angle. And due to the fact that Mr. Mirabella was making a left turn and there were no skidmarks, it can be assumed that his traveling speed is close to accurate.

For this speed and impact angle, the damage done to the truck should have been minor. The damage, however, was severe (See Appendix 12 through 16). The passenger side door to the truck, which is where the motorcycle made impact, was dented in 10 inches at the deepest spot and 4 inches at the most shallow spot (See Appendix 14). The entire front cab of the truck was shifted 4 inches from the rear bed of the truck (See Appendix 13). Furthermore, the hinges to the door of the truck were torn away from the

frame 4 inches as well (See Appendix 16). Needless to say, the passenger side window was shattered.

This large amount of damage leads to the assumption that the speed calculated by the police report is inaccurate. Should the motorcycle and the truck have been traveling at the speeds calculated by the police report, then the damage would have been much less severe. This damage would still be too extensive even if the impact angle was 90 degrees.

6.4.3 Skid Marks

The skid mark made by the motorcycle before impact was measured to be 43.497 feet. This skid continued until impact with the truck. We researched stopping distances for motorcycles, and found statistics that show the motorcycle was traveling at a faster rate than measured by the police report.

As shown in Motorcycle Training; A Beginner's Guide, the basics about breaking are that the rider should use both brakes when stopping. To most effectively stop in good road and weather conditions, the rider should apply the front brake a fraction of a second before applying the rear brake. GREATER PRESSURE SHOULD BE APPLIED TO THE FRONT BRAKE. The front brake gives the best stopping power in good conditions because the combined weight of the machine and rider are thrown forward and the front tire is pressed more firmly against the road, giving a better grip.

To begin with, the rider of the motorcycle did not follow these basic steps when braking. The rider only applied the rear break, without using the front brake. The rear

tire skidded for 43.497 feet. The accident occurred with good road and weather conditions, so there is no reason why the front brake was not used.

The guide also discusses average stopping times and distances:

- At 30 miles per hour, the average thinking distance is 30 feet, the braking distance is 45 feet, which gives a total stopping distance of 75 feet.
- At 50 miles per hour, the average thinking distance is 50 feet, the braking distance is 125 feet, which gives a total stopping distance of 175 feet.
- At 70 miles per hour, the average thinking distance is 70 feet, the braking distance is 245 feet, which gives a total stopping distance of 315 feet.

With these calculations, the skid mark left by the motorcycle was 43.497 feet, so if the rider was traveling at the speed calculated by the police report, which was 27.86 miles per hour, the motorcycle would have come to a stop before hitting the truck. But the motorcycle did not stop before hitting the truck, and it also caused extensive damage to the truck, which means that it was traveling at a good speed when it made contact with the truck.

Thus, based on the estimated stopping distances and good braking procedures, if the rider of the motorcycle was traveling at 27.86 miles per hour, he could have easily stopped before hitting the truck. This was not the case, however. Due to this evidence, the motorcycle was traveling at speeds that exceeded the 40 mile per hour speed limit.

6.4.4 Calculation Discrepancies

(See Appendix 31 for our calculations.)

Utilizing the equations for impulse momentum on pg 239 of the Engineering Dynamics book and the calculated speeds by the officer, we calculated the x and y components of the approach and departure speeds. Then using the given weights for each vehicle, we calculated the momentum in each direction. We then used these values in the given equations to see if they balanced to zero. In fact, both sides of the equations were different. Therefore the assumptions the police officer made were wrong, and they affected his calculations.

6.4.5 Data Assumptions

When performing calculations as above, the input values are essential in determining the proper output values. But the police report makes a major assumption on the resting position of the truck. In the report, the results are based "on an estimated point of rest for the truck by the operator of the truck of approximately 15 feet before it was driven or rolled to a final rest." This value is used to calculate the results of the police report. The problem with this is that it is an estimate. There was no way for the police to measure the point of rest for the truck. Thus the final results are based on an estimate and SHOULD NOT HOLD UP IN COURT.

6.5 Conclusions

How could this calculation be used when one vehicle weighs 2500 pounds and the other vehicle weights 650 pounds? How can this hold up in court if the values used in the calculations are estimates? How can this hold up in court based on the amount of damage done to the truck? How can this evidence be vaild in court based on the length of the

skid mark and the perfect road conditions? These are some of the questions that could be raised by the attorney to prove that the police reconstruction can not hold up in court.

As can be seen from our above arguments and findings, the motorcycle was traveling much faster than the police report calculated. Because of this, the motorcycle was speeding (traveling in excess of the 40 mile per hour unposted speed limit). Thus Mr. Mirabella should not be held liable for the accident. He should not go to jail, and he should not be sued in a civil case. If the motorcycle was 500 to 1000 feet away, then Mr. Mirabella should have had enough time to complete the turn if the motorcycle was traveling at the posted speed limit.

7 Case 3: Dominic Lapenta vs. JM Equipment Co.

Sources utilized in case analysis: The Operator's Manual for Rough Terran Variable Reach Forklift (Model: TL6035), Photo Album, Court Depositions, and Professor Hagglund's Notes.

7.1 Introduction

On December 29, 2001 at 9:23 AM, Dominic Lapenta was working on his house, which was under construction at 66 Deerwood Rd., Tolland, Ct. He was working with two friends and they were putting up trusses above the master bedroom. He was operating a lull (fork lift) while one partner (Camberlin) was on the ground holding the tag line, and another partner (LaPointe) was on the roof.

As Mr. Lapenta attempted to lift a truss up to the roof, the forklift tipped over (See Appendix 17 and 19). As it tipped over, he jumped from the driver's seat and ran away from the tipping machine. As he was running away from the machine, the fork lift

boom struck the victim forcing him to the ground. Mr. Lapenta suffered serious injuries from the accident and was taken to Hartford Hospital via Life Star.

7.2 Overview of the Case

7.2.1 The Lull

The lull that was being used by Mr. Lapenta was rented from J&M Equipment to assist with lifting trusses up to the roof. The first lull that Mr. Lapenta received had a problem starting, and eventually it wouldn't start at all. So he contacted J&M equipment, and the delivered another lull and removed the one that wouldn't start. The victim was hesitant to accept the lull because there were no stabilizing arms and it was smaller than the previous one.

On the day of the accident, Mr. Lapenta was operating the lull in a stationary position. He was in the process of lifting one truss. The boom was fully extended and in an upright position. As he moved the boom assembly forward on the chassis, the machine began to roll over to the left. He then attempted to move the boom back to prevent the machine from rolling over. When he realized that the machine was going to roll over, he jumped from the machine. As he jumped, he fell to the ground and attempted to crawl away. As he was doing so, the boom struck him. The victim stated that he was NOT wearing his seatbelt at the time. He DOES NOT build homes for a living, but he has experience and knowledge in the trade.

7.2.2 Description of the Ground

The ground where the forklift was positioned had a gradual downward pitch to the west of about 12 degrees (See Appendix 18). This is in the same direction that the forklift fell over and slid down the downward pitch (See Appendix 19). The forklift was equipped with a seatbelt to assist if the forklift did tip over.

7.2.3 Witnesses

Peter Chamberlin stated that he was working the tag line on the ground. It was his job to keep the truss from swinging while it was being lifted up to the roof. In the process of lifting the second truss, the lull began to wobble from side to side. He realized at this point that the lull was going to tip over, so he yelled to Mr. Lapenta. As the lull tipped over, Mr. Lapenta came out of the cab area and attempted to get away from the equipment. As he stepped away, the boom struck the victim forcing him to the ground.

The other witness was Kevin LaPointe. He stated that they were in the process of lifting a truss to the roof area above the master bedroom. The truss being moved was the second truss. Mr. Lapenta was operating the lull and Chamberlin was on the ground with the tag line. As the victim was attempting to lift the truss up to the roof, the lull began to tip to the left. LaPointe stated that at that point he realized it was going to tip over onto its left side. He repositioned himself on the roof in order to see the victim and observed him lying underneath the lull.

7.2.4 Injuries Suffered

A statement was taken from the first responder, who was Sheldon Mcintosh. He is a member of the Tolland Volunteer Fire Dept., and upon his arrival, he found Mr. Lapenta lying next to the boom. He was fully conscious at that time, and he was complaining of pain. After the incident, a trooper spoke to Mr. Lapenta's wife. She told him that he suffered from two broken legs, a collapsed lung, and a back injury. The victim should be able to recover fully, but it will take some time.

7.3 Lull Warnings

7.3.1 Dash Warnings

The dash has two important warnings that apply to this case (See Appendix 20 and 24). The first warning is in regards to the steering selector, in which different steering modes can be selected. It instructs "WARNING: Read operators manual for operating instructions." (See Appendix 22) The second warning is about wearing a seatbelt. It reads: "CAUTION: Please fasten seat belt." (Se Appendix 24)

7.3.2 Other Warnings

Upon entering the machine, there is a large warning regarding the possibility that the machine could tip over. The warning instructs the operator that it can cause death or serious injury. The operator should "...not exceed rated lift capacities, level machine before raising boom, lower the boom before traveling, and operate on firm, level surface." (See Appendix 21)

Another warning critical to this case instructs that the operator should be trained to use the machine. It reads "Only personnel trained according to Occupational Safety and Health Administration (OSHA) Rule 29CFR 1910.178(I) may be allowed to operate this machine. Read Owner/Operator Manual before operating or servicing machine." (See Appendix 22)

The last important warning applicable to this case is the warning near the handle used to enter the cab. It is a "SAFE OPERATION CHECKLIST" which instructs the operator what to do to insure safe operation of the lift. The most important of these warnings is "Always use seat belt." (See Appendix 23)

7.4 Court Dissertation

The Plaintiff stated that the accident was the fault of the company. He informed the jury that he was not properly trained on the equipment and shouldn't have been allowed by J&M Equipment to operate lift under any circumstances. He stated that he was not informed or given any literature about hazard warnings concerning the machine. However, there are numerous warnings in clear view in several places on the machine.

7.5 Our Analysis

7.5.1 Our Conclusion

Upon reviewing the materials present for the case, including the pictures, operator's manual, and court dissertations / accident reports, we have found J&M Equipment NOT liable for the injuries sustained by Mr. Lapenta. Should he have followed the necessary precautions and read the warnings on the machine, then he would

have known how to operate the machine without placing himself in danger. Furthermore, if he had his SEATBELT fastened, then he would not have sustained any injuries when the lift tipped over. The only reason he suffered injuries is because he ran from the lift as it rolled over, which landed on him when he slipped.

7.5.2 Overview of Misuse

The warnings, which were discussed in section 3, were completely disregarded by Mr. Lapenta. He did not follow any of them, including the most important one: to wear his seatbelt. When the lift tipped over, as seen by the photographs, the boom was in the extended position. Mr. Lapenta was operating the lift on ground that was not level: it had a 10 degree slope. This is important because the warnings instructed that the lift should only be operated on a level surface.

7.5.3 Disregard to the Warnings to Operate On Firm Surface / Level Machine

Furthermore, the lift slid down the incline when it tipped over: the lift was being operated on a surface that was not firm: this completely disregards the warning to only use and operate the lift on firm ground. When Mr. Lapenta lifted the truss, he did not level the traverse lift before doing so. This is also clearly described in warnings on the machine.

7.5.4 Disregard to Warning to Wear Seatbelt

The most important warning that Mr. Lapenta did not follow was to wear his seatbelt while operating the lift. It is on the machine in two different locations (according to the pictures), once as a caution and once as a warning. The caution label reads "Please Fasten Seat Belt." As already discussed, if Mr. Lapenta had been wearing his seatbelt when the lift tipped over, he would not have been severely injured: he would have remained inside the cab when it tipped over.

7.5.5 Complete Misuse of Machine

One warning label on the lift (in the photographs) instructs: "Level Machine before raising the boom. Lower Boom before traveling. Operate on firm, level surface." Mr. Lapenta did not follow any of these precautions: he did not level the machine before raising the boom. He did not lower the boom before traveling. Also, he did not operate the lift on a firm, level surface.

Because he did not follow any of these precautions on the warning label, and because he did not follow any of the previous warnings discussed, Mr. Lapenta operated the vehicle in a completely unsafe manner. He did not take any safety precautions, and he was operating the vehicle without knowing what he was doing. Should he have taken the time to read the warning labels and follow the safety precautions, he would not have sustained any injuries.

7.6 Conclusion

Mr. Lapenta is completely at fault for the accident. There were no mechanical defects with the lift: it tipped over because he was operating the lift in an unsafe and

careless manner. He did not level the Traverse Lift, he was traveling with the boom of the Traverse Lift in a fully extended position, and he was not wearing his seatbelt. Should he have operated the lift properly, then he would not have been injured.

8 Case 4: Jeremiah Johnson vs. Grafton County Et. All

Cases utilized in court analysis: Photo Album, Depositions, Video of machine Operation, ASAE and ANSI Standards, and Ag-Bagger Model G-680 through GH-690 Operators Manual.

8.1 Introduction

Jeremiah Johnson, age 19 died on June 2, 1999 after becoming entangled in the rotor mechanism of a PTO-powered agricultural feed bagging machine. Mr. Johnson was atop a PTO/tractor driven Ag-Bagger Model G-580 bagging machine, attempting, with a fence post, to clear a clog in the machine's intake throat immediately before the incident. The victim died after falling into the open throat of the machine and subsequent contact with the rotor mechanism that is responsible for pushing and packing the chopped hay material backward into a large elongated plastic bag. The incident occurred sometime between 9:00 and 9:20 p.m. as Mr. Johnson worded on the Grafton County Farm in North Haverhill, New Hampshire.

8.2 Description of G-580

8.2.1 Machine Description

The Ag-Bagger that was used was the G-580. The tunnel diameter on it was eight feet, and it had two wheels instead of four (as in the previous model). The length of the rotor was five feet. It was designed and sold in 1987. When the machine is in operation, the feed is unloaded onto a conveyor which takes it into the hopper and the machine drops it in front of the rotor. The speed of the G-580 was 36 revolutions per minute. The fingers, or rotor teeth, are three-quarters to one-inch wide, and they press the feed in from one side of the hopper to the other. The rotor is able to grab the material and move it with six-inch welded fingers that press the material in. In the deposition of Larry Inman, he reveals that the designers of the G-580 did not have any classroom training in engineering or mechanical design.

8.2.2 Warnings

There are several warnings on the machine that apply to a person if they attempt to clear the machine by poking the silage. As in this case, Mr. Kimball stood on the hydraulic box (the large green box in Appendix 26) and used a fence post to push down the dry hay in the hopper while the machine was running. This showed a disregard for the warnings. One warning reads "Do not reach or place any part of your body inside the hopper." (See Appendix 28) Another warning reads "Keep hands, feet, and clothing away from intake area and all other moving parts of the machine." Furthermore, there is another warning which states "Do not attempt to service, remove, or unclog any material while machine is in operation.

8.3 Witness Depositions

8.3.1 Neil Tinker

Neil Tinker was working with Jeremiah on the night of the accident, June 2, 1999. Neil was in charge of the AG-Bagger, while Jeremiah was running the chopper. Once they reached the last load, Jeremiah stopped what he was doing to assist Tinker. The haylage was still wet from the rain and it began to water up. It is then when Tinker started to unclog the machine with a wooden fence post.

Tinker stated in the deposition that it was Donnie Kimball who had previously showed him how to unplug the AG-Bagger by using a wooden fence post. Kimball showed Tinker how to do it while standing on the step and reaching over the top of the AG-Bagger. However, Tinker and Jeremiah went higher up (see attached diagrams) so they could sit down and placed one foot on the corner of the conveyor and one on the hopper. Jeremiah never saw Donnie Kimball show Tinker how to unplug the machine. He only saw Tinker unplug the machine on the night of the accident. Jeremiah was technically not supposed to be operating the AG-Bagger, but was only helping Tinker because it was the last load of the night. Tinker was going to shut the machine off because he was tired of trying to unplug the bagger, but Jeremiah went up there and said, "Let me try a little." The accident then occurred when Johnson was trying to unplug the machine. Tinker did not see Jeremiah fall into the machine. He was not looking and then heard him scream, "Turn it off!" repeatedly. So Tinker then turned the machine off, but Jeremiah had already been pulled into the machine.

Overall, Tinker does not believe the farm is at fault or any of its supervisors including Mr. Kimball. He also states the AG-Bagger company is not to blame and that

all blame falls upon himself and Jeremiah Johnson. Although, from the standpoint of the law, Tinker does not realize that there should have been safety guards to prevent an accident of this nature from happening even though it was a poor decision made by himself and Johnson.

8.3.2 Donald Kimball

Donald Kimball is the farm manager on the Grafton County Farm. Mr. Kimball is the individual who purchased the Ag-Bagger for the farm, after having rented a similar unit on two previous occasions. He claims in his deposition that he was never given training when he purchased or rented the machine, but that when he purchased the Ag-Bagger he did receive an owner's manual. He later learned that the owner's manual that he received was not the manual for the exact machine that he purchased. Mr. Kimball claims in his deposition that he never trained anyone to climb into the hopper of the Ag-Bagger to clear a clog, stating that that would be crazy and very dangerous. He claims that to clear clogs he would stand on the hydraulic box and use a wooden fence post to push the "haylage" through the rotating shaft that grinds the feed.

On June 1, 1999 the day prior to the day that Jeremiah Johnson was killed, Donald Kimball worked from 4:00a.m. to 3p.m., and all work with inmates was done at 3p.m. On the day that Jeremiah Johnson was killed, Kimball also worked from 4a.m. to 3p.m. Jeremiah Johnson was driving the tractor which pulled a chopper and a high dump truck while Neil Tinker was running the truck and the Ag-Bagger. There had been rain this day and the haylage was getting clogged in the Ag-Bagger, this was the reason that he had stopped work on this day at 3p.m. and that he was not responsible for the call that

was made for the inmates to keep working. This decision was made by Delton Stimson the Grafton County herdsmen/milker. Donald Kimball's testimony shows that he disagrees that he would not stand in the hopper to clear clogs in the Ag-Bagger. Kimball also is delinquent in his duties as the farm manager. He allowed two inmates, Jeremiah and Neil, to run farm equipment without adequate "Paid Grafton County Employees" as was policy at the Grafton County Farm. From this deposition and the depositions of Neil Tinker and Larry Inman, and also the police reports on file, Donald Kimball seems to be trying to divert the blame from himself by denying that he would enter the hopper to clear the clogs and that he was not responsible for the inmates working at the time of the accident.

8.3.3 Larry Inman

The deposition for Larry Inman occurred on Tuesday, January 7, 2002, at 10:07 a.m. Larry Inman worked for the Ag-Bagger company and was one of the main designers of the G-580. When deposed, he was not aware of many of the ASAE Standards, which are outlined in the following section. The standards were not taken into consideration when the G-580 was built, and thus the machine lacks many safety constraints (both warnings and guards), which poses certain risks to the operators.

The testimony of Mr. Kimball is noted in this deposition, and Mr. Inman agrees that Mr. Kimball's method of unclogging the machine posed certain risks to his safety. Mr. Kimball told that when he cleared the Ag-Bagger if it became clogged, he would often use a wooden fence post. If it were clogged with wet hay (as in the case of the accident), he would put dryer silage into the hopper. Then he would stand on top of the

silage to pack it down as the machine ran until it began to funnel down. Kimball then stated that he would get off of the silage and then stand on the hydraulic box outside of the hopper and push down with the wooden fence post, if necessary.

Mr. Inman regards the above process as both dangerous and reckless. Not only is Mr. Kimball inside of the hopper during this, but the machine is running, with the rotor spinning and taking in the hay and silage. Should he be caught he could be seriously injured or killed. Mr. Inman regards this as an OBVIOUS danger that should have been apparent to the farm manager.

Mr. Inman was asked to provide an instruction manual for G-580, but he did not have the owner's/operator's manual, so he had to provide the manual for the G-680. The manual was supposedly the same as the G-680. In the manual, should the machine become clogged, it instructs to release slowly the brake pressure until the water stops forming in the hopper bottom. If the water does not dissipate, it may be necessary to wait a little longer. Dry feed may have to be used to pick up the wet feed.

8.4 ASAE Standards

8.4.1 Standard 441

ASAE Standard 441 was adopted December of 1983. This standard concerns safety signs. Item 2.4 covers the signal words that are to be used in warnings. Section 2.4.1 covers the word "Danger," and it reads "...denotes an extreme intrinsic hazard exists which would result in high probability of death or irreparable injury if proper precautions are not taken." The Ag-Bagger G-580 does not use this keyword, even though there are items that should be covered with warnings containing the "Danger"

keyword. Instead, the word "Warning" is used. The rotor shaft presents a danger of entanglement, and should contain a warning to document said danger.

8.4.2 Standard 318.8

This section, "Shields, Guards" reads that "The following shall be shielded or shall be guarded by location to minimize inadvertent contact with hazards created by..." And section 6.1.6 covers "revolving shafts." Paragraph 6.3 further details this standard, by defining "functional components such as...augers...shall be shielded to the maximum extend permitted by intended function of the components." The rotor on the G-580 falls within the definition of 6.3. The standard recommends that such rotors "shall be shielded to the maximum extent permitted by the intended function of the component." The rotor falls under this standard, but failed to be shielded to the maximum extent possible.

8.5 Analysis

8.5.1 Unsafe Conditions / Actions

At the time of the accident, there were unsafe conditions. Notably, there were wet surfaces, the accident occurred in the evening, and there was insufficient lighting of the work area. The unsafe behavior consisted of using a pole or fence post to feed or dislodge hay / chopped grass silage. Furthermore, it was unsafe to be standing over or near the feed hopper.

8.5.2 Inadequate Policies

During the time of the incident, there was a lack of supervision of the two employees. There were also minimum safety programs: there was no formal training or documented training of the operation procedure. Grafton County Commissioners were required to provide for the care, custody, and safety of prisoner, including adopting and implementing policies and procedures necessary for appropriate training and supervision of staff and prisoners.

Because Mr. Kimball was assigned responsibility for supervising the prisoners, it was his responsibility to provide for the care, custody, and safety of prisoners working at the county Farm. Kimball instead demonstrated a dangerous and totally unacceptable method for unclogging the Ag-Bagger, which exposed prisoners operating the machine to multiple dangers including the risk of entanglement in the rotor. And they were not adequately trained to operate the machine, as required by warnings on the machine (See Appendix 28, 29, and 30).

The Grafton County Commissioners and Superintendent Libby fully understood the necessity of training because they established an appropriate training program for the prison staff. But they completely OMITTED ANY training in prisoner management, prisoner safety, or farm safety for the farm manager until after Jeremiah Johnson's death. There were also no policies for training prisoners in issues of work safety and farm safety, which is a deliberate and conscious disregard for the safety of prison farm workers.

In regards to the incident, allowing Mr. Johnson and Mr. Tinker to work on dangerous farm equipment, which was made more dangerous by wet working conditions

and poor lighting, again, demonstrated deliberate and conscious disregard for the safety of the prisoners. This, in turn, directly contributed to cause the death of Jeremiah Johnson.

8.5.3 Design Flaws of the G-580

When the G-580 Ag-Bagger was designed, the machines designers should have recognized that the machine's rotor presented a significant hazard to machine operators for many different reasons. For one, machine operators had a reason to reach into the hopper while the rotor was turning because of the tendency of the machine to clog and because of the lack of a convenient or recommended method for unclogging the machine without the rotor turning. Also the rotor was not guarded by location because the rotor was within reach of a machine operator while standing on the hydraulic box.

At the time of the design of the machine, there could have been numerous things done to the machine to make it safer. For example, the slope of the sides and bottom of the hopper could have been increased, a "live" bottom or secondary rotor to the hopper could have been added, or there could have been a device added to provide a means for safely removing clogged silage from the hopper. Or a guard to the rotor could have been put on by raising the sides of the hopper and attaching a hinged expanded metal lid to the top of the hopper. They could have even put in a "lifeline" which allowed the machine to be turned off immediately in the case of an emergency.

Not only was the design of the G-580 hazardous, but it lacked proper warnings and cautions. This was discussed in section 4 as well: illustrations and clear language (including the signal word "DANGER") should be used to communicate warnings of

serious injury. The text-only warning provided with the machine was inadequate because it lacked attention grabbing illustration or signal words. These warnings do not follow the ASAE standards covered in section 4.

8.6 Conclusion

Jeremiah Johnson's death was caused not only by the defective and unreasonably dangerous design of the Ag-Bag machine, but also by the lack of proper training and supervision provided by the County Farm. The Ag-Bagger machine, as discussed in the previous sections, should have had two things that it did not have:

1. It should have had either a guard shielding a person from the rotor or a different design, such as steeper slopes for the sides and the bottom. The G-580 had neither of these.
2. It should have had adequate warnings, indicating the severe danger posed by the rotor. The warnings on the G-580 failed to do this.

And there should have been proper training and supervision by the County Farm. The prisoners were not watched over in a sufficient manner, and they were not adequately trained. And the accident occurred in hazardous conditions, with poor lighting, and at a time when the operators were fatigued.

In summary, the death of Jeremiah Johnson could have been avoided. If the G-580 had adequate warnings and safety guards on the machine, then he would not have been exposed to the rotors and he would have known not to unclog the machine as he was. And furthermore, if he were properly trained, he would have known how to handle the machine when it became clogged.

9 Concluding Remarks

Before we began this project our group members had no previous knowledge of any part of the courtroom process, or the events that precede it. We had little knowledge of the role that an engineer plays in the courtroom and/or what his purpose is in the litigation process as a whole. To us, the law appeared to be black and white: each case has an easily reached conclusion based on the current law and statutes. Furthermore, we have never had the need or necessity to research and reason through a lawsuit, such as the ones that we were presented.

Now that we have completed this project, we have a solid understanding and have gained substantial knowledge of the courtroom process and the events that lead up to the trial. We now understand and fully comprehend the purpose of utilizing an engineer in the courtroom process and how effective he/she can be for your case. In many situations, expert witnesses are necessary for the case to be solved. This project has also prompted our group with the necessity to research and reason through a lawsuit. Next we decided a verdict on the case using the evidence presented to us, and decided where the fault that caused the accident lay and dictated who was guilty or innocent.

Throughout this project it has become undeniably clear that the law is not as black and white as we first had assumed. The law, and the language that defines it, are very vague and ambiguous. The law can not be made to cover every situation. This is where lawyers, expert witnesses, and the court process come in: they allow the law to be interpreted and adequately applied to the case. This is done by reasoning through the information presented and drawing a sound conclusion.

A major theme of WPI is "The University of Science and Technology, And Life." Before completing this IQP, we had a solid understanding of the "Science and Technology" component, but had never applied this to real world situations. By analyzing court cases and reasoning through the evidence present, however, we were exposed to the "And Life" aspect of technology. Technology will continue to be more prevalent in subsequent years to come. It will become increasingly important to have expert witnesses who can understand and grasp new technologies.

In conclusion, before we started this project, none of us had an interest in law. Now, however, two of our three group members are applying to law school after graduation. This project exposed us to an area we were unfamiliar with. Not only did we gain a lot from this project, but it stimulated us to take a different course with our lives and to try something new.

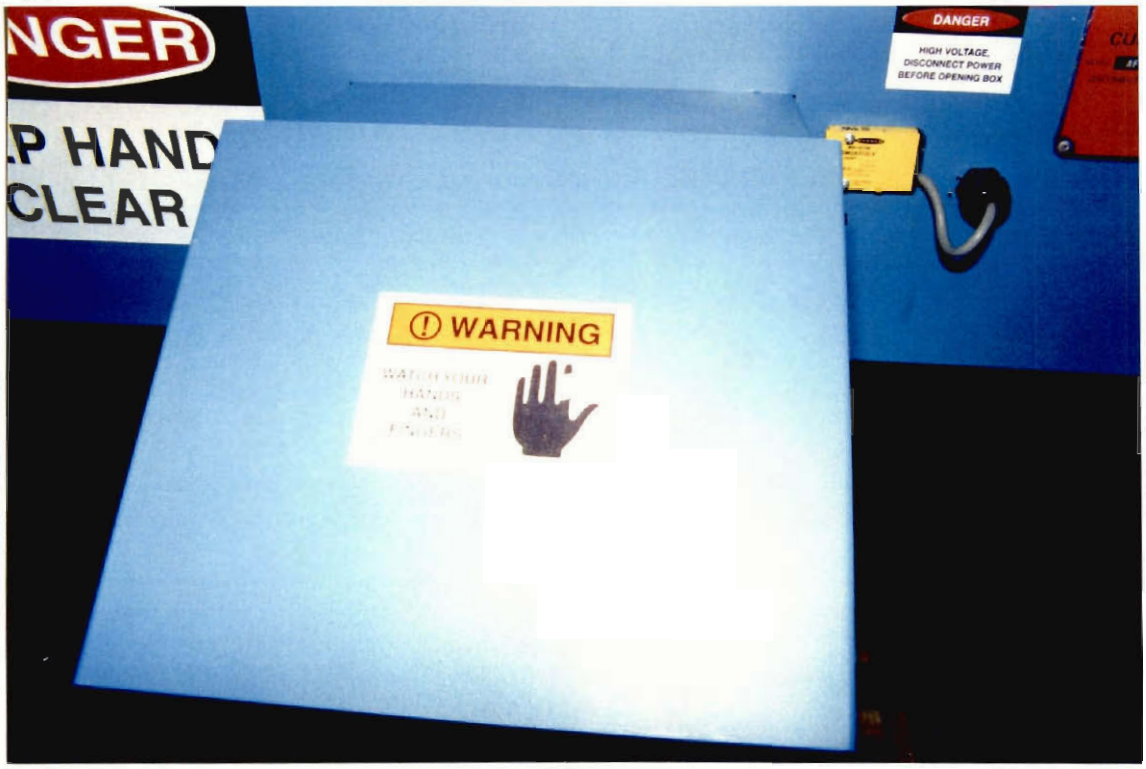
10 Appendix

10.1 Case 1

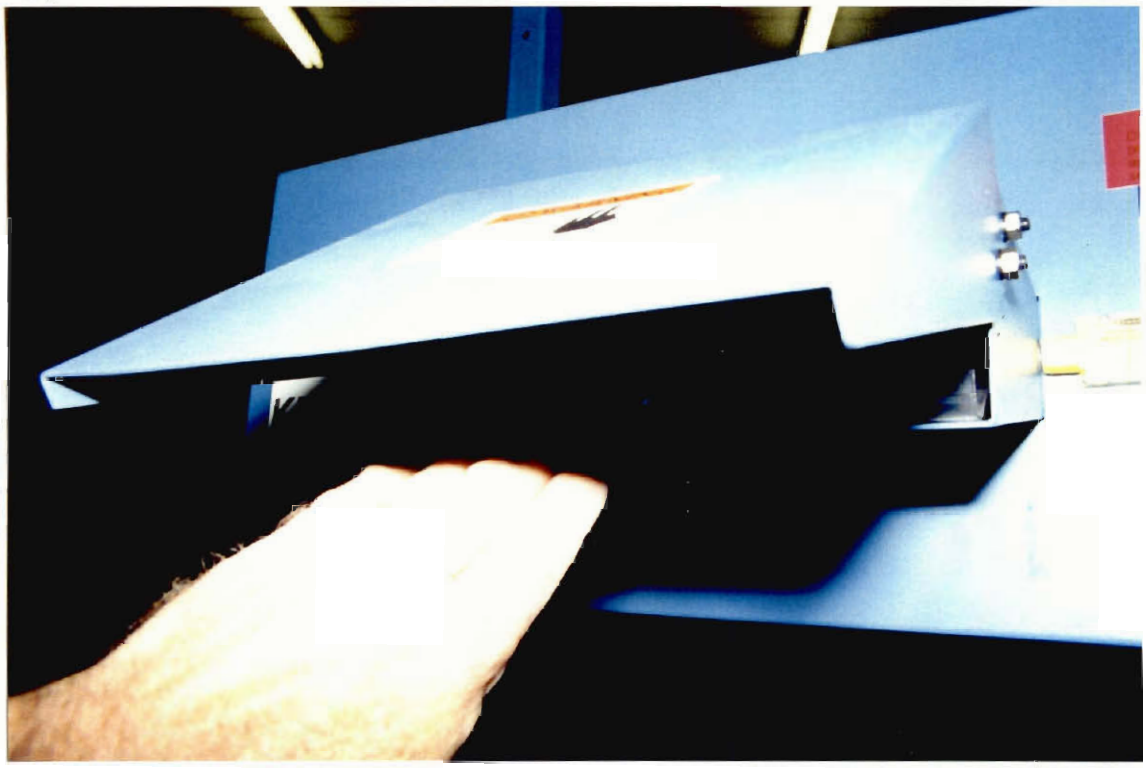
Appendix 1: Case 1 - High Voltage Warning

Appendix 2: Case 1 - General View of Machine

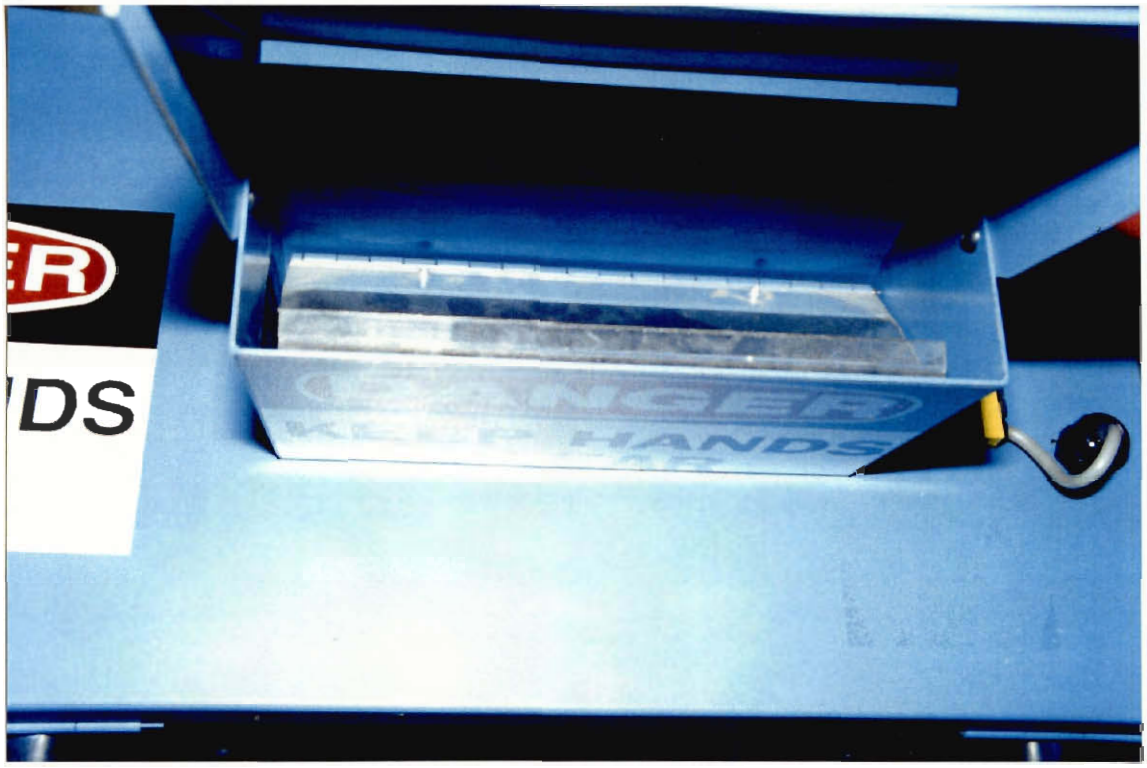
Appendix 3: Case 1 - Warning on Paper Chute



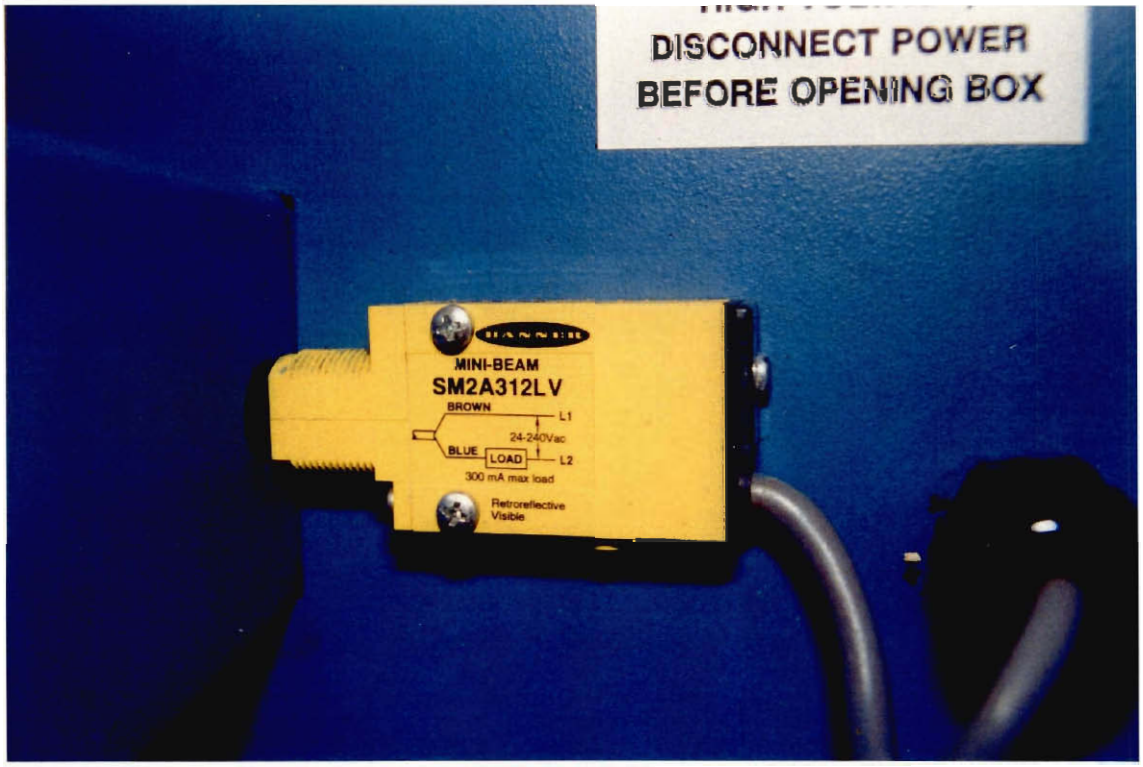
Appendix 4: Case 1 - Hand Reaching into the Machine



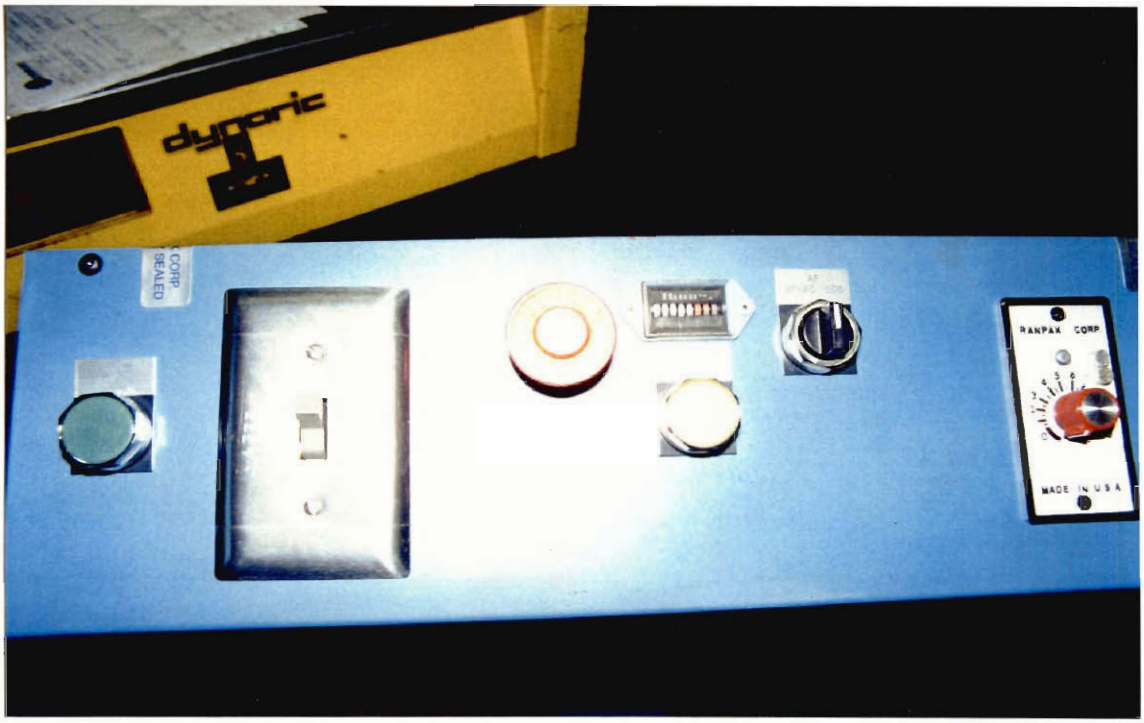
Appendix 5: Case 1 - View of Chute



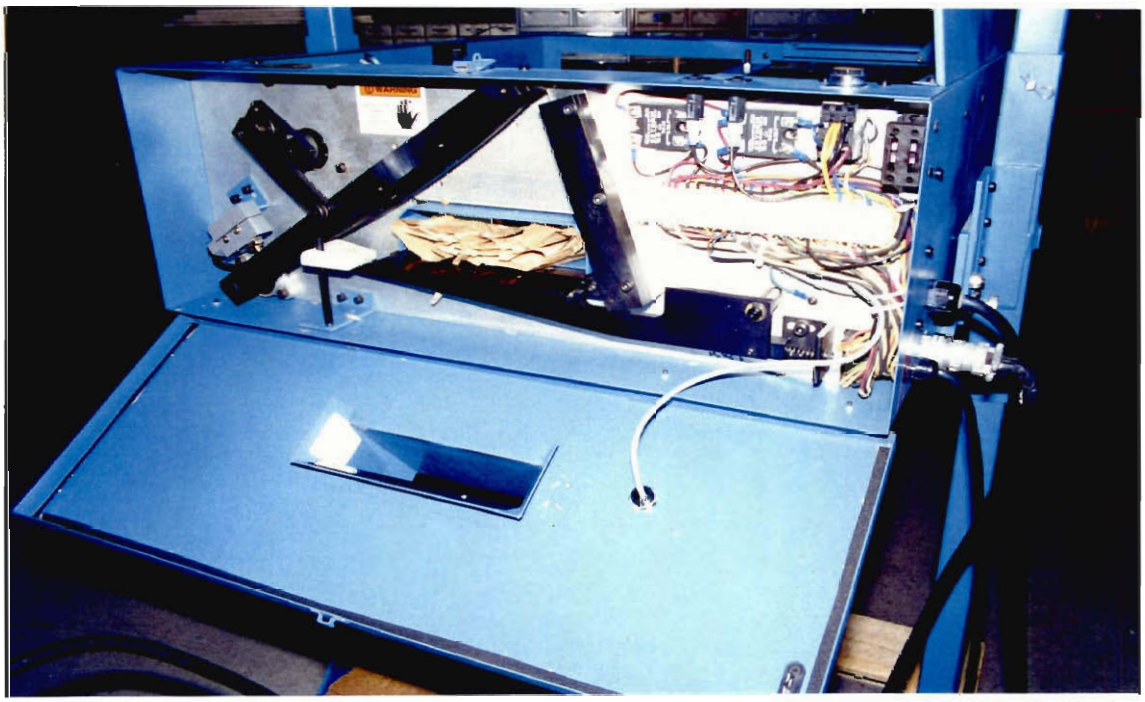
Appendix 6: Case 1 - View of Sensor Lasor



Appendix 7: Case 1 - View of Control Pannel



Appendix 8: Case 1 - View of Cutting Blade



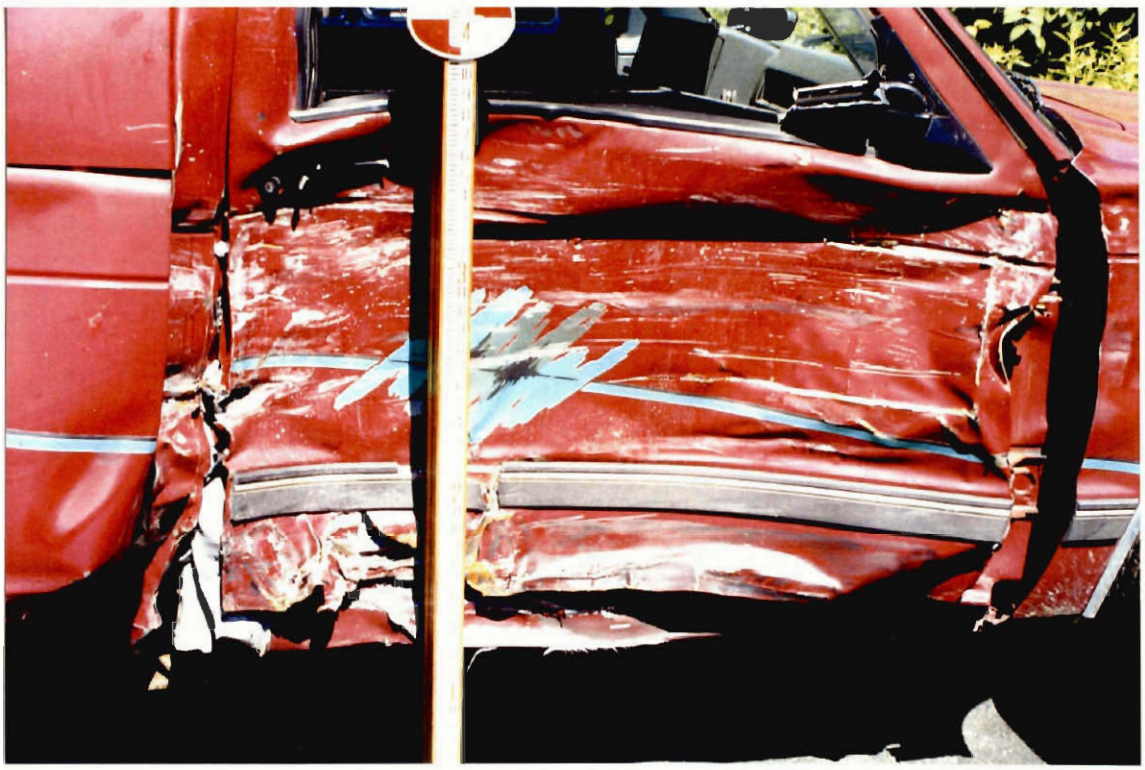
10.2 Case 2

Appendix 9: Case 2 - View Of Road

Appendix 10: Case 2 - View of Accident Scene

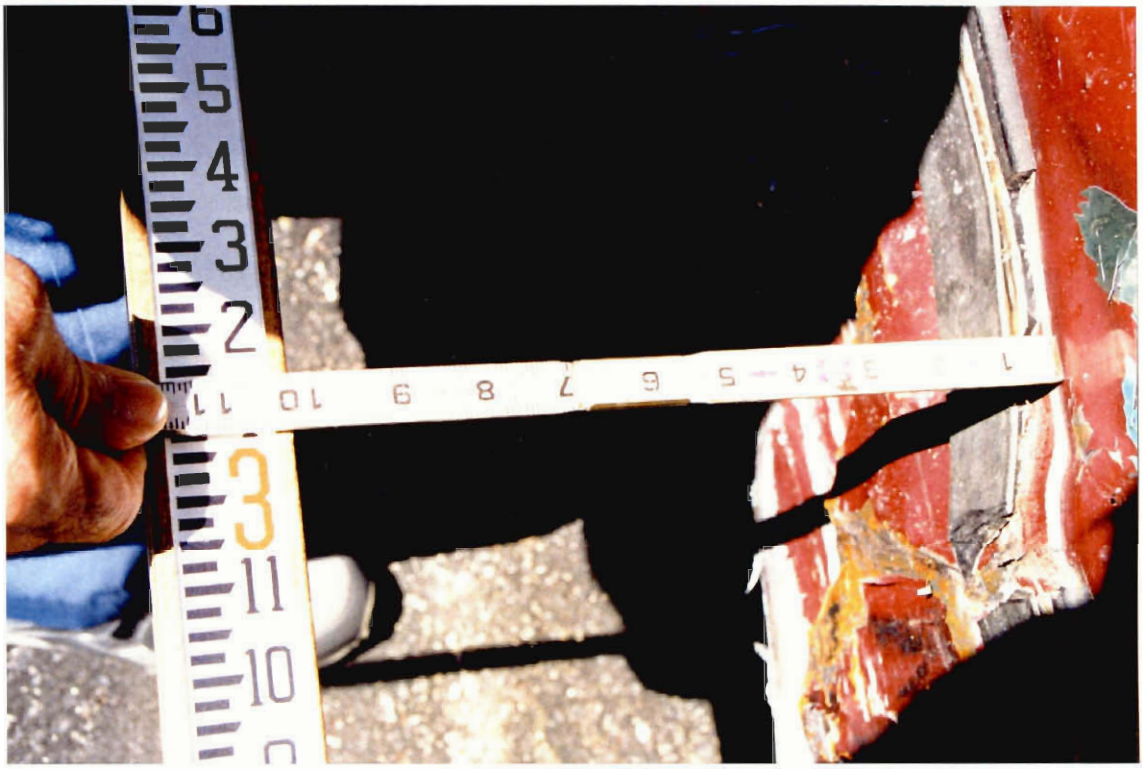
Appendix 11: Case 2 - Distance View from Collision

Appendix 12: Case 2 - Damage Done to the Truck

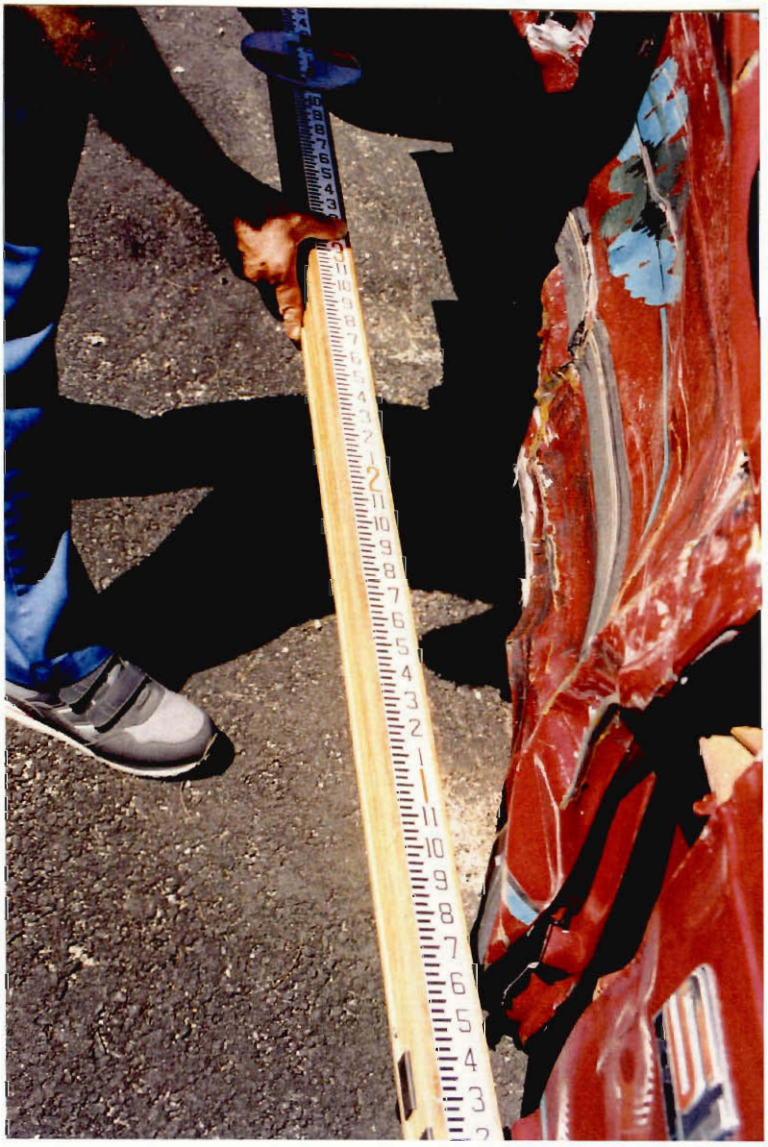


Appendix 13: Case 2 - Cab Shifted over Four Inches

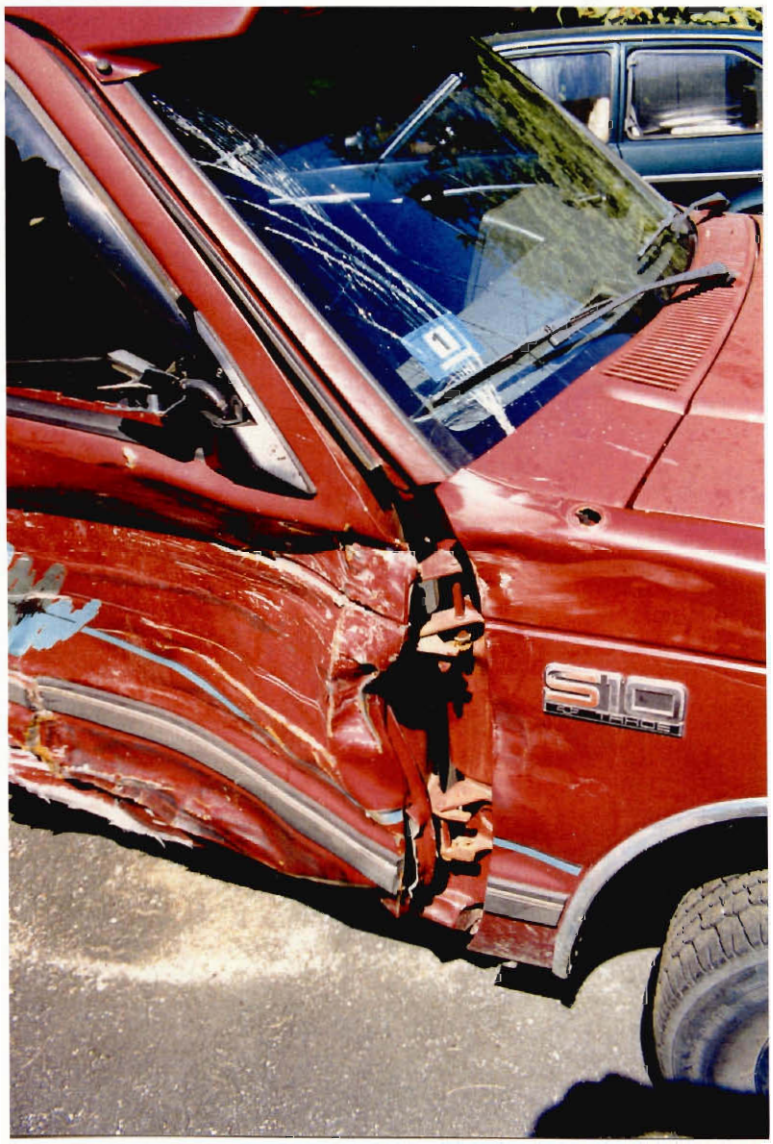
Appendix 14: Case 2 - Passenger Side Door Dented in 10 Inches



Appendix 15: Case 2 - View of Passenger Side Damage



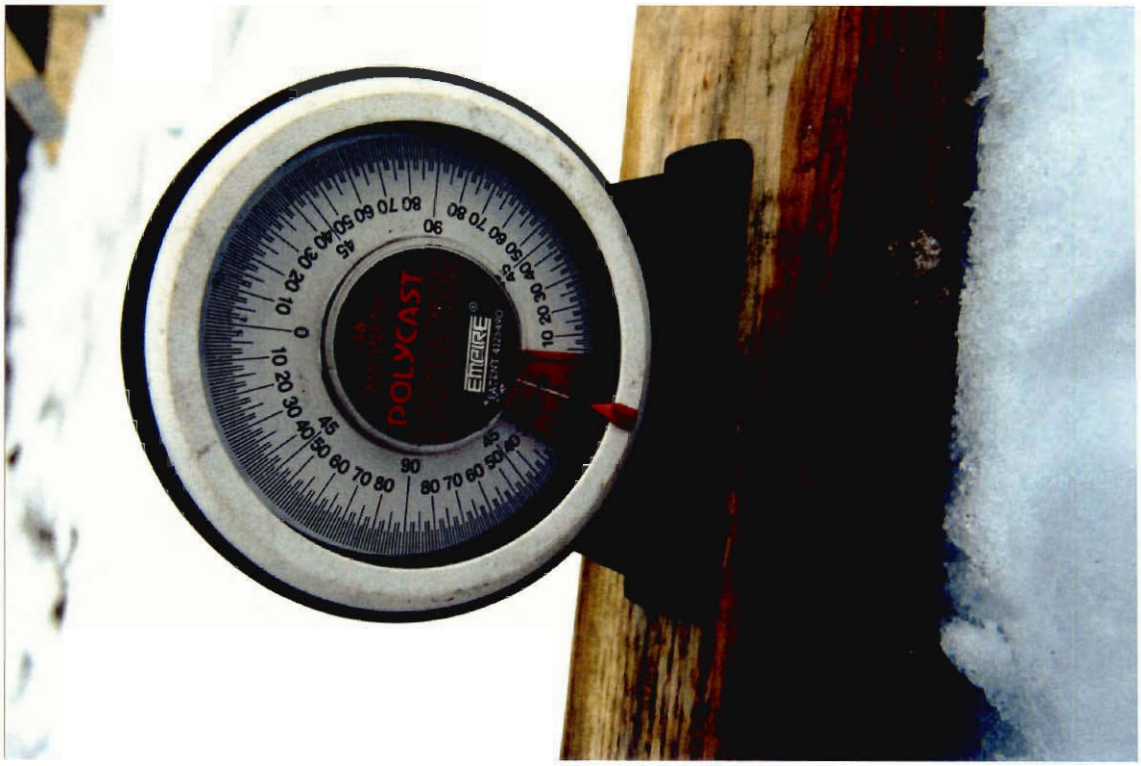
Appendix 16: Case 2 - View of Shifted Hinges



10.3 Case 3

Appendix 17: Case 3 - Lull Accident Scene

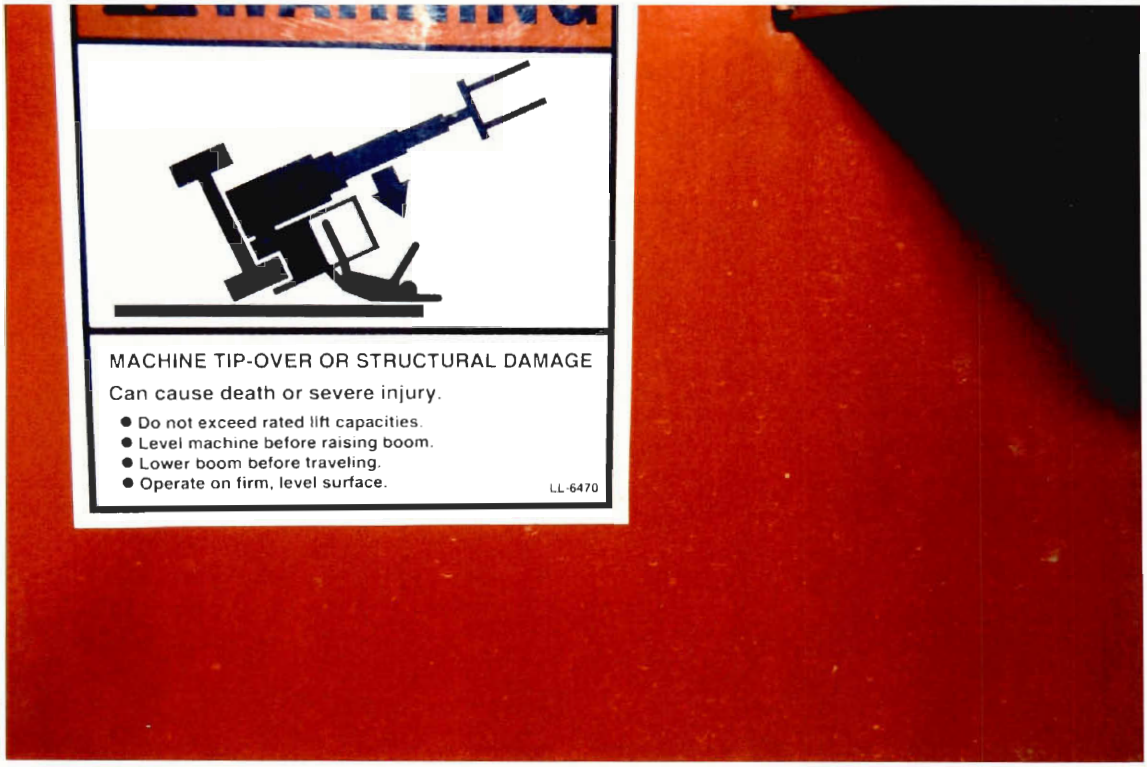
Appendix 18: Case 3 - Slope where Lull Overturned



Appendix 19: Case 3 - View of Slope Lull Slid Down

Appendix 20: Case 3 - View of Leveling Meter

Appendix 21: Case 3 - Tip-Over Warning



Appendix 22: Case 3 - OSHA Operation Warning

Appendix 23: Case 3 - Operation Checklist

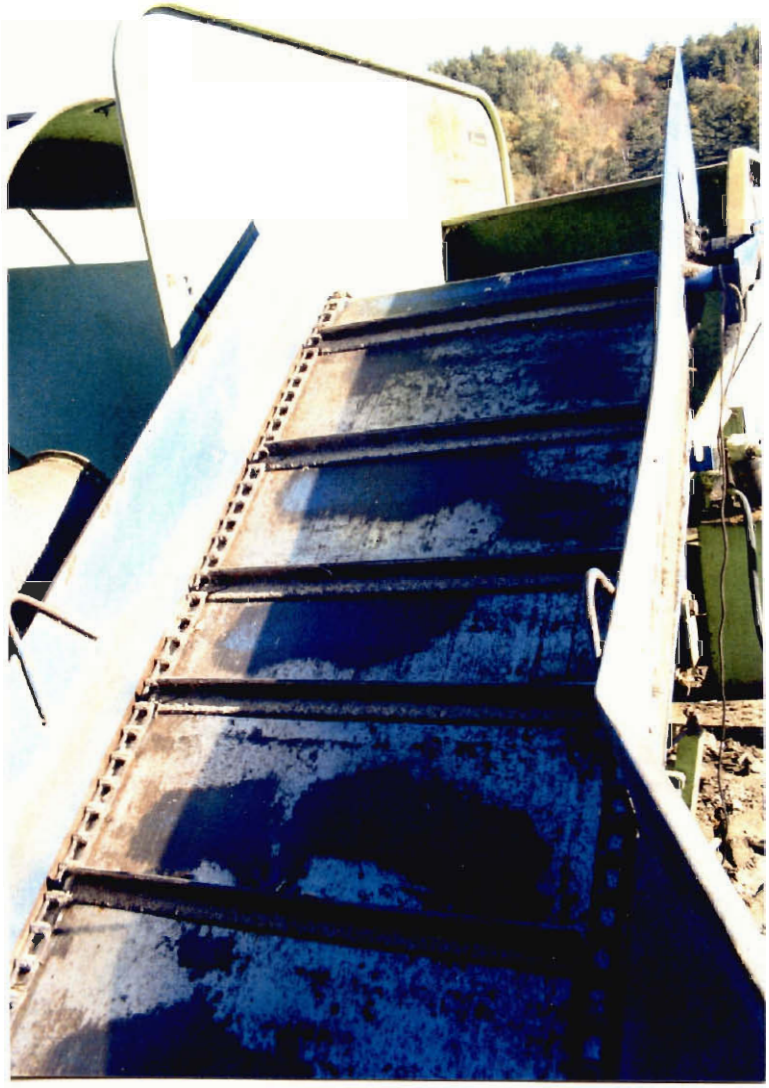
Appendix 24: Case 3 - Seatbelt Warning

10.4 Case 4

Appendix 25: Case 4 - Machine Side View

Appendix 26: Case 4 - Machine Overview

Appendix 27: Case 4 - Feed Conveyor



Appendix 28: Case 4 - Warning

Appendix 29: Case 4 - Operating Manual Warning

Appendix 30: Case 4 - Tractor Warning

Appendix 31: Case 4 - Calculations for Case 2 (Continued on next page)

Calculations

Linear Impulse:

$$m(v_x)_1 + \sum \int_{t_1}^{t_2} F_x \, dt = m(v_x)_2$$

$$m(v_x)_2 + \sum \int_{t_1}^{t_2} F_y \, dt = m(v_y)_2$$

Given Information: From Police

Approach Speeds → $V_A = 27.86$ mph $V_B = 25.57$ mph

Departure Speeds → $V_A = 9.8$ mph $V_B = 17$ mph

$(V_{ax})_1 = (27.86)(\cos 0) = 27.86$ mph

$(V_{Bx})_1 = (-25.57)(\cos 28.258) = -22.52$ mph

$(V_{ay})_1 = (27.86)(\sin 0) = 0$ mph

$(V_{By})_1 = (-25.57)(\sin 28.258) = -12.10$ mph

$(V_{ax})_2 = (-9.8)(\cos 25.385) = -8.85$ mph

$(V_{Bx})_2 = (17)(\cos 26.242) = 15.24$ mph

$(V_{ay})_2 = (-9.8)(\sin 25.385) = -4.20$ mph

$(V_{By})_2 = (17)(\sin 26.242) = 7.51$ mph

→ back of page

Conservation of "x" Momentum

$m_A(v_{Ax})_1 + m_B(v_{Bx})_1 = m_A(v_{Ax})_2 + m_B(v_{Bx})_2$

$(650)(27.86) + (2500)(-22.52) = (650)(-8.85) + (2500)(15.24)$

$38,191 \neq 32,347$

Conservation of "y" Momentum

$(650)(0) + 2500(-12.10) = 650(-4.20) + 2500(7.51)$

$30,250 \neq 16,045$

11 Sources

1. Ardco/Traverse Lift L.L.C. Owner/Operator Manual. Model TL6035. Technical Publications; Houston, TX. 1999.
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3. Hibbler, R.C. Engineering Mechanics Dynamics. Eighth Edition. Prentice Hall; Upper Saddle River, NJ. 1998.
4. Lux, William J. An Engineer In The Courtroom. Copyright 1995; Society of Automotive Engineers, Inc.
5. U.S. Department of Labor, Occupational Safety and Health Administration. Concepts and Techniques of Machine Safeguarding: 1980 (Reprinted 1981)