SELECTED
ENGAGEMENTS AND EXPERIENCE
IN VARIOUS CATEGORIES

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VEHICULAR ACCIDENT RECONSTRUCTION GENERAL

Over the past fifteen years, I have devoted a considerable portion of my practice to vehicular accident reconstruction, providing service to lawyers, insurance companies and private individuals. Past experience includes analysis of accidents involving passenger vehicles (cars), pedestrians, motorcycles, bicycles, and articulated vehicles (trucks).

TYPICAL ANALYSIS

My involvement in a case is usually at the discretion of the client. After a preliminary case evaluation, I make a thorough study of the existing record, visit the accident scene and resurvey it to ensure the accuracy of existing diagrams, inspect and measure vehicles (if they are available), interview witnesses and others involved, assist the client in discovery, formulate an opinion of the event based on my own analysis and ultimately offer testimony either through deposition or trial testimony.

ANALYTICAL TOOLS

Much of my work involves keeping current with the state of art. I maintain an extensive library of information on various subjects related to accident reconstruction. The library is continually updated from sources such as the Transportation Research Board, Society of Automotive Engineers, National Highway Traffic Safety Administration, etc.

Scene surveys are performed with Total Station laser instruments, transits, levels, tapes, etc. In addition, we have electronic acceleration measuring devices and a ballistic pavement-marking device for measuring braking efficiency and drag coefficients.

I maintain my own in-house computer facilities and am currently capable of running the CRASH3 and SMAC impact analysis program developed by the National Highway Traffic Safety Administration. I further utilize the current version of AutoCAD for all drafting and current version of Lightware to prepare animations of our case studies. This, coupled with photographic and developing/printing capabilities, allows preparation of virtually any type of graphic courtroom aid.

With the advent of computer imaging capabilities, I am now able to reproduce photographic images on the computer screen either by scanning existing photographic images or electronic processing by way of CD ROM. I also have the ability to display VHS and Super 8 formats through the computer, and capture individual frames. Editing capability is available for all images capture both photographic and video. Of particular advantage is the ability to recreate crash simulation as an unfolding "movie" on the computer screen. All computer images may be rerouted to a television of any size screen for use in the courtroom.

CASE SUBJECTS

The following subject areas have been studied as part of previous case analyses:

Speed estimates based on

- Momentum balances
- Energy balances
- Crush damage
- Skidding distances
- Yaw marks
- Trajectory analysis
- Crash data recorders

Road friction as affected by

- Surface type
- Dry or wet conditions
- Speed
- Tire type
- Season and temperature
- Contaminants

Visibility and conspicuity
Braking capability of various types of vehicles
Time distance studies
Highway defects
Signing, striping, and motorist information needs
Mechanical analysis of vehicles
Human factors
Special problems associated with highway construction and maintenance operations

ACCIDENT STUDIES (TYPES & NUMBERS)

I have performed over 1600 detailed reconstructions for both plaintiffs and defendants in both civil and criminal matters. Historically, the split varies, usually between 40 - 60%. My experience shows that less than 10% of these cases require trial testimony. Although I have not kept records of my deposition testimony, I would estimate that I have been deposed at least 100 times.

STRUCTURAL FAILURES

I have examined numerous structural and foundation failures involving steel, concrete and wood. Specific examples have involved the collapse of large wooden trusses that supported an atrium type roof at a shopping center, the disintegration of thousands of square feet of concrete roofing, the collapse of a steel clarifier unit at a water treatment plant and the collapse of a steel tether support structure for observation blimps used by the Federal Government in drug interdiction programs. On a smaller scale, I have also used the same analytical techniques to model the structural behavior scaffolds, man lifts and step ladders.

STRUCTURES & FOUNDATIONS

Dover Steel Corporation, Dover, Delaware. Personnel man lift scaffold used for renovation of support cables for the Delaware Memorial Bridge.

Diamond Shamrock Corporation, New Castle, Delaware. Design of structural steel spray drying units for new bagging house. Approximately 60 tons of steel used. Plans included fabrication drawings.

Chrysler Corporation, Newark, Delaware. Designed concrete footings for new paint facility. Design included special bridge footings to be placed against existing structure.

Falcon Steel Company, Wilmington, Delaware. Designed support piling system and concrete pile caps for new steel fabrication plant and overhead crane system.

Caroline County Jail Structure Renovations, Caroline County, Maryland. This project involved the structural analysis of a very old building that was being renovated. Problems developed that eventually required analysis of the entire structure. Special in place testing of the corrosion of the existing steel beams was necessary.

University of Pennsylvania, Civil Engineering Laboratory Renovations, Philadelphia, Pennsylvania. Design of structural components required for renovation. The project was significant in that it required use of many beams placed in the building in the early part of the century. These beams did not conform to today's codes.

Springhouse Village Mall, Springhouse, Pennsylvania. Analysis of 52 foot long flat, wooden roof truss system which collapsed. STRUDL was employed to analyze deflections due to fabrication and shrinkage.

Porter Reservoir, Wilmington, Delaware. Design of a space frame supporting structure for large steel clarifier units.

United States Customs Service. Design of a lightweight tubular steel and/or aluminum structure to be used for radar patrols of the U.S. coastline. Structure was significant in that it required a large torsional resistance.

Port of Wilmington, Wilmington, Delaware. Design check of Dockside Container crane for the Port.

HIGHWAYS & TRANSPORTATION

My experience in roadways is extensive and I have participated in all phases of design and construction. My experience began as an inspector for DelDot, monitoring the construction of portions of I-95. Work included inspection of both structures and pavement. My experience continued as a research engineer with DelDot analyzing the environmental impact of major highway corridor projects. As a consultant in private practice, I have designed many miles of roadway considering both structural and geometric aspects. I was also retained as a consultant by DelDot to analyze concrete deterioration on Delaware's interstate roadways, and was eventually in responsible charge for development of contracts for millions of dollars of roadway reconstruction. I have also developed a new method for roadway restoration for which I am now seeking federal approval and a possible patent.

Delaware Turnpike, New Castle County, Delaware. Research to determine the causes of Portland cement concrete pavement deterioration. Based on findings, I designed several miles of roadway restoration involving patching, underdrains, sealing and other miscellaneous work.

Hercules, Inc., Wilmington, Delaware. Developed several training films on joint sealing for highway construction and maintenance, which have been approved by the Federal Highway Administration for Distribution to all State Agencies.

Division of Highways, New Castle County, Delaware. Designed several roadway improvement projects, which included realignment, grade and drainage.

TRAFFIC STUDIES

I have done numerous traffic studies and entrance designs for some of the largest development projects in Delaware. Analysis includes traffic generation and design of related improvements necessary to minimize impact on adjacent highway systems. Work includes intersection and segment capacity analysis as well as intersection design and signalization.

A partial list of examples includes:

Peoples Plaza

This is one of the largest commercial/office complexes in Delaware, consisting of approximately 750,000 glfa. The study had to be coordinated with the Route 896 bypass and part of our work resulted in quantifying ramp volumes for this new alignment.

Mansion Farms
This study examined the impact of one of the largest proposed residential tracts in Delaware. Working with DelDot and County Planning, we proposed an area wide study that encompassed approximately 20 proposed developments.

Rehoboth Shopping Mall
This project included the rezoning of a large tract outside Rehoboth, Delaware. Our work involved a traffic impact study and the design of three major entrances that had to be coordinated with the reconstruction of Route 1.

The Delaware Corporate Center
This project involved a traffic study and entrance design on Route 202, north of Wilmington. These entrances had to accommodate 15 acres of office space and 40 acres of residential units. The complexity of the project was compounded by integrating this site with other development in the area as well as the reconstruction of Route 202.

Pencader Corporate Center
This development, located south of Newark, Delaware, is the largest office/industrial complex in the State. The study performed by us ultimately led to the reconstruction of Route 896.

Bridgeville Shopping Mall
This project is a 200,000 square foot shopping mall proposed at the intersection of Route 1 and Route 404. Our design recommended a redistribution of traffic at this low capacity intersection by construction of a new Mall Boulevard, which will, in part, alleviate peak hour beach traffic at this location.

Below is a partial listing of additional traffic impact studies that I have conducted:

Drummond Plaza, Newark, Delaware.

Pencader Woods, Newark, Delaware.

Commons Professional Park, Wilmington, Delaware.
(Won New Castle County Design Award)

Interstate Business Center, Newark, Delaware.

Tall Pines, Newark, Delaware.

Elizabeth Plaza, Wilmington, Delaware.

Bellini's Garden Center, Wilmington, Delaware.

Pike Creek Shopping Center, Newark, Delaware.

Larson Farms, Wilmington, Delaware.

Red Roof Inn, Newark, Delaware.

Stanley IV, residential and commercial center, Newark, Delaware.

White Clay Industrial Center and Office Park, Newark, Delaware.

Nowakowski Site, hotel and office complex, Newark, Delaware.

Becks Woods, residential site, Newark, Delaware.

Route 896 Shoppes, commercial center, Newark, Delaware.

Moore Farm I, residential site, Route 13, Delaware.

Moore Farm II, residential site, Route 13, Delaware.

Lester Property, residential site, Route 13, Delaware.

Folk Property, residential condominium site, Newark, Delaware.

Naamans Service Center, retail commercial site, Brandywine Hundred, Delaware.

Peoples Plaza, Glasgow, Delaware.

Lums Pond, New Castle County, Delaware.

Mansion Farms, New Castle County, Delaware.

ENVIRONMENTAL

Based on my previous work in this area, I was selected to serve on the County Executive's Environmental Advisory Board. Our task was to provide technical input for proposed environmental legislation and identify areas and concerns that may require legislative action.

Department of Natural Resources and Environmental Control, Dover, Delaware.
Preparation of the Kent County River Basin Water Quality Management plan. This work involved the identification of all point and non-point pollution sources in Kent County,

Delaware, to determine impact on receiving streams. The work was done in conjunction with the NPDES permitting process.

Department of Highways and Transportation, Dover, Delaware.
Preparation of four major environmental impact studies for corridor related highway construction. This work involved establishment of methods to quantify noise, air, and water pollution. One of these studies was used by the Regional Office of EPA as a guide for other states to follow in the preparation of similar studies.

New Castle County, Delaware.
Researched the feasibility of municipal leaf composting on a countywide basis.

Keenwick, Delaware.
Made an environmental study to determine the water quality impact of a proposed canal system. Flow rates and dissolved oxygen measurements were taken to assess the capability of natural biodegradation of the receiving stream.

Newport, Delaware.
Designed an ozone disinfection system for the Town of Newport's public drinking water supply. This project was significant in that it was probably only the second time ozone had been used for this purpose on this scale in the United States.

HYDRAULICS & HYDROLOGY

Much of my specialized graduate work was in the area of hydraulics and pipeline design. In addition, I was the editor of the American Society of Civil Engineers Pipeline Journal for four years. I have also lectured at locations across the country on pipeline design and solids conveyance by pipeline. I have done a number of design and analysis projects, some of which are listed below.

Townsend, Delaware.
Designed water main distribution improvements.

Longwood Gardens, Longwood, Pennsylvania.

Designed "Eye of Water" display fountain. The design provides a circular hydraulic jump,which resembles an eye.

Various locations, Delaware, Maryland, Pennsylvania.
Made studies to determine limits of the 100-year flood elevation based on rainfall, run-off and backwater computations. Prepared similar studies for design of internal drainage and flood retention structures for numerous development projects.

Representative examples are:

Larson Farms

I designed the detention facility for this extensive townhouse site, which was unusual in that the outlet structure had to be sized to accommodate deficient downstream conditions.

Upper Chesapeake Industrial Center
This 250 ± acre project lies partially in Maryland and Delaware with a detention facility draining into each state.

Pencader Corporate Center
This site contained a large artificial pond that was redesigned to accommodate storm flows. Use of the pond resulted in considerable savings to the owner. We also performed a complete flood analysis of Muddy Run, the major watercourse through the site.

King of Prussia, Pennsylvania.

Assisted in the analysis of the rupture of a fourteen-inch gasoline pipeline operated by Sun Oil Company. The analysis required development of a mathematical model to simulate the rupture and compute the volume of petroleum product lost.

University of Pennsylvania
Assisted in the development of a pipeline system to grind and pump solid waste from cities.

Universities of Pennsylvania and Delaware
Analyzed existing equations for the prediction of energy loss in the heterogeneous regime. Developed new proportional constants for existing equations that enabled more accurate prediction of loss and a new parameter for determining flow regimes.

Corps of Engineers, Philadelphia District
Developed a new pipeline and pumping concept to move large volumes of sand. The method as originally envisioned was to retrieve offshore sand deposits for eroding beaches along the New Jersey coast. Later the method proved beneficial for bypassing sand mound inlets and is now in use at Indian River Inlet, Delaware.

New Castle County, Delaware.

Design of the State Road Interceptor sanitary sewer. This facility is approximately six miles in length with diameters up to 48 inches and drains the Army Creek Basin.

Symposia on Freight Pipelines
Have assisted Iraj Zandi in the administration of three international symposia on freight pipelines. I was chairman of the subcommittee on pumps for the fourth symposium held in October of 1982.

Slurry Pipeline Short Courses
Co-lecturer with Pipeline Educational Resources Center in presentation of seminars on the design of slurry pipelines. The course is sponsored by Pipeline Educational Services Center and has been presented in Philadelphia, San Francisco, and Houston.

MECHANICAL

The term mechanical as used here is closely related to the structural aspects of civil engineering. That is, both involve the concepts of strength of materials and the analytical procedures of stress and strain. The engagements and cases listed below however, also include aspects of safety beyond the normal "factor of safety" analyses which reduce the risk of structural collapse or mechanical failure. In the sense used here, safety is a more encompassing term that includes guarding, controls and human/machine interaction. Over the past twelve years, I have devoted considerable time to this area in the investigation of industrial and in-home accidents. The work involves not only analysis, but collection and interpretation of standards developed by numerous organizations throughout the U.S.

Port of Wilmington, Wilmington, Delaware.
Working with Ambric Testing and Engineering, we were the owner's representatives for the inspection and testing of the mechanical, electrical, and structural components of a new 30-ton container crane which is the heart of the Port's future expansion into container handling operations.

Newport Water Distribution System
Designed ozonation system for water supply for town of Newport, Delaware. This involved numerous automatic and manual controls, sensing devices and alarms.

Buckhart v. Eagle
Analysis of performance of a solids handling pump.

Sears Conveyor
Analysis of conveyor system in Sears warehouse. Control system was defective since it allowed startup from a remote station.

City of Wilmington - Water System
Ongoing project to retrofit all of the drive units on the clarofloculators at the Porter Reservoir Filter Plant. This included design of a new drive unit consisting of 3 reduction gears, research into new sealed bearings, and control systems.

Newport Pump Station

Designed a new pumping station for town of Newport, Delaware, including controls.

Blackwood v. Deister
Analysis of a coal recovery system involving several unit operations for separating coal from non-usable material.

Slover v. Fabtek
Analysis of powered, articulating, rotating man lift.

Concrete Mixer

Investigation into operation of rotating mixer on a concrete truck, especially operator requirements for cleaning mixer after load delivery.

Colonial Chevrolet Lift
Inspection and analysis of mechanics car lift and its ability to retain a raised vehicle.

Powered Paper Shear
Investigation of cutter to determine how it double cycled injuring an operator. Controls were found to be deficient, and wear had damaged the anti-repeat pin.

Hydraulic Lift Malfunction
Investigation to determine reason for inadvertent start of a hydraulic lift.

Forklift Malfunction
Investigation to determine reasons for inadvertent start of a forklift.

Malfunction in Bakery Machine
Investigation of no guarding and lack of interlock.

Snow Blower Accidents
Investigation of accidents injuring operators while clearing jams.

Construction Lift
Investigations of construction lift that malfunctioned allowing worker under the lift while it was moving. Controls and door attachment were at issue.

Oil Heater Fire
Investigation into code requirements for installation of furnace and fuel supply. Control valves were found to be deficient.

Design of Booster Pump Station
Design included controls, sensing devices, and startup of auxiliary power.

Metal Shearing Machine
Investigation showed machine was improperly guarded.

Concrete Mixer Instability
Analysis into stability of a towed concrete mixer. Issues were height of center of gravity and suspension.

Washing Machine Malfunction
Investigation into washing machine, which amputated a child's arm. Issues involved controls, guarding and interlocks.

Trailer Couplers
Investigation of coupling mechanisms for trailer hitches

Failure of Railroad Repair Car
Tracked vehicle incorporated lifting platform, which inadvertently dropped. Issues were maintenance and controls.

Dump Truck Malfunction
Inadvertent activation of lift, which caused a major accident in Lincoln Tunnel, New York City. Issue involved control of lift.

Design of Chlorine Storage Facility
Building design involved controls for accidental spillage of chlorine.

Crane Collapse
Investigation into collapse of crane. Issues were faulty sensing and control and weight shift.

Printer Roller Accident
Investigation showed improper guarding during maintenance.

Industrial Power Saw Accident
Investigation showed saw to be improperly guarded.

Explosion of Heat Exchanger/Reservoir
Investigation still in progress. Issues appear to be related to sensing and control.

Hand Drill Malfunction
Hand tool failed to stop, injuring worker. Issue was location of control.

Alligator Shear Injury
Investigation showed lack of guards.

Explosion of Road Paver
Investigation showed improperly guarded hydraulic lines.

Conveyor on Power Filter Press
Investigation showed lack of guards and improper controls.

Design of Man Lifts for Delaware Memorial Bridge
Complete design of powered basket cages to carry workers during cable repairs.

Jack Stand Failures
Investigation showed lack of appropriate connection of hydraulic cylinder to stand and contaminants in hydraulic oil.

Design of Waste Container
Necessary to standardize containers at DuPont Experimental Station.

Dough Rolling Machine

Child's hand crushed due to improper guards.

Failure of Surgical Device
Patient blinded when instrument failed to shut off. Machine control was at issue.