



Making Our Roads Safer:
The Sandy Johnson Foundation

Highway Safety Initiative

Danger on the Highway

A guide for motorists and highway officials
concerned with improving highway safety.

SECOND EDITION

Dean T. Johnson

Author of: *Driver-Conditioning: the Unexpected Killer*

Danger on the Highway

“The experience of being conditioned while driving has been adversely affecting highway safety for over a century. Yet, the most difficult task to accomplish with this manuscript may be to transfer an awareness of driver-conditioning beyond this writing and embed it into the hearts and minds of those who control our system of highways. Only through an awareness and acceptance of driver-conditioning, coupled with a willingness to modify existing procedures, will real change have a chance.”

~ Dean Johnson



“Man cannot discover new oceans unless he has the
courage to lose sight of the shore.”

~ Andre Gide
Author

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Highway Officials
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Highway Safety



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Also by the author

DRIVER CONDITIONING

The Unexpected Killer

SECOND EDITION

A WORKBOOK for Both
New and Experienced Drivers

This WORKBOOK serves as both a
reference and teaching guide complimenting the
Supplemental Driver's Education Program

The Hidden Dangers of Driving

and is available through

The Sandy Johnson Foundation website:

www.sandyjohnsonfoundation.org

and

THE HIDDEN DANGERS OF DRIVING

An Internet-Based

Supplemental Driver's Education Program

Developed for teens but suitable for adults seeking a deeper
understanding of the intrinsic dangers associated with
driving.

*“The important thing is this: to be able, at any moment, to
sacrifice what we are for what we could become.”*

~ Charles Dubois
Naturalist

Dedication

This book, as well as all educational material pertaining to *Driver Conditioning*, is dedicated to Sandra Lee Johnson, whose ultimate sacrifice created a pathway to the discovery of Driver Conditioning and the supporting Highway Safety Initiative that bears her name.



Born: February 27, 1956

Died: October 5, 2002

Killed instantly in the intersection of
S.R. 310 and C.R. 25
in Licking County, Ohio

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Foreword

By: Bruce Hamilton

In the highway safety community, we often make reference to the “three pillars” of our work: safe roads, safe drivers, and safe vehicles. While this is a useful way to structure our efforts and develop focused priorities, it also leaves us vulnerable to operating in silos with insufficient communication across areas of expertise. From academic research conducted in laboratories to traffic enforcement carried out just feet from moving vehicles, and from impassioned victims’ advocates to savvy policy wonks, road safety is a field that needs contributions from all types of people carrying out all kinds of tasks. And we all must work together.

Dean Johnson’s Highway Safety Initiative is a remarkable contribution to this landscape, precisely because he explicitly links diverse disciplines into a cohesive, actionable program. Grounded both in principles of human psychology and traffic engineering, Dean’s program demonstrates why roads must be designed for the people who use them, and why road users of all types must be attuned to the ways their brains are both helping and hindering their ability to respond to the traffic environment. It is rare to find a program whose conclusions offer equally immediate and practical takeaways for both transportation officials and the general motoring public, but this is exactly what Dean has masterfully woven together in this thoroughly revised second edition of his Highway Safety Initiative.

As with all of the work produced by the Sandy Johnson Foundation, the Highway Safety Initiative was born from Dean's all-consuming determination to effect positive change in the wake of the tragic loss of his wife, from whom the Foundation gets its name. But in addition to this humble passion, the Initiative also benefits greatly from Dean's keen financial sense from his prior career in real estate and his service to non-profits, including as a Board Member of the National Organizations for Youth Safety (NOYS). Dean has a realistic sense of how to maximize limited resources, and all of his recommendations are low-cost options that more than pay for themselves in medical costs and property damage averted, not to mention the incalculable reductions in human pain and suffering.

The highway safety community has made a commitment to Zero: that is, Zero deaths and life-altering injuries on the nation's roads. While it is a steep challenge, it is the only acceptable goal. To achieve it, we need innovative, cross-cutting approaches that acknowledge there is no one way to Zero. I am confident that the Sandy Johnson Foundation's Highway Safety Initiative will offer seasoned transportation professionals and brand-new drivers alike a refreshing perspective on this issue, and will be integral to eliminating preventable carnage on our roads.

Toward Zero Together,



Director of Safety & Research Programs, Roadway Safety Foundation

Purpose

The purpose of this writing, which contains the Sandy Johnson Foundation (SJF) Highway Safety Initiative (HSI), is to save lives by:

1. Providing a deeper understanding of the cause of crashes at high-accident locations (HALs) and other dangerous, or potentially dangerous, sites;
2. Educating both the public and highway officials as to the existence, the causes, and the effects, of Driver Conditioning¹; and
3. Presenting an aggressive, pro-active action plan designed to help highway officials recognize, evaluate, and correct both high-accident sites and locations with the potential of becoming one in a matter of days, rather than years, and at low cost.

Only through a deeper understanding of the underlying cause of motor vehicle crashes can constructive progress be made to reduce the number and severity of fatal and life-changing injury crashes on our nation's highways.

(Authors note: Use of the word "accident" is currently being avoided by many highway officials and road safety advocates when speaking of any mishap involving a motor vehicle. This text uses that term interchangeably with "crash" and "collision" as well as other descriptive terms typically

associated with any catastrophe occurring on our nation's system of highways.)

1. Driver Conditioning is the underlying cause of nearly all vehicular crashes. It is defined as *the process through which drivers become conditioned to respond to traffic patterns and road conditions that remain consistent over an undefined period of time or distance.*

Background

On October 5, 2002, my wife Sandy and her mother Jackie were killed in a violent automobile collision at the intersection of S.R. 310 and C.R. 25 (Morse Road) just east of Columbus, Ohio. Two years prior to that crash, the Ohio Department of Transportation (ODOT) had ranked that location the eighth most dangerous intersection in the state.

After their deaths, I arranged for a meeting with an assignment editor for The Columbus Dispatch, Central Ohio's prominent newspaper. At the conclusion of that meeting, the assignment editor agreed to conduct an investigation of the crash site. During that research, he discovered that the intersection where Sandy and her mother died had been studied six times over the previous 13 years. In response to one of those studies, a costly modification was made to the highway on the southbound approach to the intersection. But rather than reduce the frequency of crashes at the site, the change prompted drivers to increase speed while driving through the area, increasing the danger and leading the way to the ranking of "eighth most dangerous intersection."

Troubled by the discoveries of the newspaper's investigation, and filled with a desire to understand the cause of Sandy's crash, I reviewed the results of the six highway studies conducted by ODOT. During that review, I was surprised to learn that none of the studies had identified a cause behind the significantly high number of crashes taking place at that

location. From my perspective, this was unacceptable. It was clear that ODOT did not understand the problem in existence at that location, making it virtually impossible to identify a solution and execute an effective change.

After completing my examination of the results of the newspaper's investigation and highway studies, I decided to conduct my own analysis of the site in order to determine the cause of Sandy's crash. Over the next several weeks, I visited the location numerous times and personally witnessed the occurrence of several near-collisions.

Additionally, during that period, through a series of unanticipated events, I was able to interview drivers who had been involved in crashes at that site, as well as others who had barely avoided a crash. Through an analysis of those interviews, and combining that information with data from other investigations, I was not only able to determine the cause of Sandy's crash, but I also uncovered the potential cause of the other crashes as well—scores of crashes that had plagued that intersection for over 15 years. Once the underlying cause was determined, I identified a simple, low cost, “fix” that would effectively reduce, and potentially eliminate, future tragedies at that location.

Armed with this information, I presented a “Recommendation for Change” to the Ohio Department of Transportation on December 3, 2002. The following day I received a call from an ODOT representative acknowledging a willingness to proceed with the proposed change. Ten days after my

initial request, the intersection was modified in accordance with my recommendation and the carnage that had plagued that location for so many years came to an abrupt end.*

Feeling an obligation to persist, I studied other high-accident locations. Those studies revealed that the principles used to identify the cause of crashes at the location of Sandy's death would be equally effective when applied to other sites. Further, I determined that the low-cost remedies available to prevent collisions at Sandy's crash site would be successful at other high-accident locations as well.

As a result, I wrote ***Danger on the Highway** – A guide for motorists and highway officials concerned with improving highway safety*. In it, I introduce Driver Conditioning¹ as the prominent underlying cause of nearly all vehicular crashes that occur on our nation's highways.

Based on that recognition, I present a clear and logical approach for identifying low-cost, easy-to-implement solutions to dangerous intersections and other locations known to be afflicted with a disproportionately high number of crashes. In addition, equipped with this fundamental knowledge, authorities will have the ability to identify potential dangers at newly designed or constructed locations and correct them, before a first mishap can take place. Accordingly, I believe that if the principles outlined in this Highway Safety Initiative were implemented on a national scale, thousands of lives could be saved annually.

To complement this writing, and to address the needs of student drivers, I also developed the internet-based supplemental driver's education program: *The Hidden Dangers of Driving*. Created for teens but suitable for adults, this eleven-part educational series brings Driver Conditioning to the forefront of conversation and exposes the many dangers associated with this naturally occurring phenomenon.

Supplementing this internet-based educational program is the Second Edition of the student driver's educational workbook titled: *Driver Conditioning – The Unexpected Killer*. Following the same educational format presented in *The Hidden Dangers of Driving*, this workbook was developed to serve as a reference guide for teens who have completed the internet-based program, or it can be used as a stand-alone educational piece which can be studied in place of that program.

Both of these supplemental driver's education courses are accessible through The Sandy Johnson Foundation website.²

It is my belief that *it is impossible to recognize and develop solutions to problems that are not known to exist*. By recognizing Driver Conditioning for what it is, and exposing teens to the dangers it presents, many highway tragedies can be prevented.

* (Page 7) In our endeavor to provide accurate information, it must be pointed out that at least one fatal crash occurred at the location of Sandy's crash after the discrepancy at the intersection was corrected. In 2008, a drunk driver, who failed to stop for a red light, killed three young adults.

1. Driver Conditioning is defined as *the process through which drivers become conditioned to respond to traffic patterns and road conditions that remain consistent over an undefined period of time or distance.*

2. www.sandyjohnsonfoundation.org

PART ONE

Is it Time for Change?

Chapter One

Laying a Foundation

*“The shell must break
before the bird can fly.”*
~ Alfred Lord Tennyson
Poet

One of the most critical problems confronting travelers on our nation’s highways is the existence of locations where subtle changes in traffic patterns or road conditions exist, but go unnoticed. Often, these sites or stretches of highway experience a disproportionately high number of crashes and ultimately become known as *high-accident locations*, or HALs.

A HAL designation is earned when an intersection, a single-site location other than an intersection, or a stretch of highway that can span several miles in length, experiences a disproportionately high number of motor vehicle crashes.

Typically, these accidents reveal a consistent pattern and expose the fact that different drivers are making similar mistakes. It is these locations that are the primary focus of the Highway Safety Initiative presented in this book.

That does not mean there are not other areas of concern. For example, there are locations where subtle changes exist, and fatal and life-changing injury accidents occur, but a HAL

designation has not been assigned. These locations typically fall into one of three distinct categories, i.e., **high** or **low volume traffic areas**, as well as **new roadways which include those that are under repair or redesign**.

Locations with *high traffic volume* are usually found on our nation's freeway systems in or around municipalities. Although a disproportionately high number of crashes may not occur at specific sites in relation to total traffic volume, the incidence of like-kind accidents occurring at a specific location with a potential for death or serious injury make these locations vitally important and of major concern.

The second category where fatal and life-changing injury crashes can occur without earning a HAL designation are those sites with measurably *low traffic volume*. These locations are typically found in rural areas and may actually be significantly more hazardous than many HALs. But since they are usually traveled by "locals" who are aware of the danger, the high level of risk that exists when traveling through the area may not be immediately recognized. Because no more than one or two incidents may be experienced at these sites per year, they will often fall "under the radar" of highway officials and can remain a hazard to motorists for many years.

This creates the potential for a deadly situation under two common scenarios. The first arises when new housing developments or commercial facilities are built, and new drivers are drawn to the area. Under these circumstances,

vehicular crashes are bound to increase in direct proportion to the increase in traffic.

The second situation having a negative impact on low volume crash sites is when a detour directs new traffic through an area for a short period of time. Under this scenario, a satisfactory response to a sudden increase in crashes may not be forthcoming, as authorities might not be motivated to initiate permanent corrective action if the increase of traffic is only temporary.

This exact scenario unfolded in late summer of 2016 at a location in northwest Ohio soon after the beginning of the school year. Three high-speed crashes occurred within just eight days, two of which involved fatalities. The tragedies occurred after a short-term detour directed new traffic through an area that was typically mostly traveled by local residents. Eight others were critically or seriously injured in these avoidable crashes, including four teenage girls.

In this case, although the problem with the site suddenly became known, it was not addressed by highway authorities in a permanent way due to the temporary status of the detour. Obviously, with the detour discontinued and the temporary safety measures removed, death and injury are sure to follow as other new travelers pass through the area over the months and years to come.

Unfortunately, untold numbers of dangerous locations like this exist across the country and they will remain a hazard to

unsuspecting travelers until new ideas, such as this Highway Safety Initiative, are introduced and acted upon in a positive way.

The third area of concern is *newly constructed roadways* which includes *highway locations under repair or redesign*. This last category is especially important, for as we develop an effective strategy to reduce the number of fatal and life-changing injury accidents, we must also be proactive and implement programs that will give highway officials the tools necessary to take corrective action at dangerous or potentially dangerous locations *before crashes begin*.

This last statement may seem like we are putting the proverbial cart before the horse—how can a dangerous situation be identified without first having a crash that alerts authorities that a potential problem might exist? In fact, there are a number of sophisticated approaches addressing this issue that have been championed both here and abroad. The Federal Highway Administration’s Crash Modification Factors (CMF) Clearinghouse, for example, provides scientific estimates of the safety benefits that can be expected from implementing a variety of countermeasures, such as rumble strips or median barriers. Building on the CMF database and a global body of additional research, the U.S. Road Assessment Program (usRAP) uses video or photo logs of a road network to rate roads for safety and provide an engineering improvement plan. Rather than basing the results on crash data, usRAP’s outputs are generated from predictive risk modeling according to the design features of the road.

Driver-conditioning, however, has not traditionally been included in engineering or other analyses, so we propose additional important steps for proactively identifying high-risk areas. Those steps include:

1. Accepting Driver Conditioning as the prominent underlying cause of crashes;
2. Supporting a program that uses Driver Conditioning as the foundation for identifying *potentially dangerous sites* before collisions begin to occur; and
3. Implementing this broad-based Highway Safety Initiative to guide all facets of the processes of identifying, analyzing, and correcting both *known* dangerous locations as well as locations with the *potential* of becoming one.

Completion of these steps will fulfill the primary objectives of the SJF Highway Safety Initiative by creating an opportunity for expansion of the measures impacting highway safety.

Like other reports or analyses, the Initiative being introduced in Part Three of this text is multi-faceted in scope, as there is no single cure for the correction of all dangerous locations. However, unlike other highway safety programs, this Initiative utilizes low-cost methods of highway analysis. This approach leads to the identification of traditional, easy-to-implement solutions that can be completed in a matter of

days. Identifying and correcting highway deficiencies in a matter of days rather than years could save thousands of lives annually.

In the following pages, a series of common sense, actionable procedures are recommended, each complementing and supporting the other, in order to accomplish the goal of saving lives by reducing fatal and life-changing injury crashes across the country.

As a side note, there are many high accident locations where speed is not a factor and only minor damage to the vehicle results from a crash. Although this Initiative can be used effectively at these locations to determine the cause of mishaps and to develop an effective method for correcting them, the goal of this Initiative is to proactively identify, analyze, and correct highway locations where collisions result in death or life-changing injury.

Chapter Two

Defining the Problem

“The annual toll of fatalities and serious injuries on the nation's roadways remain too great.”

~ Mary E. Peters

Former Administrator of
The Federal Highway Administration

Over the past several decades, more than 30,000 people have lost their lives each year while traveling on our nation's highways. Many years have experienced more than 40,000 highway deaths.¹ If we were to total all of the fatalities resulting from highway crashes since the early 1900s, we would find that well over three million people have lost their lives, in addition to the countless millions of other lives which have been changed forever as a result of a life-changing injury.

As the collective number of highway deaths continues to soar, concern for the improvement in the overall safety of highway travelers has developed within the ranks of national, state, and local highway authorities. Mary E. Peters, former Administrator of the Federal Highway Administration (FHWA), clearly expressed this sentiment when she wrote:

“Safety is a fundamental building block for designing and constructing any highway project. It is the basis for the engineering analysis and standards that transportation agencies apply to the road network. Yet despite the advances that transportation professionals have made to incorporate a safety philosophy into everything they do, the annual toll of fatalities and serious injuries on the Nation's roadways remains too great.”²

As Administrator Peters stated, even though combating the issues that plague highway safety is becoming a greater part of highway planning projects, the number of fatalities and life-changing injuries due to vehicle crashes is still too high. As a result, studies are being conducted on many aspects of driving, including:

1. The lack of seat belt use;
2. The number of alcohol or drug impaired drivers on our highways;
3. The increasing frequency of cell phone use; and
4. Distractions both inside and outside of the vehicle.

Additional studies evaluating accident types are also increasing, including:

1. SUV rollovers;
2. Crashes involving trucks and buses; and
3. Tragedies at railroad crossings.

Up until recently, it was often pointed out that even though more people are taking to the highways, the number of deaths per 100 million vehicle miles traveled (VMT) was trending downward. This decrease in highway fatalities was often credited to state and federal safety initiatives, faster response times of emergency personnel, safer vehicles, safer roadways, and greater public awareness.

However, a recent spike in the number and rate of highway fatalities has safety advocates and policymakers scrambling for answers. For example, 2012 experienced a sharp increase followed by another upsurge in 2015. As of this writing, 2016 will yield yet another increase in fatalities, both numerically and in relation to VMT.³

The truth is, we will continue to experience both upward and downward movement in crash statistics over the foreseeable future—so long as vehicles are under human control. And unless there is meaningful change in the manner in which highways are evaluated for potential risk factors outside the current analysis structure, nothing will foster a permanent reduction in highway deaths.

In the following chapter, we will begin an excursion down a progressive trail. That venture will start with a brief statement regarding the assignment of blame, and develop through its conclusion by unfolding a Highway Safety Initiative designed to reduce the unacceptable number of fatalities and life-changing injuries that continuously take place all across the country.

On this journey, you will learn that the root cause of many of the accidents that shatter so many lives lies deep within our own instinctive ability and desire to learn. In addition, you will come to understand how, by combining the safety efforts of individual drivers, law enforcement personnel, and highway officials, we can accomplish the goal of saving lives.

1. <http://www.iii.org/media/facts/statsbyissue/highway/>
2. <http://www.fhwa.dot.gov/publications/publicroads/04may/04.cfm>
3. Source: National Center for Health Statistics, 2015 Annual Report File (ARF)

Chapter Three

Assigning Blame

“Partly in response to our legal liability system, and partly out of professional pride and self-preservation, road agencies and individual traffic engineers have become very deft at denying responsibility for crashes – by finding ways to assign 100% of the blame to the driver. A century of traffic engineering jurisprudence has now assembled a very effective 'blame-the-driver program' to protect us all from liability. By arguing that case for so long, most of us have even come to believe it.”

~ Edmund Waddell

Transportation Planner

Both law enforcement and highway professionals agree that, except for a minority of vehicular crashes where an animal strike or mechanical failure plays a role, nearly all automobile mishaps are a result of driver error. Over the years, that sentiment has been expressed not only in casual conversations but has prevailed through documentation in both crash reports and traffic studies.

But, as well-meaning as those comments, reports, and studies may be, when like-kind crashes occur at a specific location repeatedly over time, we must assume there is an underlying cause, separate from simple driver error, contributing to those crashes.

To illustrate this point, let's step away from our discussion of highways for a moment and consider a flight of stairs.

What do you think would happen if, half-way up a flight of stairs, one step was one inch higher than the others? The answer, of course, is that someone ascending the stairs would probably trip; someone descending the stairs could potentially fall if they weren't holding on to a handrail.

So my question is, if someone trips or falls, is it the "walker's" fault, or should part of the blame for the mishap be placed on the construction of the stairs?

The answer to this question is not as simple as it may seem. One school of thought would argue that the person traveling on the stairs is at fault because he or she failed to pay attention to the change in the height of the riser. Another group would disagree, stating that the unannounced and unanticipated change in the height of the riser "caused" the person to stumble.

These arguments are an over-simplification of the problems facing highway officials when it comes to assigning responsibility for a crash; however, in this case, the truth is that both the person failing to notice the change *and* the stair construction are to blame!

Now, let's add a twist. Suppose a sign that warns of the change in the height of the riser were placed where parties ascending or descending the stairs could see it. Clearly, the

incidence of people tripping or falling would be reduced. However, the question is, “Would mistakes at this location on the stairs be eliminated?”

Surprisingly, the answer is “No!” which prompts another question: “Why not?”

That question will be answered as we explore a specific learning process that is often overlooked when considering matters pertaining to highway safety—*conditioning*.

PART TWO

A Basis for Change

Chapter Four

Conditioning

“Repetition is the mother of learning.”

~ White Mountain Apache Indians Archives

Conditioning is the primary influence of non-instinctive human behavior. It is a continuous process that guides virtually every aspect of our lives. Our moment-to-moment behavior is influenced in either a positive or negative way, depending in part on our past experiences.

Conditioning is defined by Encarta® World Dictionary as “a method of controlling or influencing the way people or animals behave or think by using a gradual training process.” There are two kinds of conditioning. For our purposes, this book will be referencing operant conditioning. This kind of conditioning involves a stimulus of some kind (visual, auditory, etc.) from the environment (not the person) that prompts a behavior, and a consequence of the environment, which either reinforces or punishes the behavior, thus increasing or decreasing, respectively, the likelihood of the behavior being repeated.

Studies by Psychologist and Behaviorist B. F. Skinner, as well as Biological Sciences Doctor K. N. Dudkin, and others confirm that human behavior is, in large part, a result of conditioning. In short, our current and future actions are influenced by what we have experienced.

According to research conducted by Dr. Dudkin, throughout our lives, we visually observe objects or experience behavior or actions which may become stored in our subconscious and recalled through memory. According to the results of their study, it is this memory that may later influence our behavior when confronted with the daily activities affecting our lives.

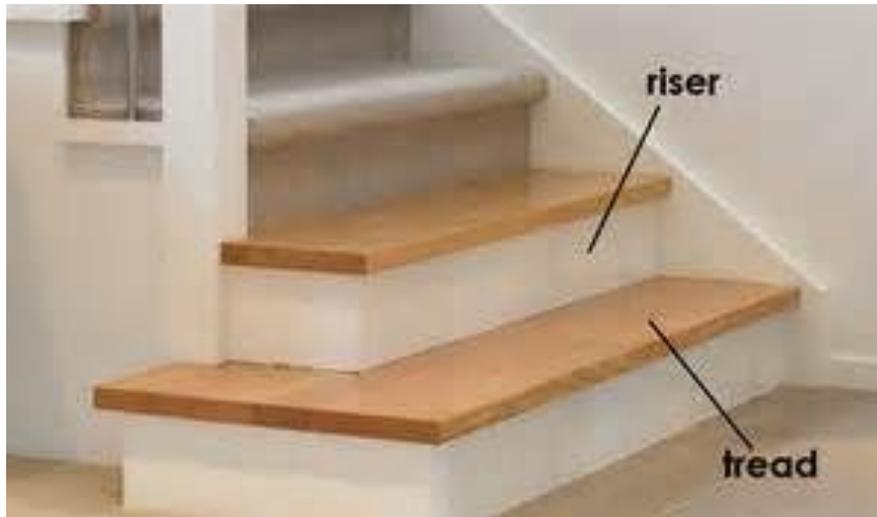
“It has been established that memory is not only a system for formation and storage of cognitive structures, but also an assembly of mechanisms and processes that also are controlling ones and dependent on selective attention, adjustment to perception, and context and biological significance of the objects that participate in the processing of sensory information.”¹

To paraphrase the above quote, our physical and visual experiences create memories which have a controlling effect on our thought processes and, ultimately, our behavior. Therefore, when it comes to human behavior, perception and attention play a significant role in the learning process.

Let’s briefly revisit the flight of stairs discussed in the last chapter that displayed a sign which warned of the change in the height of the riser.

To simplify this review, let us first examine what happens when we approach a flight of stairs for the first time. Typically, the first thing observed is the location of the first step in order to determine where to place our foot before ascending or descending. The next things we observe are the

height of the riser, the depth of the tread, and the distance we must travel to reach the top or bottom. We register all this information in an instant—mostly subconsciously. This is considered the stimulus for our behavior.



The conditioning process takes place with our first two steps onto the stairs. If our first step is successfully made and our initial expectations are met, our original observation is “reinforced.” (Reinforcement happens when the consequences of our behavior lead to desired or beneficial results.) If our second step confirms what was learned with our first step, the conditioning process is essentially complete. In other words, our first two steps confirm our expectations and direct our subsequent actions—how high we lift our leg, at what angle we place our foot, and so on.

Once that is learned, we will remain conditioned to that visual stimulus (the stairs); and as long as all things remain as they should—the risers are all the same height and the

treads are the same depth—we will behave as we learned. Thus, *our mind can pay little attention to the stairs and focus, instead, on countless other things.*

With the mind now potentially focused on other matters, is the sign on the stairs which warns us of the change in riser height sufficient to cause us to take notice and modify our behavior? Sadly, the answer is, “Probably not!” Once we have been conditioned, we cling to what we learned, unless what we have learned is no longer reinforced or if we begin to be punished for our behavior (stumble or fall in this case).

To summarize this particular conditioning process, and to heighten the importance of the point we are attempting to make, our attention to a new stimulus (the sign) is shared with the history/experience we have with the stairs and our initial observation of them (original stimulus). Therefore, *acting on anything that does not visibly or audibly attract our attention beyond that initial stimulus becomes less likely.*

Fortunately, the construction of stairs is regulated by building codes in virtually every jurisdiction in the country, so being confronted by a step in a flight of stairs that is one inch higher than the others is unlikely.

Unfortunately, our network of highways is a lot more complex. Through a system of roadways, single-lane dirt roads can ultimately lead to multi-lane thoroughfares that continue on to obscure alleyways. Certainly, with so many transitions taking place, it is little wonder that motorists

sometimes get confused, or changes go unnoticed, as there are bound to be some unanticipated differences (stimuli that conflict with our previous learning experiences) when dissimilar roadways and traffic patterns connect.

So, when comparing stairs to highways, remember: people failing to safely ascend or descend a flight of stairs when one step is one inch higher than another, and different drivers making the same mistake at a single highway location, are all influenced by the same human learning process: **conditioning!**

Once we become conditioned to traffic patterns and road conditions, we do the same thing when we are driving as when we are on a flight of stairs—we respond to our environment exactly as we have been reinforced, even though the stimulus may have changed slightly. This is called generalization—when one learns to behave in a certain way with “similar,” but not exact stimuli. And when we generalize, making a mistake is simply a matter of time—not a matter of choice; and if high speed is involved, death or life-altering injury can be the result.

Now, armed with the revelation that conditioning influences our behavior and thought process while driving, is the driver solely to blame for all highway mishaps? The answer depends on whom you ask. Many transportation authorities will continue to say “Yes!” while others are beginning to realize that the highway may be a contributing factor.

Keeping this in mind, the next two chapters will introduce two concepts regarding conditioning. The first steps outside the scientific realm and requires the use of our imagination; in other words, we are going to create a concept of conditioning that could be considered self-induced rather than being learned through an outside source/stimuli. In reality, there may be no such thing, but using our mental creativity we will explore that “created” reality.

The second concept is more traditional and is the very foundation of this program. Let’s get started!

1. Dudkin K.N., “Visual-recognition processing in conditioned behavior,” *Perception* 35 Suppl. C (2006): 76.

Chapter Five

Behavioral-based Conditioning

“The chains of habit are generally too small to be felt until they are too strong to be broken.”

~ Samuel Johnson
Poet

When studying psychology we learn that conditioning takes place only when influenced by outside stimuli. In other words, there is no such thing as “self” conditioning. But let’s use our imagination for a moment, and see if we can find a creative way to establish the general concept of “self-conditioning” and link it to our personal driving behavior.

Here is what I propose: You and I can “condition” ourselves! We can teach ourselves how to behave. We can train ourselves to perform both positive and negative behaviors, automatically, when confronted with certain situations or “stimuli.”

First, some background. Decisions are generally placed into one of two categories: right or wrong. And usually, we can tell the difference between a right and wrong decision by the consequence it creates. For example, anyone who has touched a hot stove when they were young has likely never done it again, at least not on purpose. Why? Because when

they touched that hot stove and were burned, they learned pretty quickly that the consequence to that behavior was unfavorable.

So it is with countless other actions. We perform an act, receive immediate feedback, and either continue the activity or discontinue it, depending on the outcome—the consequence resulting from that act.

Based on this reality, we could logically say the definition of a wrong decision is “*any decision that results in a negative consequence.*” Conversely, the definition of a right decision could be “*any decision that results in a positive consequence.*”

Although this seems simple enough, it does create a dilemma: how do we know for sure if a particular decision is right or wrong if there is neither a positive nor negative consequence? What happens when we initiate an action and the consequence of that action is neutral?

The answer to these questions is the basis for this chapter. The reasoning behind that statement is this: if we perform a specific act and there are no negative consequences resulting from that act, that action is registered in our mind as being positive. Being a critical point, I repeat: *If we perform a specific act and there are no negative consequences, that act is registered in our mind as being positive.* Understanding this basic principle is vital to understanding Behavioral-based Conditioning.

Let's look at a couple of examples by reviewing two activities that we know are wrong, and see if we can make them appear to be right. We'll begin with a discussion of seatbelt use. We are taught to use our seatbelt when traveling in a vehicle. But when we are alone, and not under the control or influence of another person, we have a personal and private decision to make: do we wear our seatbelt, or do we *not* wear our seatbelt? Obviously, one decision is right, and one is wrong. Since we have been taught to wear a seatbelt, in order to change that behavior, thought will have to occur, and with thought, the evaluation of consequences takes place.

If we chose to continue to buckle-up after weighing the consequences, we begin to perform that act each time we get into a vehicle, and it can become an "automatic behavior." In short, the act of sitting in a car can initiate the action of buckling our seatbelt if the habit of buckling up has been created. Under normal circumstances, we will automatically repeat that act until we change our decision

On the other hand, if we choose not to buckle-up, and there are no negative consequences that follow, our wrong choice is reinforced and our mind interprets that action as a "positive." Through repetition, the act of not buckling our seatbelt can become a *habit*.

Let's discuss texting.

We are taught not to read or send a text while driving. But, once again, when we are alone, we have a personal and private decision to make. If we choose to continue to perform in the manner in which we were taught, we will begin to avoid that act each time we get into a vehicle. That avoidance can then become “automatic” which means we will avoid reading or sending text messages while driving.

On the other hand, if we choose to send or receive a text, and there are no negative consequences that follow, our wrong choice is reinforced, and our mind interprets that action as a ‘positive.’ Through repetition, the act of sending and receiving text messages can become a *habit* and be performed without giving it any thought whatsoever.

What happens when we repeat a bad habit too many times? Sooner or later, the negative consequences we were warned about can occur and the outcome can be life changing.

To summarize, in either case, whether we make the right choice or the wrong one, over time we will have “taught,” or “programmed,” or allowed ourselves to be “conditioned” to a specific stimulus (the act of sitting in a vehicle). And as simplistic as the act of getting into a vehicle is, that activity can initiate either right or wrong actions based upon our own self-taught behavior, regardless of its conflict with actions previously learned.

Like any other activity with which we become familiar, as we gain driving experience we naturally become more

confident in our driving abilities. With that confidence, our aversion to risk can be distorted and negative/bad habits can be born. An example of this was effectively identified by a comprehensive AAA Foundation for Traffic Safety study of novice drivers, which found that the slightly older teenage siblings of brand-new drivers were much more likely to engage in distracting behaviors, likely because of increased comfort and overconfidence.¹

Learning this lesson is not only important for drivers like you and me, but it is also invaluable to highway professionals. When evaluating HALs or newly constructed, or modified, roadways, it is vital to be able *to understand human behavior and use that knowledge to foresee the potential future actions of motorists*. This awareness can be instrumental in the recognition and evaluation of potential highway dangers.

1. AAA Foundation for Traffic Safety study can be found at https://www.aaafoundation.org/sites/default/files/DistractedDrivingAmongNewlyLicensedTeenDrivers_0.pdf

Chapter Six

Driver Conditioning

“Mental states of every kind - sensations, feelings, ideas - which were at one time present in consciousness and then have disappeared from it, have not with their disappearance absolutely ceased to exist.”

~ Hermann Ebbinghaus
German Psychologist

Driver Conditioning is defined as *the process through which drivers become conditioned to respond to traffic patterns and road conditions that remain consistent over an undefined period of time or distance.*

In order to highlight the above definition, consider the following statement: *Like taking our first two steps when navigating a flight of stairs, the act of driving itself becomes a conditioning process. Once conditioning has occurred, our attention to new stimuli will diminish, creating a greater probability that mistakes will be made when unexpected or subtle changes in either traffic pattern or road conditions are encountered.*

Perhaps it would be helpful to review a location where Driver Conditioning is known to have taken place. The site we will review is the location where Sandy and her mother were killed—the birthplace of the recognition of Driver Conditioning.

To refresh your memory, that intersection had been studied six times over a 13 year period. As a result of one of those studies, a costly modification was recommended and completed just a few years before Sandy's crash. That modification led to the site becoming more dangerous, leading to the ranking of "eighth most dangerous intersection." The danger at that location was ultimately corrected after ODOT acted on our recommended change. The proposed solution was developed based on the principles being presented in this text.

In order to give you a deeper understanding of the process of Driver Conditioning, let me provide a breakdown of what drivers encountered on the 12 ½ mile journey Sandy took on her final road trip. It took less than 20 minutes to complete.

Seeing an itemized list of times, distances, and traffic control devices takes away from the actual experience of this short trip as one cannot view the countryside, listen to highway sounds, or encounter other distractions one would normally face when traveling—but that isn't really needed.

As you review the data, simply allow your mind to recognize a pattern being established and see if you can better understand the process of Driver Conditioning.

At Mile Point 0.0, the vehicle turned right, leaving the northbound freeway exit ramp of I-270 in northeast Columbus, as it began heading east on Morse Road (CR 25).

<u>Mile Point</u>	<u>Elapsed Time*</u>	<u>Pattern Encountered</u>	<u>Visual Observation</u>
0.0	0.00	Intersection	Traffic Signal
0.2	0.18	Intersection	Traffic Signal
0.5	0.51	Intersection	Traffic Signal
0.8	1.16	Intersection	Traffic Signal
1.8	2.44	Intersection	Traffic Signal
2.0	3.09	Intersection	Traffic Signal
2.4	3.52	Intersection	Traffic Signal
3.1	4.48	Intersection	Traffic Signal
4.8	8.03	Intersection	Four-Way Stop with Signs and Flashers
7.7	11:18	Dangerous Intersection Sign	Side Traffic Stops Only
9.0	12.57	Intersection	Four-Way Stop with Signs Only
9.5	14.03	Intersection	Four-Way Stop with Signs Only
10.2	15.14	Dangerous Intersection Sign	Side Traffic Stops Only
12.2	17.27	Dangerous Intersection Sign	No Intersection in View
12.4	17.52	Final Intersection	Signs with Four-Way Flashing Lights

(*All times are approximate and can vary depending on traffic density and traffic light sequence.)

The final intersection encountered on this trip had the appearance of a four-way stop: two oversized stop signs (one on each side of the road leading into the intersection) and

two flashing warning lights facing each direction—the color being visible only from the direction it faced.

As the vehicle approached the intersection and came to a stop, a small, inconspicuous, rectangular sign warning “Cross Traffic Does Not Stop” could be seen attached below the stop sign on the driver’s right. Resembling a YARD SALE sign in size and shape, new travelers to the area often looked past it, having already determined the intersection required all traffic to stop.¹

That is what Sandy did. That is what an elderly woman did the Wednesday after Sandy’s crash when three cars were totaled—fortunately, no one died in that incident. That is what a young woman did the Saturday following Sandy’s death—barely being missed as she, with four other occupants in her car, sped up to avoid being struck by a southbound vehicle. The list could go on.

To summarize the timeline above, Sandy encountered a total of eleven intersections before arriving at her final destination—intersection number twelve. Traffic lights controlled the traffic flow at eight of those intersections, while three required traffic from all directions to stop before crossing.

Also encountered were three Dangerous Intersection (D-I) signs—the final one displayed just before the final intersection came into view. The two previous D-I signs were posted at intersections where only cross-traffic was required to stop—Morse Road travelers continued unrestricted.

For just a moment, let's attempt to step into Sandy's mind as she approached the final intersection, to see if we can comprehend what she must have experienced.

1. Dangerous Intersection sign number three is observed. At this time, as before, the intersection being referenced is not in view. Sandy would have assumed there is no action required on her part—she has an unobstructed path just as before—so there is no mental preparation made to modify her driving behavior due to the presence of this sign.
2. Immediately after passing the D-I sign and upon cresting a small hill, she observed two large stop signs and two flashing red lights. Also visible are two additional flashing lights facing each direction—the color of those flashing lights is not visible. No cross traffic is observed. The intersection is roughly four hundred yards away.
3. Resembling other intersections she encountered on her journey, she immediately perceives the crossroad ahead to be a four-way stop—there is nothing readily noticed to indicate otherwise.
4. As she arrived at the intersection, her pathway is clear except for a vehicle approaching from the right with its left turn signal flashing.

5. Being a careful driver, she waited for the vehicle to stop. The driver of that vehicle does exactly what she expects—he stops short of the intersection yielding to her.
6. With the area clear of all other visible traffic, she entered the intersection. As the front of her car passed the center of the road, her life came to an abrupt end.

The result of the crash is shown below. Not visible in this photo is the driver's side of the vehicle. If shown, it would dramatically reveal the force of the impact. The blood-splattered interior and steering column void of its "wheel" also expose the severity of the crash.



Crash Scene Photo - October 5, 2002

(Although difficult to see, the steering wheel, with airbag deployed, hangs outside the passenger-side window—propelled there by the force of the collision.)

With some degree of regularity, first-time travelers to this location failed to respond properly to the traffic control devices in place at that site. Although prominently displayed,

even the “Cross Traffic Does Not Stop” sign was not recognized by many first-time travelers.

Here is the bottom line: *Driver Conditioning had greater influence over the actions taken by travelers arriving at that site for the first time, than did the traffic control devices installed for their safety.*

Why?

1. The unseen warning sign notifying motorists that *Cross Traffic Does Not Stop* is another consequence of Driver Conditioning and will be covered in a later chapter.

Chapter Seven

Expectation Vs. Conditioning

*“Life is so constructed that an event does not,
cannot, will not match the expectation.”*

~ Charlotte Bronte
Novelist and Poet

Before we continue, let's take a step back in time to November 2002, the period just after I identified the concept of Driver Conditioning.

Soon after Driver Conditioning was recognized as the underlying cause of Sandy's crash, I discussed the concept and the implications of this phenomenon with federal and state officials involved with highway safety. Many of them acknowledged an awareness of (what I will call) “driver-expectation” (meaning a driver developed a certain expectation that ultimately was not met which contributed to a crash) but had never heard of, or considered Driver Conditioning.

After considerable study and thought, the connection between conditioning and expectation was uncovered. This is what I learned:

CONDITIONING is an environmentally prompted and reinforced process that, when successful, leads to predictable future behavior.

EXPECTATION is a result of conditioning.

In fact, one cannot have an expectation without first being conditioned.

I also came to realize that by only focusing on expectation, the original hypothesis of driver error is supported as being the only recognizable cause of crashes. In other words, the at-fault driver had the wrong expectation; therefore, driver error was the cause (the only cause) of that specific accident.

On the other hand, by considering the three components of conditioning (stimulus, behavior, consequence), the emphasis is placed on the highway, where the underlying cause of many crashes can be found, rather than being placed solely on the driver.

By presenting this argument, I am not trying to shift blame away from the driver, but rather I am attempting to draw attention to the influence consistent road conditions and traffic patterns have on drivers who may not be paying 100 percent attention to all available stimuli.

These comments are not meant to discredit or otherwise imply, that consistency is anything other than a “good” for our highway system. The efforts of highway officials to maintain consistency in traffic patterns and highway

conditions is both necessary and vital to creating a safer environment for road travel. But we must not lose sight of the effect consistency has on human behavior and the impact that is potentially felt when consistency is not maintained.

I would like to make one final point on this before moving on. According to a report titled “Accident Surveillance System, Caltrans Highway Safety Improvement Program,” dated December 1998, “It is (our) responsibility to make roads as safe as practicable. If multiple drivers, regardless of their failings, are making the same driving error, it can be suspected that an improvement to the road is possible. Driver violation and DUIs are not acceptable reasons for eliminating the investigation process.”¹

I would like to add to that by stating that any type of impaired driving, whether it is due to the influence of drugs or alcohol, driving while drowsy, or other irresponsible acts such as drag racing or cell phone use, also causes accidents. But, to paraphrase the above, *even under circumstances when it is obvious those factors contributed to a crash, do not overlook Driver Conditioning as a possible contributor as well.*

As we expand our understanding of Driver Conditioning, the next chapter will provide answers to the following questions: How does Driver Conditioning affect highway safety? And, what happens when drivers allow conditioning to influence behavior?

1. Caltrans: The California Department of Transportation

Chapter Eight

Effects of Driver Conditioning

“Multi-tasking arises out of distraction itself.”

~ Marilyn Vos Savant
Author and Playwright

It is important to recognize two things about Driver Conditioning: Firstly, it is experienced and reinforced nearly every time we get behind the wheel of a car. Secondly, our natural and automatic responses to being conditioned while we are driving are that our levels of perception and attention to subtle changes in stimuli are reduced. When awareness of our surroundings is diminished, one of two mental processes takes place: Mental Compromise or Cognitive Disengagement.^{1,2}

Mental Compromise is a period when our awareness of the act of driving is diminished as we focus our attention on other matters. Breaking down Mental Compromise into its two sub-categories, *intentional* and *unintentional*, will help with our understanding of this state of mind.

Intentional Mental Compromise occurs when we intentionally lessen our level of concentration and begin to focus on things other than driving and our driving environment. For example, tuning a radio, operating a phone or other device, and engaging in verbal communication such as disciplining a

child or conversing with a passenger are all examples of how we voluntarily stop paying attention to driving. Included in this group is the purposeful act of re-directing our thoughts to matters unassociated with driving or our driving environment.

If we were to categorize all the physical and mental distractions we initiate while driving, the list would be quite long. But suffice it to say that these are periods when our attention to driving is intentionally lessened in order to physically or mentally address other issues or matters unassociated with driving.

Unintentional Mental Compromise is a slight variation of the above. It takes place when our thought processes take over *involuntarily* and we consider past, present, or future events which may influence or touch our lives. This situation usually occurs when traveling alone or during quiet times as our mind unintentionally wonders and considers an endless variety of topics.

While experiencing these mental separations from the act of driving, another phenomenon takes place known as **Automaticity**. Automaticity may be defined as *the automatic processing of information by an organism in response to stimuli in a way that is automatic and involuntary; occurring without conscious control*.

To put it another way, automaticity simply means that we have mastered the ability to participate in a physical activity

so well that our mental attention can be directed toward something completely separate from that activity. When applied to driving, it means that we have both physically and mentally mastered that process to such a degree that we no longer need to devote our direct attention to it. In other words, our responses to our driving environment become automatic and therefore can be completed without direct mental effort. As a result, we behave in conditioned ways with ease. For reasons that are obvious, automaticity is clearly a “positive” in helping us to maneuver a vehicle in areas that are unchallenging, but *it should never be relied on as an effective method for safely operating a motor vehicle under any circumstances.*

The other mental process is **Cognitive Disengagement**. Cognitive Disengagement is that period of driving when we are not consciously aware of our surroundings. It is usually experienced during long periods of driving or when driving in areas that are extremely familiar to us. Immediately after experiencing Cognitive Disengagement, it is common to come to the sudden realization that we do not recall the last several miles or minutes of travel.

During this mental state, we are neither in thought nor consciously aware of the fact that we are driving. It is like being asleep at the wheel, with the only noticeable difference being that our eyes are open.

As stated earlier, the ability to function in this capacity is based on Automaticity. Our previous experiences and our

level of conditioning allow us to react “automatically” to our driving environment.

Cognitive Disengagement can be so intense that it may take a moment for a driver to recover from lapsing under its control. For example, it may take a few seconds for a driver to recognize where he/she is, or to remember where he/she is going.

It would be easy to wonder why we do not become involved in more accidents as we experience Cognitive Disengagement, but the answer is actually quite simple; as mentioned earlier, our eyes are open. Consequently, most visual distractions or audible interruptions will bring our attention back to the highway, allowing us to avoid a potential crash. Observations such as seeing brake lights or a turn signal, even a simple lane change being made by a vehicle in front of us, can catch our attention and bring it back to the highway and the act of driving. In addition, the sound produced when passing over rumble strips or other such sensation-producing variances on the surface of the highway will have the same effect.

In the following chapters, you will learn what *you* can do to help minimize the effects of Driver Conditioning and the resulting mental processes that impact our lives; namely, Mental Compromise, and Cognitive Disengagement.

But first, let's compare Cognitive Disengagement to another, well-known, mental condition referred to as Highway Hypnosis.

1 & 2. Both Mental Compromise and Cognitive Disengagement are terms recognized in medical and psychiatric journals and refer to psychiatric and mental disorders. Although the same terms are used in this text, a different definition has been applied to each term and should not be confused with any medical or psychiatric disorder.

Chapter Nine

Highway Hypnosis

“I'm not asleep...but that doesn't mean I'm awake.”

~ Author Unknown

When developing the theory of Cognitive Disengagement, I ran into the common phrase Highway Hypnosis. For those of you familiar with Highway Hypnosis, I would like to point out the difference between the two phenomena.

Cognitive Disengagement can take place anytime, day or night, while Highway Hypnosis primarily occurs at night.

Cognitive Disengagement can occur during either long or short trips, while Highway Hypnosis generally occurs during long, monotonous periods of driving.

Cognitive Disengagement is caused by Driver Conditioning. Highway Hypnosis, on the other hand, is a result of fatigue.

Cognitive Disengagement occurs as a result of a lack of challenge when driving. This can take place when traveling in familiar areas or when traffic patterns and road conditions remain consist for long periods of time or distance, whereas, Highway Hypnosis is a result of inactivity and/or a lack of rest.

Fortunately, both Cognitive Disengagement and Highway Hypnosis can be controlled or, at the very least, influenced by the same things. For example, when able, take small breaks from driving. In addition, staying mentally and physically active will help a driver remain focused.

Before we present the Sandy Johnson Foundation's Highway Safety Initiative, we will review two important topics. The first was referenced in Chapter Six where it was disclosed that first time travelers to the intersection where Sandy was killed did not see the warning sign, *Cross Traffic Does Not Stop*. Therefore, in Chapter 10, we will address the impact Driver Conditioning has on our inability to see objects, such as highway signs, traffic signals, or potential hazards that are clearly within view. The second topic will be covered in Chapter 11, where we will review what drivers can do to help themselves diminish the effects of Driver Conditioning.

Chapter Ten

Did You See That?

*“To see what is in front of one’s nose
requires a constant struggle.”*

~ George Orwell
British Author

I am sure many, if not most, of you have watched a video where the viewer (you) is instructed to keep track of a specific activity. For example, you may be asked to count the number of times a ball is passed from one person to another or the number of jumps made by a specific person or group while others are jumping around them.

If you choose to participate in the challenge, you carefully watch and count as those in the video perform before you. At the conclusion of the routine, it is revealed that something else was occurring on the monitor such as a person wearing a gorilla suit or chicken suit openly walking among the participants. If you have ever participated in such a viewing, there is a high probability that you didn’t notice the other things taking place on the video, whether it be the chicken or gorilla walking by or other events that were in full view.

These videos are often displayed under a heading of **Inattentional Blindness**. Inattentional Blindness can be defined as *the failure to notice a fully-visible object within*

our field of vision because attention is engaged on another task, event, or object.

Within the study of psychology, there are other types of “blindness” such as Attentional Blindness and Change Blindness. Although each of those could have a negative impact on highway safety, we will focus here on Inattentional Blindness. It is this phenomenon that presents the most common, and therefore greatest, threat to motorists.

It is important to realize that Inattentional Blindness is not directly caused by Driver Conditioning, but it is certainly exacerbated by it. As our attention is directed toward deep thought, visual events, or physical activities, it is easy to be “blind” to a majority of things within our field of vision. If those things present a potential hazard or are warning of an upcoming change in either traffic pattern or road condition, and our response to them is either delayed or thwarted altogether, deadly circumstances can arise. For example, Sandy didn’t see the sign declaring “Cross Traffic Does Not Stop” that was in plain view—directly in her line of vision.

This deadly issue of not seeing things within our field of vision presents itself to motorists countless times during each moment of every day, making it vitally important that highway professionals both *recognize* the danger it creates and *act* to reduce its occurrence. Knowing how to deal with this unavoidable and persistent threat is vital if highway travelers are to be kept as safe as possible. Because of this, the Highway Safety Initiative will contain suggestions on how

the negative impact of Inattention Blindness can be minimized.

Before we leave the topic of blindness there are two other issues related to vision that should be addressed. Both of these occur naturally and present a unique challenge. The first is called **Visual Expectation**. Visual Expectation in this context is simply defined as *the expectation to see a specific object or thing within our field of vision at a specific time or place*.

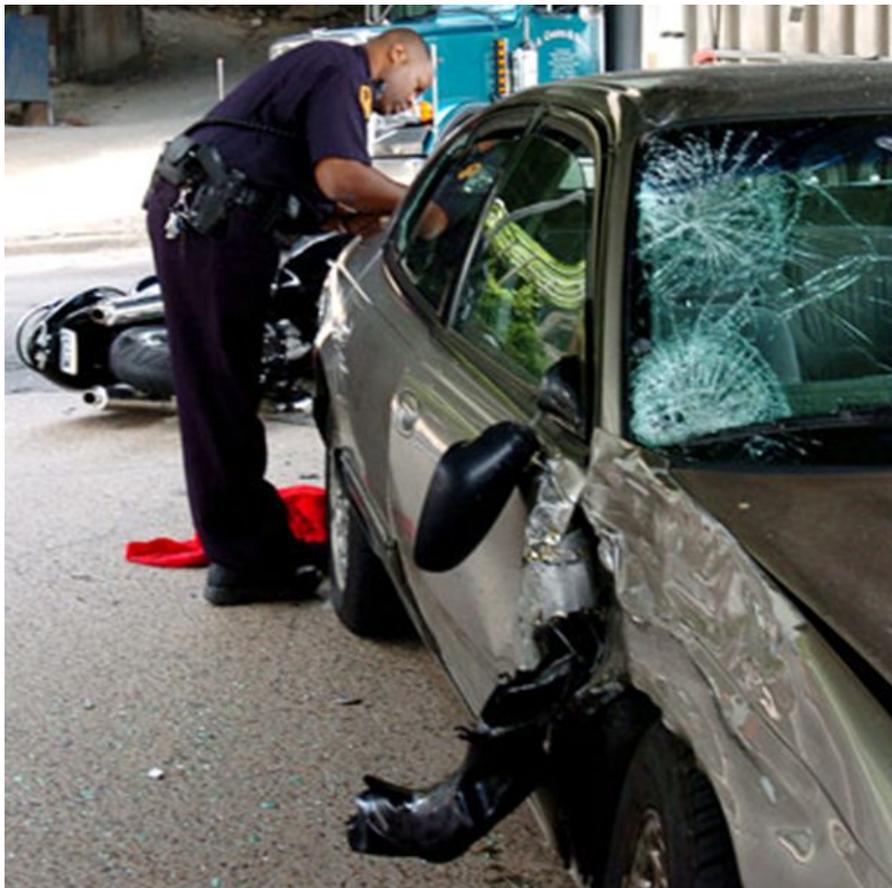
Just as drivers can become conditioned to respond improperly when experiencing subtle, unrecognized, changes in traffic patterns and highway conditions, drivers also develop patterns of behavior when influenced by visual stimuli. In a 2006 study conducted by Steven B. Most and Robert S. Astur regarding visual cognition,¹ evidence was presented that concluded that drivers who are looking for a specific object while negotiating through traffic, may fail to notice other, potentially important, aspects of their environment.

This lack of attention to other objects in our field of vision is typically the underlying cause of crashes involving motorcycles, pedestrians, and bicyclists. Simply put, when car and truck drivers prepare to initiate a turn, change lanes, or pull onto a highway, they often only look for other cars and trucks. This action can result in drivers looking past motorcycles, pedestrians, and bicyclists, even though they are within view.

Take a look at a couple of vehicles after a collision with a motor cycle. In the first photograph, we can see the result of a vehicle turning in front of an approaching motorcycle. The crash occurred at 11:00 AM and the cyclist was in full view of the driver, yet was not seen. The windshield on the vehicle shows the shatter point (upper impact area) where the motorcyclist's face hit the vehicle's windshield. The biker survived this crash.

The second photograph displays the motorcycle involved in that crash.

(The first two photos are by Philip G. Pavely/*Pittsburgh Tribune-Review*)





In the photograph on the following page, a female driver attempted to cross an intersection while a motorcycle approached from the right. In this case, it is known that the vehicle driver was on her cell phone at the time of the crash. Apparently, with her attention focused on conversation, she looked right past the approaching biker. Unlike the crash previously discussed, the motorcyclist involved in this collision was killed, as were the two young women in the vehicle. The motorcycle was traveling 85 mph at the time of the impact and entered the vehicle *through* the passenger-side door. The force of the collision was so strong, the vehicle rolled 20 feet on impact.



Photobucket.com

To help heighten an awareness of the seriousness of this problem, let's look at some statistics. For example, motorcycle registration jumped from over 3.8 million in 1997 to over 6.2 million in 2005. The number of fatalities, however, increased disproportionately from a low of 2,116 in 1997 to a high of 4,810 in 2005.² More recently, motorcyclist fatalities increased by 8.3% from 4,594 in 2014 to 4,976 in 2015.³ These figures make motorcycle safety a growing concern among all highway safety advocates and should inspire all of us to use extreme caution when traveling.

The second issue impacting a driver's ability to respond to hazards, and the final topic to be presented in this chapter, is **Tunnel Vision**. Oxford Dictionaries defines Tunnel Vision

as *“sight in which objects cannot be properly seen if not close to the center of the field of view.”* Although Tunnel Vision is seldom experienced by most drivers, it presents a threat to all highway users.

In the context of this writing, Tunnel Vision is caused by specific driving conditions that typically include two elements:

1. Straight roads; and,
2. Monotonous, or unchallenging, driving conditions.

When experiencing Tunnel Vision, mental processing of visual data is limited to an extremely small spot in the center of our normal field of vision. Outside that spot, the area is both mentally and visually blurred, almost to the point of non-existence. While being subjected to Tunnel Vision, we are aware of the fact that we are driving, but thought, beyond that limited mental awareness, is minimal to non-existent.

The obvious danger with Tunnel Vision is that a driver’s ability to see things in their immediate vicinity is totally obscured. This means that things like stop signs, visual warning devices including LED lights, even intersections can be driven past or through without being noticed.

Under circumstances such as this, the most effective system in bringing a driver’s attention back to their driving environment would be rumble strips. All other methods typically used to draw a motorist’s attention to a specific

hazard are mostly ineffective, except for the possibility of Strobe type flashers.

I want to re-emphasize that Tunnel Vision is extremely rare and may never be experienced by some drivers. But, if you are ever driving in an environment that contains mile after mile of straight highway with little to no challenge, just be aware that Tunnel Vision can occur, causing you or other motorists to miss obvious traffic safety controls or life-threatening hazards that are in plain view.

At this point, we will conclude our discussion of the problems associated with the loss of visual perception. However, Inattentional Blindness will be addressed in more detail within the pages of the HSI.

1. Psychology Press, Feature-based attentional set as a cause of traffic accidents; VISUAL COGNITION, 2007, 15 (2), 125-132
2. U.S. Department of Transportation: Action Plan to Reduce Motorcycle Fatalities; October 2007
3. NHTSA's Fatality Analysis Reporting System (FARS) 2015

Chapter Eleven

Avoiding Driver Conditioning

What can we do?

*“Wisdom consists of the anticipation
of consequences.”*

~ Norman Cousins

Political Journalist and Author

Now that we understand Driver Conditioning, what can we do to keep from falling under its influence? Remember, we experience the process of being conditioned nearly every time we get behind the wheel of a car. Therefore, in order for us to avoid becoming a victim to this natural phenomenon, we must modify our behavior, or control our thoughts in some way, to help us maintain our focus on driving.

There are some mental steps that can be taken, attitudes we can develop, and actions we can take to help reduce the influence of Driver Conditioning. We will list some of them here and provide a brief explanation.

1. Make a concerted effort to remind yourself of the existence of Driver Conditioning.
2. Mentally work to prevent your mind from expecting things to stay the same.
3. Drive at a speed that will enable you to stop within the distance of your sight.

4. Purposely work to mentally pay attention to all traffic signs and other traffic control devices.
5. Ask yourself, “What if...?” when you realize you are not paying attention to your driving environment.
6. Recognize that ALL drivers are affected by Driver Conditioning.
7. When possible, do not initiate a maneuver with your vehicle that will require another driver to respond.
8. Pay attention to the actions of other drivers and expect the unexpected.
9. Remain aware of the fact that past experiences do not guarantee future events and past results do not guarantee future outcomes.
10. If your vehicle is moving, look where you are going.

Although the effects of conditioning cannot be avoided 100 percent of the time, we can limit its influence by incorporating a two-step process into our driving routine. First, **make a concerted effort to remind yourself of the existence of Driver Conditioning** as you get behind the wheel. Without recognizing that Driver Conditioning exists, there is no way to prevent it. The timeless expression “ignorance is bliss!” does not apply to Driver Conditioning.

Second, you need to **mentally work to prevent your mind from expecting things to stay the same**. In other words, remind yourself that just because you have traveled safely on a particular route many times before, or have experienced consistent traffic patterns and road conditions for the past several miles, unexpected changes *can* and *will* occur.

Mentally anticipating change can be accomplished in several ways. For example, you may have traveled through neighborhoods thousands of times without ever encountering a problem, but that does not mean a problem will never arise. In the future, rather than drive through a neighborhood without concentrating on driving, teach yourself to focus your attention ON the neighborhood. One way this can be done is by looking under parked cars as you drive, watching for little feet or animals which may be ready to dart into the street. Pay closer attention to yards and driveways, looking for any activity that could indicate someone might be ready to enter the roadway. In addition, when approaching parked cars, you can look inside each vehicle to see if there is anyone who may potentially be getting ready to open a door into the street as you are passing.

You can take other steps to modify your driving behavior in order to force your attention to remain on driving. For example, when turning a corner, driving around a bend in the road, or cresting a hill, expect, and/or focus on the possibility, that you may have to stop suddenly—don't simply let your previous experiences dictate your expectation that the roadway in front of you will remain clear and you will negotiate the maneuver successfully.

Also, realize that when traveling at high rates of speed, the actions you take to avoid a crash may fail, so prepare yourself mentally to take appropriate steps to avoid a crash in advance. As much as possible, always **drive at a speed that will enable you to stop within the distance of your sight.**

Also, do your best to **purposely work to mentally pay attention to all traffic signs and other traffic control devices.**

In short, concentrate on your own driving behavior and habits, and work to develop ways in which you can maintain a fresh, unconditioned eye on driving.

By remaining mindful of the task at hand, and treating each encounter as if it is new, the influence of conditioning over your current driving experience will be reduced.

Another exercise that will help you to maintain focus on driving is to develop the habit of **asking yourself, “What if...?” when you realize you are not paying attention to your driving environment.**

In other words, get into the practice of asking yourself questions that relate to your current driving experience. Questions like “What if the driver in front of me brakes suddenly?” “What if the driver in the lane next to me doesn’t see me and decides to pull into my lane?” “What if the car approaching from a side street doesn’t stop?”

Although the scenario you are considering may never take place, simply asking those questions on a continuous basis will help maintain your attention on your current driving experience and will aid in your ability to guard against the effects of Driver Conditioning.

It is also important to **remember that Driver Conditioning affects ALL drivers.** Therefore, when other drivers are responding to their environment in a conditioned way and/or experiencing the effects of Mental Compromise or Cognitive Disengagement, their absence of awareness can create unexpected, life-threatening circumstances for you. In order to combat that, **when possible, do not initiate an action with your vehicle that will require another driver to have to respond.** Being an important point, I repeat, *when possible, do not initiate an action with your vehicle that will require another driver to have to respond.* Clearly, if an action is taken by one driver that affects another, and the other driver delays in his/her response, the results can be deadly. The phrase you may have learned in drivers' education class, "Drive defensively!" certainly applies here. In short, validate everything and take nothing for granted.

We have all heard or read the statement "there are no guarantees in life." That is especially true when driving. But you will give yourself a better chance of arriving at your destination if you follow a couple of simple rules when traveling: **pay attention to what others are doing and to what they may encounter, and expect the unexpected.**

Always remember that **past experiences do not guarantee future events; nor do past results guarantee future outcomes.** Turning a corner while looking the other way to check for on-coming traffic one thousand times without an incident, does not guarantee you will successfully negotiate

that turn harmlessly the one-thousand-and-first time! In short, **if your vehicle is moving, look where you are going.**

* * *

In the preceding chapters, we have learned:

1. The definition of Driver Conditioning;
2. The process that causes Driver Conditioning;
3. The impact of Driver Conditioning on highway safety;
4. The effects of Driver Conditioning on our ability to remain focused on driving; and
5. The actions we can take to avoid it.

Now, let's learn what highway officials, and others charged with keeping our roadways safe, can do to help protect us from the negative influence of Driver Conditioning.

PART THREE

**The Sandy Johnson Foundation
Highway Safety Initiative**

Chapter Twelve

Implement Aggressive Public-Awareness Programs

*“It’s important to know that words
don’t move mountains.*

Work, exacting work moves mountains.”

~ Danilo Dolci

Sociologist

The old saying “What you don’t know won’t hurt you” does not apply to the highway. When you combine the effects of Driver Conditioning with high speeds and subtle changes in traffic patterns or road conditions, it is just a matter of time before someone is seriously injured or killed. When ignorance is added to the mix, the odds of this undesirable outcome significantly increase.

In order to prevent that from happening, the public must be informed about Driver Conditioning, its cause, and potential influence on highway safety. Several methods can be used to educate the public and increase awareness of Driver Conditioning, and the impact it has on highway safety. Those methods can be broken down into three simple, yet powerful, areas:

1. Implement a more comprehensive curriculum for driver's education classes—one that includes Driver Conditioning in its course material.
2. Develop public service announcements (PSAs) to inform the public of Driver Conditioning and the HSI through the use of television, radio, and social media.
3. Initiate a “site-specific” warning program that contains features of *Notification* and *Education*.

Let's review these programs and see how they can complement each other in a comprehensive, public awareness program.

Driver's Education

Driver's education classes offer the greatest opportunity to teach young drivers about Driver Conditioning, its cause, and potential effects. This fact alone makes the expansion of driver's education curriculum our first priority.

To facilitate this, The Sandy Johnson Foundation (SJF) has created an internet-based supplemental driver's education program in order to help young drivers learn about Driver Conditioning. It is titled “*The Hidden Dangers of Driving*” and guides young drivers into an understanding of, and an appreciation and respect for, the influence of Driver Conditioning on motorist behaviors and highway safety.

To complement this web-based educational series is a workbook titled: “*Driver Conditioning: The Unexpected Killer.*”

This workbook provides essentially the same learning experience available through the internet-based program and is offered for those who may not have access to the internet. The workbook can also serve as a handy reference tool for those completing the online course.*

Public-Service Announcements (PSAs)

Since driver's education courses are geared toward the new driver, an additional method to reach experienced motorists should be implemented. Public service announcements can accomplish that task while serving to reinforce the message being taught in the classroom.

In addition to bringing awareness of Driver Conditioning to experienced motorists, and reinforcing the material learned by students via our internet-based program or workbook, PSAs would also be an effective tool to use when informing travelers of the third method of education: a site-specific notification and education campaign designed to notify motorists of change and educate them as to what the specific change is.

Notification and Education (Site-Specific)

The site-specific portion of our proposed public awareness program contains two elements, namely, *Notification* and *Education*.

The purpose of **Notification** in this program is to alert motorists of a change in either traffic patterns or road conditions that the driver may not be anticipating. This can be accomplished by utilizing a method that causes a driver's attention to be "brought back" to his or her driving environment. Most typically, that can be accomplished by using one of three attention-getting devices: rumble strips, flashing LED lights, or strobe-type lights. Although I have only witnessed two locations with a strobe light warning system over the 10's of thousands of miles I have traveled, they are definitely attention-getting and deserve more consideration when a prominent warning system is needed. But, use of any of these methods will help draw the driver's attention back to their driving, giving highway officials the opportunity to "educate" the driver to the impending change.

The **Education** portion of the program does exactly what the name implies—it educates the public as to what change they are about to encounter using site-specific highway signs that are either traditional or non-traditional.

Non-traditional signs are helpful when informing drivers of a needed change in behavior in order to avoid a potential risk. For example, when encountering an intersection where the cross street does not intersect at a 90 degree angle, it is likely that a portion of the highway being crossed will be blocked from the driver's view by the "A" column (that portion of the vehicle which supports the roof between the front doors and windshield). For drivers who have developed the bad habit of looking only once before crossing a roadway, an approaching

vehicle can be missed during that single glance. Obviously, crossing the highway with an unseen vehicle approaching at high speed can be catastrophic.

Below is a picture that combines both traditional and non-traditional signs in order to address a sight problem similar to the one mentioned above. The non-traditional sign was installed after a site analysis conducted by the Sandy Johnson Foundation revealed the potential cause behind the higher than normal crash-rate at this location. Notice how the configuration of the signs, along with the color, shape, and size visually attracts a driver's attention to them.



When drivers are confronted with a specific danger, they must be informed clearly and concisely. According to the County Engineer who requested our analysis, the disproportionately high crash rate ended after the new sign was installed.

Another example of how this portion of the public awareness program might work is through the use of rumble strips. For this example, we will review a charter bus crash that took place in Atlanta, Georgia on March 2, 2007. You may recall this event as it received national attention after five members of the Bluffton University baseball team, along with the bus driver and his wife, were killed in a horrific single vehicle crash.

This tragedy occurred around 5:30 a.m., shortly after a new driver nestled into the driver's seat to begin the final leg of their journey. The bus was transporting students to Florida where they were to begin spring practice and participate in exhibition games. Just moments before the fatal crash, the driver failed to notice signs that were warning of an upcoming change in the traffic pattern. As a result, the vehicle continued to follow a lane that unexpectedly became an exit ramp.

Traveling too fast to stop at the end of the T-shaped intersection, the bus crashed through a security fence at the end of the exit ramp and tumbled over a short retaining wall, falling over twenty feet to the highway below.

The cause of the crash is easy to deduce. Upon examination of the approach to the scene of the accident, it was clear that the driver was following a specific lane that was marked by a diamond design painted in the middle of the lane. That design indicated the lane was to be used by vehicles with two or more occupants. Experiencing unchallenging travel in that

lane, the driver stopped paying close attention to his driving environment and failed to notice the signs warning of the change.



Associated Press / Gene Blythe

As a result, he continued driving as his most recent experiences had taught him—following, without thought, the diamond design painted on the highway.

If rumble strips, LED flashing lights, or strobe-type lights had been installed leading up to this change in traffic pattern, followed immediately by highway signs explaining what change was taking place, the attention of the driver could have been drawn back to the highway where he would have

received an appropriate warning. Had this been done, this tragedy could have been avoided.

According to newspaper articles, a similar accident took place at that same location a few years before, resulting in the death of the driver. Unfortunately, in spite of that tragic event, officials did not adequately respond and the hazard at that location remained uncorrected for too long.

* * *

For purposes of comparison, a similar traffic pattern existed for decades in another major city. When driving south into the downtown area of Columbus, Ohio, the left lane of I-71 abruptly ended at a T-shaped intersection, just like the one in Atlanta. However, data reveals two significant differences. First, unlike the Atlanta traffic pattern, rumble strips, along with signs warning of the traffic pattern change, were in place in the lane several hundred yards before its end. Secondly, no mishaps of a similar nature occurred at the location.

* * *

Countless crashes like the one in Atlanta, where drivers respond in a conditioned way to unexpected changes in traffic patterns, occur daily across the country. Clearly, there is a strong need for a program that includes a combination of Notification and Education—not just one of these features, but *both*.

As a final note, some methods of Notification are preferred or recommended over others due to a variety of reasons. For

example, use of rumble strips has at times been met with community opposition due to noise pollution concerns and/or fears of the impact they may have on motorcycles. Keeping this in mind may help the public when working with highway officials to address hazards at specific locations.

* Copies of the student workbook “*Driver Conditioning – The Unexpected Killer*” may be purchased through The Sandy Johnson Foundation website at:

www.sandyjohnsonfoundation.org

1. To view the PSAs developed for Driver Conditioning, or to purchase additional copies of this Highway Safety Initiative, visit The Sandy Johnson Foundation website.

Chapter Thirteen

Identify the Specific Cause of Crashes at High-Accident Locations

The Three Purposes of Asking the Question “Why?”

*“For purposes of action, nothing is more useful than
narrowness of thought combined with the energy of will.”*

~ Henri Frederic Amiel

Philosopher and Poet

To this point, we have identified Driver Conditioning as an underlying cause of collisions at high-accident sites. We have also identified a program to educate the driving public about this potentially deadly conditioning process and demonstrated how motorists can be effectively warned of changes in traffic patterns or road conditions. Now, let’s look at how we can quickly and efficiently determine why crashes are taking place at specific locations. In other words, what particular conditioning factors might be present at a specific HAL? Learning the answer to this simple question vital for the highway professional as it will also help to identify an effective method for correcting the problem.

Before we attempt to accomplish this, we will summarize two investigative/information-gathering processes currently in use: **Traffic Crash Report** and **Traffic Engineering Report**. We will then shift the focus of these processes and place more weight on an area of information gathering that is currently not being utilized to its fullest potential. That single shift will create the basis of our investigative process.

The Traffic Crash Report “Why” - Purpose Number 1

One of the primary duties of law enforcement when conducting an investigation of a vehicular crash is to complete a Traffic Crash Report. These reports have been in use for years and guide the investigator through a series of questions and information-gathering processes in order to help law enforcement determine if any laws were broken. More specifically, the process questions how fast the vehicles were traveling; if weather conditions played a role; or if drugs or alcohol contributed to the crash. Other answers are also sought, including if there were any other militating factors such as an animal or other hazard in the roadway, visibility issues, cell phone use, radio tuning, or other distractions that may have influenced driver behavior.

Completion of the Traffic Crash Report also requires the collection of other data, such as the distances traveled by each vehicle after impact, and the length of skid marks, if any. In addition, the path each vehicle took before, during, and after the crash is illustrated through drawings showing

the location of vehicles at various positions during the crash sequence. Finally, photographs are taken in order to support and validate the final determinations of the investigative team. All this is done to produce an accurate scenario of what happened at the accident site.

To complement this data, law enforcement officers request written narratives from all those involved in, or were witness to, the crash.

Obviously, these statements are important to help determine exactly what happened, thereby aiding law enforcement and investigators in their quest to determine if laws were broken—if anyone was going too fast; if anyone failed to yield; if a vehicle was operated recklessly; and so on.

The Traffic Engineering Report “Why” - Purpose Number 2

Looking beyond a single crash at any specific location is the Traffic Engineering Report. Typically, these reports are generated in order to determine if there are potentially any engineering deficiencies present at a specific site which may be contributing to crashes. State transportation departments may conduct these reports internally or they may be commissioned to an outside firm. Regardless of who completes the report, the data which is needed takes years to collect.

The statistics collected during the period of study may include such things as:

1. The number and speed of vehicles traveling through the area;
2. The time of day/night traffic is the heaviest or lightest;
3. Relevant crash histories;
4. Intersection geometry and control;
5. Sight lines/distances;
6. Placement of signage; and
7. Other factors deemed necessary.

In addition to the years of data collection, it is common for these reports to take several months to complete and they can cost many thousands of dollars.

As stated earlier, the Traffic Engineering Report is commissioned *to determine if there are any highway deficiencies at that specific location which may be contributing to crashes.*

Unfortunately, the methods employed to conduct the study are not sufficient to determine the potential cause or causes behind vehicular crashes. The reason these reports are inefficient is because they focus on the specific site in question without studying the roadways approaching the site. This simple reality renders the study incomplete, as there may be no deficiencies at that location. In fact, an overwhelming majority of the studies I have reviewed for over a decade did not provide an accurate description of the problems facing motorists at the sites in question and, consequently, did not offer effective solutions.

Let's take a moment to assess the Engineering Report to see if we can validate the statement made above; specifically, *these reports are inefficient because they focus on the specific site in question without studying the roadways approaching the site.*

A quick review of any Engineering Report will reveal that these studies focus solely on the sites themselves in order to learn if applicable engineering standards have been met. That would be like studying the step in our earlier stair-step example where one step is one inch higher than the others. Applying the same method of study to the stair example, we could easily determine that since the nine-inch step meets the local building code, there is nothing wrong with the step. Therefore, no problems exist that could contribute to human error. Obviously, that conclusion is incorrect, because it fails to acknowledge that the step is *different* from the ones immediately preceding it. The same holds true for highway travel. Although a specific site may meet all requirements, if “conditioning” is not considered as a potential contributor to the crash rate—if changes in traffic pattern or road conditions are not considered—the process of evaluation is insufficient to determine a potential cause. And as long as the process of studying a location does not change, the incomplete data that is collected in the Engineering Report will continue to hamper the effectiveness of this type of highway study. With that being the case, it isn't a question of “if” a future crash will occur, but “when?”

Finally, as previously mentioned, another difficulty with the Engineering Report is time; years of data collection are typically required before an engineering report is requested, and then they often take months to complete. Adding to this inefficiency, if a deficiency is found, it may take months (or years) more before any corrective process is begun. When accidents are occurring and people are being killed or injured, that is not acceptable.

A Paradigm Shift

“Why” – Purpose Number 3

Although the Traffic Crash Report seeks to learn why an accident happened in order to determine if any laws have been broken, and the Traffic Engineering Report focuses on engineering deficiencies, the investigative process is still falling short of its desired effectiveness of adequately protecting the public.

On March 17, 2004, I met with the superintendent of the Ohio Highway Patrol, Colonel Paul D. McClellan. Also in attendance were Major James H. Walker, Office of Field Operations, and Lieutenant Richard S. Fambro of the Public Affairs Unit. During our meeting, we discussed the importance of learning the “why” of an accident.

But the “why” we were focusing on was different from the previous two. Our “why” focused attention on the at-fault driver. Our purpose for making that shift was to help us learn

why accidents were occurring at specific sites so that appropriate measures could be taken to prevent future crashes.

All in attendance agreed that a simpler, more time sensitive, and less costly solution to the problem of discovering why accidents are taking place at a particular site lies in a minor adjustment to the way crashes are investigated. As a result, the Ohio Highway Patrol expressed willingness to work with the Ohio Department of Transportation in order to implement a more in-depth interviewing process of at-fault drivers.

That willingness led to the issuance of the following highway patrol inter-office communication, dated March 12, 2004. Originating from Major J. H. Walker, Commander of Field Operations, the communication was addressed to all post personnel.

Subject: Investigating crashes: Finding “why”

“The Ohio State Highway Patrol has established and maintained a reputation recognized worldwide for excellence and innovation in traffic crash investigation.

Through training and experience, we have mastered the science of determining who, what, when, where and how crashes occur. Yet, in many of our investigations, we have not always determined why. It is critically important that we determine the ‘why’ the crash occurred.

Thorough questioning of drivers is the most pertinent part of the crash investigation that provides the answers to ‘why’ the

crash occurred. An example of determining the ‘why’ a crash occurred is, if a driver failed to stop or yield at a stop sign, a question on the OH-3 should be ‘sir / ma’am, why didn’t you stop or yield at the stop sign?’

The information gathered from determining the ‘why’ could prove beneficial to prevent future crashes....”

The willingness of the Ohio Highway Patrol to improve communication with the Ohio Department of Transportation was commendable. Unfortunately, ODOT expressed satisfaction with the information gathering process which was in effect at that time and no changes were made.

Perhaps a little background information will help to understand why the “why” question, asked in the manner it is being proposed here, is so important. (Keep in mind that the Ohio Department of Transportation studied the location of Sandy’s crash six times over a period of 13 years and *none* of those studies identified a cause for the exceptionally high crash rate.)

During the first few weeks following my wife’s accident, I had the opportunity to interview several drivers who had experienced a crash, or near crash, at the location of her death. The interviewing process I implemented focused on the question, “Why did you (the driver) fail to properly execute passage through the intersection.” The four drivers interviewed openly admitted to the reason they entered the

intersection. In short, they all thought the intersection was a four-way stop—ALL of them.

In keeping with the program being discussed here, I concluded that if all of the interviewed drivers said they believed the location was a four-way stop, they must have arrived at that conclusion based upon a common belief that was generated outside the influence of the traffic pattern existing at that site. In other words, the signs at that location had no influence over their behavior when they decided to pull into the intersection. Therefore, something outside that environment must have had an influence on their behavior. After driving the route myself and personally experiencing the conditioning process, there was no doubt in my mind that Driver Conditioning was the underlying cause of crashes at that location. Being aware of the “cause” of crashes at that location, it was easy to arrive at a solution—a method of reducing, or eliminating, crashes.

Based on that experience, I engaged in conversations with other at-fault drivers involved in crashes at other locations. I learned through those interviews that deficiencies could be discovered quickly and easily through this modified interviewing process, and perhaps, more importantly, I was able to develop a low-cost, easy to implement, remedy.

In short, what I discovered was that when questions were asked in a direct manner, the at-fault drivers were inclined to respond in an honest and direct way. The answers to seemingly simple questions like “Why didn’t you stop at the

intersection?"; "Why were you going so fast around the curve?"; "Why did you pull into traffic?"; "Why didn't you yield at the train crossing?"; and "Why did you lose control of your vehicle?" put a new dimension on the investigative process that carried with it overwhelmingly positive results.

To summarize, the drivers responsible for the crashes were simply asked why they did what they did. The answer to that single question proved to be the only clue needed to determine the cause of crashes at specific high-accident locations and often led to the identification of low-cost solutions.

Chapter Fourteen

The Truth, the Whole Truth, and Nothing But... .

”The truth is found
when men are free to pursue it.”

~ Franklin D. Roosevelt
U.S. President

Critics of the procedures being recommended here—asking at-fault drivers “Why did you...?”—will state that drivers involved in accidents will often attempt to hide the truth if it implicates them in any way as being at fault. Unfortunately, the critics are right.

All too often, drivers responsible for causing a mishap of any kind are the last ones to admit it. Take, for example, a driver speeding through a signaled intersection trying to beat the light—and failing. Under circumstances such as this, many drivers will attempt to shift blame or deny responsibility for a crash by stating they did not see the signal or that the light was “yellow” when they entered the intersection, knowing full well they saw the light and it was red.

In situations like the one mentioned above, it is the behavioral-based conditioning discussed earlier that is most likely the cause of the crash. In other words, the driver was, in all probability, simply repeating a bad habit they had

“gotten away with” many times before. *Few drivers will admit when they unsuccessfully execute a bad habit.*

On the other hand, drivers who honestly believed something to be true about a specific crash site that turned out not to be true, were quick, and often anxious, to point out that fact—perhaps as an act of self-defense or to justify their actions.

So, when Driver Conditioning is the true, underlying cause of a crash (as opposed to the action of repeating a bad habit), most at-fault drivers will admit to their mistaken belief. An alert investigator should easily be able to recognize this honesty and be able to arrive at an accurate conclusion regarding the underlying cause of a specific crash by the end of their investigation.

* * *

Before moving on to the next topic, I would like to share an experience. In July of 2003, The Sandy Johnson Foundation received an email from a father who had recently lost his mother and two daughters in a collision between a car and a tractor-trailer just outside of Chicago. According to the father, the crash had occurred at a location that was known by residents to be extremely dangerous. At his request, I contacted him by phone. I was surprised to learn that the loss of his children and mother had occurred the week before.

He told me that his family died due to the negligence of a truck driver who failed to stop at a traffic light. Apparently,

the truck driver was so distraught after the crash that he admitted to reading a book while driving.

The father continued to tell me that the intersection where his family was killed was also the site of several other high-speed crashes over the years. According to him, the signaled intersection was the first one encountered for many miles as travelers entered a commercialized area. The typical crash at that site resulted from drivers, traveling from a rural area, failing to stop when the signal was red.

Realizing that a “bad habit” contributed to this collision, I asked the grieving father a few questions. I quickly determined that Driver Conditioning was a contributing factor in the crash, because the truck driver, who had been experiencing unchallenging travel for several miles, unexpectedly came to a traffic light—an unexpected change in traffic pattern—and failed to notice it.

Arriving at that conclusion, I was able to determine what was wrong, and how a simple modification to the site could prevent future collisions. Before concluding our conversation, he asked for suggestions on what he could do to stop others from being killed at that location. I offered my solution.

A few months later I spoke with the father a second time. He told me that with the help of a local politician, the Illinois Department of Transportation was persuaded to install

rumble strips in the roadway leading to that intersection, just as I had recommended.

Several years later, I contacted the father again to see if the correction had lasting effects. He responded by saying that, to his knowledge, no additional crashes had taken place. Once again, after years of inaction and seeming bewilderment on the part of highway officials, a simple, low-cost solution was easily identified and was sufficient to stop the carnage at that site. But it took a knowledge of Driver Conditioning, and an understanding of the influence it has over driver behavior, to understand the cause of crashes at the site and develop an effective modification.

In this case, although the driver was continuing a bad habit, his honesty about his comfort level, and the fact that he stopped paying attention to his driving environment confirmed that Driver Conditioning was the underlying cause of that crash as well as the probable cause of other accidents at that site. And by considering Driver Conditioning as the cause, rather than simply making sure engineering standards were being met, a low-cost solution was easily identified.

To summarize, if Driver Conditioning had been recognized early on as an underlying cause of highway crashes at that location, and the safety Initiatives recommended here had been followed, it is likely that fatalities and life-changing injuries would have been stopped years earlier. In fact, they may never have begun.

In our next chapter, we will discuss locations that have not developed a crash history and answer the question: “Should they be overlooked?”

Chapter Fifteen

Learning to Recognize a Potential HAL

“It's what you learn after you know it all that counts.”

Attributed to Harry S. Truman

In the film classic *Raiders of the Lost Ark*, Indiana Jones is confronted by a dangerous foe—a formidable enemy, dressed in black and highly skilled in the art of inflicting pain and death on his adversary. As this imposing figure demonstrated his proficiency and technical knowledge of how to “slice and dice,” a crowd in the street parted to reveal his presence to our hero. With a smile that exposed his self-confidence, the highly trained executioner continued his exhibition by masterfully slicing the air with his weapon of choice. As he awaited a response from Jones, the crowd in the street and the audience in the theater were filled with anticipation—what will our exhausted hero do to combat such a threatening force? Will he become the next victim of this deadly assassin?

We were given the answers to our questions through the execution of a simple, three-step process: Jones identified the problem; developed a proper response; then took immediate action—he recognized a threat, pulled his weapon, and fired. Danger eliminated!

Through this short journey back in time, I am suggesting that the same principles apply to highway safety. I don't mean to imply that *all* problems associated with crash sites are simple to identify, analyze, and correct. However, at most locations that *is* the case, and they should be dealt with accordingly.

The phrase “high-accident location” indicates that a disproportionately high number of vehicular crashes occur at a specific site over a defined period of time. But what about locations that haven't earned that designation? Should we continue following the current procedures and wait for a specific number of fatal crashes to occur or a measured period of time to elapse, before being alerted to the fact that a problem may exist?

Understanding the effects of Driver Conditioning, and realizing it is human nature to reduce our attention to driving once we become comfortable with current traffic patterns and road conditions, make it possible for a *potential* high-accident area to become the focus of attention *before* the first casualty takes place. Anyone, from an alert resident to a road construction worker or highway official familiar with the area, could identify specific aspects of a location as being “different” from the roadways approaching the site. Being aware of a subtle change, in either the traffic pattern or road condition, could trigger action aimed at modifying the site before a tragedy takes place.

As development expands into unpopulated areas, new subdivisions, industrial parks, shopping plazas, construction

areas, and newly designed roadways can turn a calm and peaceful section of a highway into an area deluged with new traffic where crashes occur with frequency, seemingly overnight. Therefore, it is important to understand that when following the SJF Highway Safety Initiative, *a concerted effort must be made to look for the “potential” for accidents to occur, rather than simply waiting for them to happen.*

With this in mind, and with our focus on highway safety being directed toward locations most susceptible to fatal and life-changing injury crashes, two factors need to be considered when attempting to identify a *potential* high-accident location—a location where crashes have not yet begun to take place. The first aspect to consider is **speed**. Is there a potential for life-threatening speeds within the targeted area? Note the word “potential” is used here. It doesn’t matter if the posted speed limit is 25 mph; if travelers often exceed that limit by 10 to 15 mph or more, deadly crashes become a possibility.

The second factor to consider is **consistency**. Is the traffic pattern and/or road condition of the highways leading to the location under evaluation, consistent with the site being studied? If the answer to that question is “No,” the difference should be recognized as having a potential for contributing to driver error. That being the case, corrective measures should be considered for implementation.

Clearly, no one has a crystal ball that can foresee the future, and no one can predict with 100% accuracy the potential for

accidents to occur at a specific site. However, *if we are to positively impact the number of fatal and life-changing injury crashes, it is necessary to focus greater attention on accident prevention, to leverage existing opportunities – such as the U.S. Road Assessment Program – and to augment current efforts by implementing this Highway Safety Initiative.* Embracing this mindset, and implementing the Initiative presented here, highway officials will be armed with the ability to recognize the potential for a crash and implement corrective action, before the first accident takes place.

Chapter Sixteen

The Evaluation Process

“All truths are easy to understand once they are discovered; the point is to discover them.”

~ Galileo Galilei

Physicist and Engineer

When evaluating an intersection or segment of a highway for the potential of becoming a high-accident site, or in order to help with the process of determining why a disproportionate number of crashes occur at a specific location, several questions should be asked.

Intersection

1. When approaching an intersection, is it easily discernible from all directions?
2. Does anything change at that site, making it inconsistent with the surrounding roadways? If so, is there a satisfactory warning to motorists—are signs (education) adequately displayed, along with a proper warning (notification) system alerting motorists of the conflicting traffic pattern or road condition?

Section of Highway

1. Are traffic patterns or road conditions consistent within the high-crash area?

2. Are traffic patterns or road conditions on the approach to the dangerous location consistent with those patterns or conditions within the high-accident area?

General

1. Are there external distractions that may influence a driver's ability to focus on his or her driving while traveling through the intersection or area?
2. Are the speeds of vehicles passing through the area in excess of 35 mph? (Note: We are not looking for posted speed limits of 35 mph or higher, but rather we are interested in the actual speed of vehicles passing through the area.)

The evaluation should also include a detailed sketch of the intersection or stretch of highway being reviewed. The sketch, along with supporting narrative, should accurately identify several things:

1. The number of lanes, along with curves, turn lanes, and other highway characteristics;
2. The hazards that may be present;
3. The location and type of highway signs;
4. The specific traffic patterns or road conditions that are inconsistent with the surrounding area;
5. The potential distractions or any condition that might tempt a driver's attention away from the roadway; and
6. The disparity between posted speed limits and actual speeds traveled.

In addition to compiling the above information, each roadway leading to the site should be traveled by the investigator for a period of 10 to 15 minutes or more, from each direction. This will allow an opportunity for the investigator to become “comfortable” with the area, potentially permitting Driver Conditioning to take effect and influence expectations of the evaluator.

See **Exhibit A** (page 119) for an example of the format that can be used to create a HIGHWAY EVALUATION FORM.

PART FOUR

The challenges of Change

Chapter Seventeen

Creating an Effective Organization

“How wonderful it is that nobody need wait a single moment before starting to improve the world.”

~ Anne Frank

Holocaust Diarist and Writer

After presenting the Sandy Johnson Foundation’s Highway Safety Initiative at a statewide conference being held for county engineers in Ohio, I was approached by one engineer, a nationally known advocate for strong highway safety standards, who stated, “You nailed it! *This* is what’s been missing!”

Still another engineer requested to have evaluations performed on two high accident locations in his county in order to identify the cause of crashes at those sites. Within the next few weeks, an evaluation was conducted. The results of that evaluation were presented and, according to that county engineer, after acting on our recommendation, crashes at the sites were reduced.

Several months later, another county engineer who was present at the conference, used the principles of our Initiative to modify a fatal crash site with positive results. Each of these engineers showed a desire to consider and implement

new ideas in order to reduce highway fatalities. After all, as has been demonstrated, *willingness to accept new ideas saves lives*.

However, on many other occasions, concerns about litigation have prevented authorities from acting on the recommendations of this Initiative, because its principles are not contained within in the Manual on Uniform Traffic Control Devices (MUTCD). In conflict with this policy/philosophy, the Sandy Johnson Foundation believes that all common-sense options for saving lives should be kept on the table at all times.

Let's explore this more deeply. It is easy to recognize that departments at all levels of government typically have long-standing, "carved-in-stone" guidelines directing all phases of operations. In many cases, procedures have been developing for over a hundred years and some have been in practice for decades. In situations such as this, it is common for a specific culture or mindset to be established exerting influence over all personnel within the department from management to interns. As a result, it can be difficult to introduce new programs that require change. That difficulty can be exacerbated when the recommendation for change comes from outside the department.

The difficulty of implementing change to existing guidelines can vary considerably from one department to another. This is due, primarily, to the motivation or reasoning behind the necessity, or desire, for change. For example, in some cases,

procedures may have evolved in order to facilitate a more efficient workflow. In others, procedures may be influenced by operational costs. Still other changes could be motivated by political concerns. But when it comes to the operating processes that govern how highways are managed, protection from litigation is the driving force.

Highway officials will stress that adhering to strict guidelines offers protections that are good for everyone—both the government/department as well as the general public. They accurately state that without those protections, so much money would be spent on legal processes and claims that they would have little to no funds left over for highway maintenance or implementation of needed safety improvements. While this concern is certainly justified, it is not sufficient to prevent the rapid adoption of solutions that can save lives each and every day.

Based on the above, it is clear that introducing a major change in a department with a deeply embedded culture can be more effective if an autonomous unit or division is created within that department/organization. This new unit should be developed and operated solely for the purpose of solving the problem at hand. In this case, that would be the processes of identifying, analyzing, and correcting (making safe) HALs and potential HALs.

For that reason, The Sandy Johnson Foundation recommends that each state establish an independent unit or division within each jurisdiction. More specifically, each DOT district

and each county should create an autonomous unit or division. The head of this new division would answer to the director or engineer responsible for that department or county.

This newly developed entity should be tasked with the responsibility of working exclusively on the current list of HALs, newly designed or constructed roadways, as well as other sites that may pose a potential threat. Given that responsibility, the first order of business would be to identify the top ranked HALs within that specific district or county, and establish a priority “hit list.” Once the highway locations are identified, each location should be subjected to the following evaluation process:

1. Review the site traffic crash reports;
2. Interview law enforcement and emergency medical personnel familiar with crashes at the site to gain their perspective as to the cause of crashes;
3. Interview at-fault drivers responsible for past incidents to learn “why” they made a mistake; and
4. Drive through the site and surrounding areas in order to validate the information that has been gathered and to identify inconsistencies.

Depending on the findings of each evaluation, typically one of three actions, or a combination of actions, should be sufficient to prevent future crashes, or at least limit them. They are:

1. Initiate a site-specific Notification and Education program;
2. Make necessary adjustment(s) to existing traffic control device(s); and/or
3. Begin a plan for an effective modification if needed.

As stated in number three above, at some locations it may be necessary to impose more significant modifications in order to effectively eliminate a threat. In those circumstances, even though a major project may be required, the site-specific Notification and Education program should be initiated—used as a stop-gap to warn motorists of danger while more extensive modifications are planned and completed.

By following the recommendation of creating an autonomous unit, once adequate measures (procedures and personnel) are in place, it would be possible to identify the cause of crashes at individual sites and establish a plan for corrective action in a matter of days. In many cases, once a remedy is identified, an effective team could begin scheduling for a corrective project immediately, with completion following soon after. Reducing the time required to identify and implement needed change, from a period of years down to a number of days, could save thousands of lives each year if those processes were adopted nationally.

Two final points. First, it is critical to establish a relationship with law enforcement in order to identify the “why” behind the actions of a driver responsible for a crash. Without such a

collaboration, identifying the cause of a mishap can be difficult, at best, allowing an area to remain dangerous for an extended, and unnecessary, period of time.

The second point I want to briefly touch on is “cost.” Some departments are extremely limited when it comes to discretionary funds making it difficult, if not impossible, to create a separate unit within their organization—regardless of its benefit. In such cases, utilizing current employees may be a workable solution. Assigning full-time employees to implement this program on a part-time basis, perhaps one or two days per week should be considered.

1. MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F.

Chapter Eighteen

A Case Study

*“We have committed the Golden Rule to memory;
let us now commit it to life.”*

~ Edwin Markham

American Poet

Let us take a look at the history of a California site where accidents began occurring after a major highway modification was completed in the late 1980s.

On December 13, 1991, in order to combat the rise in accidents at a specific section of S.R. 57 in Orange County, Caltrans (the California Department of Transportation) initiated a study to determine the cause behind the high number of crashes taking place. The study concluded by faulting drivers and identifying “driver error” as being the cause of crashes at that site and offered no suggestions for improvement.

With crashes continuing unabated, a second study was conducted one and one-half years later. That study supported the findings of the first report and named “driver error” as the cause. Once again, no recommendations for change were made.

Needless to say, with no corrective measures being taken, crashes continued which ultimately triggered a third study.

Upon completion of that study, which was conducted nearly seven years after the location first began experiencing the sudden increase in crashes, it was determined that engineers who designed the highway did not allow for proper drainage of the road surface. This oversight resulted in water pooling on the highway surface during wet weather, causing vehicles to hydroplane.

If the SJF Highway Safety Initiative had been in place, and our program of identifying the cause of crashes had been applied, interviews of at-fault drivers would have been conducted when accidents first began to occur. That interviewing process would have quickly revealed that drivers simply lost control of their vehicles when the pavement on that stretch of highway became wet. Visual observations of the roadway during wet weather, coupled with the testimony of at-fault drivers, would have quickly revealed the problem that due to improper drainage, water was pooling in the roadway, causing hydroplaning.

At that point, it would have been easy to determine that Driver Conditioning was the underlying cause of accidents at that location. After arriving at that conclusion, the Notification and Education program could have been introduced immediately. In this case, at the very least, drivers would have been adequately warned of the potential for danger during wet road conditions. That warning could have prevented countless crashes during the period of time needed for scheduling and completion of the necessary repairs.

For those who may question how Driver Conditioning contributed to the cause of accidents at that site, let's think back to our discussion of Driver Conditioning. Based upon the definition alone, we can determine that there was an unexpected change in road conditions at that location. Drivers who had been traveling for several miles on wet road surfaces without encountering a traction problem, suddenly lost control when arriving at the site in question. In other words, drivers became comfortable in their driving environment and stopped paying attention. And without proper implementation of a Notification and Education program, they simply didn't notice the pooling of water. Consequently, without an adequate warning being given to motorists of the change they were about to encounter, it was inevitable for the number of highway crashes to spiral out of control.

The difficulties encountered at this particular location took a great deal of time and hundreds of thousands of dollars to correct. In this case, the advantage of using our method of hazard identification and correction, over the one that was used by Caltrans, is this: It took Caltrans more than seven years to acknowledge and accurately identify the problem.

If the method being recommended here had been utilized, the obscure change in road conditions would have been identified immediately. This recognition could have allowed for signs and warning flashers to be strategically placed, notifying and educating motorists of the dangers at that location until the problem could be corrected. In short, more

than six years of crashes, involving fatalities, injuries, and property damage, could have been avoided.

Chapter Nineteen

Potential Problem – Simple Cure

*“Whenever you have eliminated the impossible,
whatever remains, however improbable,
must be the truth.”*

~ Arthur Conan Coyle
Writer and Physician

When any program is developed to implement change in human behavior, it is always possible that the program itself might create a situation that could grow into a different problem. Recognizing Driver Conditioning as an underlying cause of accidents, and implementing a proactive public awareness program in order to combat its effects, is no exception.

For example, when developing PSAs to alert motorists of the new public awareness program of adding site-specific warning signs along with rumble strips, LED flashers, or strobe lighting at high-accident locations, there may be an implication in the mind of the public that all known and potential high-accident locations will be equipped with signs and flashing lights or rumble strips. Looking at this from the perspective of the motorist, an intersection or stretch of highway that does *not* display those highway safety features may be considered safe, or that no threat is present.

Obviously, it is not our intention to trade one dangerous mindset for another.

Therefore, when presenting information about Driver Conditioning and HALs to the general public through the use of public service announcements and driver education programs, it is important to acknowledge that not all HALs within the state have been identified. Also, it is advisable to acknowledge that as new highways are built and communities expand, potential HALs are being created daily. Therefore, it is necessary to continuously regard Driver Conditioning as a threat and to recognize the necessity to remain alert to potential changes in traffic patterns and road conditions at all times.

In addition, it may prove invaluable to get the public involved. Asking drivers to identify locations that they believe may present a danger to the public can go a long way toward keeping our roadways safe.

One way of promoting this would be through the use of PSAs or social media. Asking the public for help in identifying dangerous areas could help officials identify locations that are not on the state's "radar." By allowing the public to anonymously "contact a toll-free number to report a potentially dangerous area or location," transportation departments could develop a data-base of potentially dangerous sites they had not yet identified. Obviously, this could contribute greatly to the success of keeping our roadways as safe as possible.

Summary

“They say that time changes things, but you actually have to change them yourself.”

~ Andy Warhol
American Artist

The Sandy Johnson Foundation Highway Safety Initiative is designed to be a guide for two distinct groups: motorists and highway authorities.

Motorists can benefit by learning about Driver Conditioning, what causes it, and how it can be prevented. Knowledge of this naturally occurring phenomenon could easily diminish the effects of Driver Conditioning, making highway travel safer for everyone. Keep in mind, it is not possible to eliminate, or even to reduce, a specific threat when the threat itself is not even known to exist.

Highway officials can benefit by learning how a simple modification to current procedures can enhance their ability to identify, analyze, and correct highway locations known to be, or that have a potential to become, dangerous. As such, use of this guide will enable officials to accomplish the following:

1. Establish a basis for recognizing that driver error is not the only cause of motor vehicle mishaps.

2. Recognize Driver Conditioning as an underlying cause of most vehicle crashes.
3. Require Driver Conditioning be taught to students prior to obtaining a driver's license.
4. Develop PSAs to alert the public to Driver Conditioning and the other aspects of the Highway Safety Initiative presented here.
5. Modify the traffic accident report to include a more in-depth interview of the at-fault driver to determine why the driver "did what he/she did."
6. Foster a stronger relationship between the general public, law enforcement, and contractors, as well as local, county, and state highway professionals and other stakeholders, in order to proactively address highway deficiencies.
7. Create an autonomous department within each highway jurisdiction to facilitate necessary change in the discovery, analysis, and correction procedures currently in use for the treatment of HALs or potential HALs.
8. Implement an aggressive Notification and Education process to aid in the rapid conversion of dangerous, or potentially dangerous, highway locations.

9. Modify existing laws and safety requirements as they pertain to motorcycle travel.

As a concluding reminder, according to Mary Peters, the former Administrator of the Federal Highway Administration, too many fatal and life-changing injury accidents are occurring on our nation's highways. This is taking place even though highway safety is an integral part of every aspect of highway design and study.

With this in mind, *is it time for change?*

Acknowledgements

Many individuals, from personal friends and professional advocates to those deserving of both titles, have made contributions to this writing. Some have done so directly, others indirectly. But regardless of the group in which one may fall, my gratitude to each of them could not be greater.

Mike DeWine, Ohio State Senator – Took seriously the importance of the discovery of Driver Conditioning and introduced legislation to help this foundation in our efforts to both introduce and implement needed change.

Dean C. Ringle, P.E., P.S. Franklin County Engineer – Opened the door to the professional world.

David P. Brand, P.E., P.S. Madison County Engineer – Held that door open and became one of my best friends as well as a strong advocate for this Initiative. Dave lost his battle with cancer on Dec. 31, 2015, and is deeply missed.

Scott C. Coleman, P.E., P.S. Logan County Engineer – Stepped up at a critical time to offer advice and direction.

Leigh Makay, Ph.D. – An outstanding college Professor who added considerable value and direction to our message.

David Woodyard, MDiv., Retired Pastor – A friend and exceptional writer and editor.

Anne Wilhelm, Esquire – Provided her greatly appreciated editing skills.

Bruce Hamilton, Director of Safety & Research Programs at the Roadway Safety Foundation – Offered both technical guidance and advice, as well as friendship, advocacy, and editing.

Sandy Spavone, Executive Director of FCCLA – Personal friend and deeply dedicated advocate for teen safety.

Sandra Lee (Ebert) Johnson – The most important contributor of all. Sacrificing her life so that others might live.

Exhibit A

HIGHWAY EVALUATION

NAME OF STUDY AREA: _____

From GPS Point _____ To GPS Point _____

Observations when Driving from the:

North South East West Other

- 1. Visibility of intersection: _____
- 2. Noticeable hazards: _____
- 3. Satisfactory warning: _____
- 4. Inconsistencies: _____
- 5. Distractions present: _____
- 6. Speeds => 35 mph: _____

Under each directional heading, or 'Other,' a simple "Good/Fair/Poor," or "Yes/No" answer is required.

Visibility of intersection

1 - North: _____

1 - South: _____

1 - East: _____

1 - West: _____

1 - Other: _____

Noticeable hazards

2 - North: _____

2 - South: _____

2 - East: _____

2 - West: _____

2 - Other: _____

Satisfactory Warning

3 - North: _____

3 - South: _____

3 - East: _____

3 - West: _____

3 - Other: _____

Inconsistencies

4 - North: _____

4 - South: _____

4 - East: _____

4 - West: _____

4 - Other: _____

Distractions Present

5 - North: _____

5 - South: _____

5 - East: _____

5 - West: _____

5 - Other: _____

Speeds \geq 35 mph

6 - North: _____

6- South: _____

6- East: _____

6 - West: _____

6 - Other: _____

Recommendations

Notes - Drawings

Evaluation Date: _____

Evaluation Completed by: _____

Title: _____

Contact Numbers: (O) _____ (M) _____

(Other) _____

Project Identification: _____

Project Start Date: _____

Scheduled Completion Date: _____

Project Completion Date: _____

(5)

GLOSSARY OF TERMS

Automaticity - the processing of information in response to stimuli in a way that is automatic and involuntary; occurring without conscious control.

Behavioral-based Conditioning - the process of initiating, and adapting as a habit, automatic human behavior through intentional repetition.

Cognitive Disengagement - a period of time while driving when we are not consciously aware of our surroundings or purpose.

Conditioning - a method of controlling or influencing the way people or animals behave or think by using a gradual training process.

Driver Conditioning - the process through which drivers become conditioned to respond to traffic patterns and road conditions that remain consistent over an undefined period of time or distance.

HAL (High-Accident Location) - a designation earned when an intersection, single-site location other than an intersection, or a stretch of highway that can span several miles in length experiences a disproportionately high number of motor vehicle crashes.

Highway Hypnosis – a trance-like state caused by monotonous driving and fatigue.

Inattentional Blindness - the failure to notice a fully-visible object within our field of vision because attention was focused on another task, event, or object.

Intentional Mental Compromise - knowingly taking our focus away from the act of driving to do, or think about, other things.

Mental Compromise - a period when our attention to driving becomes secondary as our primary attention is placed on other matters.

Unintentional Mental Compromise – an involuntary process when our attention shifts from driving to consider (think about) past, present, or future events that may influence or touch our lives.

Visual Expectation - the expectation to see a specific object or thing within our field of vision at a specific time or place.

ABOUT THE AUTHOR

Dean Johnson graduated from Franklin University in Columbus, Ohio with Bachelor of Science Degrees in Finance and Business Management. The majority of his career has been spent in the mortgage and residential building industries until the deaths of his wife Sandy and her mother in October of 2002.

After their deaths, Dean embarked on a journey.

That journey began the day after his wife's death with a visit to the accident site where she and her mother were killed. Over the next several weeks, Dean initiated an investigative process that led him to identify Driver Conditioning as an underlying cause of that violent crash. After further study, he discovered that the principles of Driver Conditioning could be used to:

1. Identify the probable cause of crashes at other dangerous locations where like-kind accidents occur; and,
2. Help identify newly constructed or designed locations which *hold the potential* for becoming a high-accident site.

In 2003, Dean was featured in a story in Reader's Digest pertaining to unsafe highways which drew national attention.

He has appeared on CNN and participated in local television programs relating to highway safety in Ohio and Michigan.

For two-and-a-half years, Dean worked closely with Senator Mike DeWine's legislative team in Washington D.C. and was instrumental in aiding in the development of legislation pertaining to the Strategic Highway Safety Program as well as the law mandating the Five Percent Report. Although no longer a requirement, the Five Percent Report required the disclosure of the top five percent of dangerous intersections and stretches of highway to the general public within each State, along with other data.

In addition, in order to promote youth safety at the national level, Dean became involved with The National Organization for Youth Safety (NOYS) and served on the Board of Directors from 2013 through 2015. The creation of the supplemental driver's education program, "*The Hidden Dangers of Driving*" and the related workbook, "*Driver Conditioning – The Unexpected Killer*" continue to promote teen highway safety by exposing the continuing threat Driver Conditioning poses to all motorists.

Finally, the Sandy Johnson Foundation's Highway Safety Initiative and seminars on Driver Conditioning have been presented to officials representing multiple government departments at the county, state and federal levels as well as national youth organizations.

CONTACT INFORMATION

Dean Johnson is available for speaking engagements on matters involving highway safety. Programs have been developed for adult motorists, corporate drivers, teenage drivers, and highway professionals within all levels of government tasked with the responsibility of keeping our roadways safe.

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