

Homework #2

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IEN 512

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Auto Racing Industry- Evolution of Quality

- Everyone please write about a page (a little less)
- 12pt, Times Roman, 1.5 spacing
- Need to have individual contribution document – 3/5 references
- Write a paragraph summarizing what you wrote for our “One page summary/timeline” we have to distribute to the class
- I’m sure a lot of our information will overlap so we need to work together to make sure it flows... we can claim “sub topics” - aka say what part you’re doing..
 - If someone would like to make an outline, I haven’t researched yet

Add references to the last page under- “References”

Create your power point slide

Instructions are under Course documents.

B)

‘The second place is the first to lose’, this is the mentality of all pilots on the auto-racing industry. For many years now, people have been driving their cars at a high speed and not only as a sport, but also as a job. After World War II occurred, the United States’ economy was very affected; high taxes, bans, and alcohol traffic began. The society was in an era that needed quick solutions and cash flow in a fast way. The way to transport such merchandise was through automobiles and because of this, there was a need to have conductors willing to drive high-speed cars capable to escape the police in case they were caught, these drivers were called the bootleggers. To test the speed of the cars, bootleggers started racing against each other. Over time, these races started gaining popularity because people enjoyed watching them; the adrenaline this racing competition caused attracted money, popularity, and rivalry. William France, an American racing driver, organized the first car race and founded the National Association of Series Car Racing (NASCAR) which nowadays is the most popular stock-car racing.

The auto racing sport contributed significantly to vehicle production of the commonly used car because auto racing companies are constantly finding a way to improve their cars whether it be through improved designs, technology or speed.

Through the enforcement of continual new safety regulations and the development of technology in the sport of auto racing, the industry has made significant improvements in the area of safety. The nature of the sport consists of competitive high speeds which often put the drivers at increased risk of death or injury. Safety had been a concern since the creation of the

sport, and as the death count of competing drivers began to rise, the subject of safety was no longer a factor that could be taken lightly.

There are several types of auto racing, but NASCAR became the most prevalent in the United States because of the popularity gained from several NASCAR races in several countries around the world. NASCAR began to pursue the need for safety measures more intensely after the death of Dale Earnhardt Sr., a very important professional racer who won over 76 Winston Cup races (Nash). The driver died in a car accident in 2001 during a Daytona 500 race due to a basilar skull fracture (motorsport.com). It was determined that the death could have been prevented by a better seat belt that would have kept the driver's head from hitting the steering wheel and reduced the force of impact to the neck (motorsport.com). In response, drivers were obligated to wear head and neck support equipment called the HANS device made out of flexible material, carbon fiber and Kevlar, restricting movement thus decreasing injury in the event of a collision (Bonsor). Additionally, the original five-point seat belts were improved to a six-point harness that secures the driver's legs (McKinley and Hill). The entire seat belt is connected to one release point where drivers can easily remove the harness.

In order to create a safer sport, NASCAR implemented many safety measures and changes to equipment. The organization implemented SAFER, Steel and Foam Energy Reduction, track walls that are "impact-absorbing" otherwise called "energy-absorbing walls or soft walls" (Nash). Many tracks other than NASCAR have implemented a form of soft walls. These include Cellofoam (made of plastic foam wrapped in polyethylene), Polyethylene Energy Dissipation System (polyethylene), Impact Protection System (made of PVC material in honeycomb structure with a rubber outside), and compression barriers (made of soft materials

that would act as a cushion) (Bonsor). Seats inside the race car were also changed to carbon fiber in order to help drivers maintain the correct position and keeping control of the vehicle.

The collection of data has also contributed to the improvements made in safety in auto racing. Incident data recorders were created to provide an “incident database” where specialists can analyze the information to make modifications (Nash). They have run computer modeling simulations to find ways to minimize injury upon the impact of NASCAR’s drivers. Other measures include improving the cockpit design to have more airflow and a roof that opens to allow for easy exit (Nash). In 2003, NASCAR required cockpits to add an extra fire-extinguisher that are “heat-activated” (McKinley and Hill). Furthermore, NASCAR improved their overall car design by moving the driver’s seat to the center of the car to allow the car to have more force absorption in a side collision before injuring the driver (McKinley and Hill). The car's energy absorption materials placed inside the frame of the car.

In addition to NASCAR, Formula 1 racing is a world-recognized sport. Formula 1 has seen many evolutions in quality throughout the sport. Perhaps one of the most important is the mandated quality of racing suits. In the 1950’s, drivers were left to their own choosing on what to wear when driving. Drivers wore whatever they felt comfortable in, ranging from Stirling Moss’s striking overalls to Fangio’s preferred racing attire of polo shirts, work jackets and slacks (Redbull.com). In the 60’ and 70’s fire retardant attire began to be worn. After many accidents involving fires took place, the FIA implemented rules about fire suits in 1963. After Niki Lauda’s accident in 1976 teams switched their suits from cotton-based to bulky and uncomfortable five-layer suit made to NASA specifications, using the same materials used to make astronaut suits (Redbull.com). By 1994, the FIA mandated that the pit crews needed to

wear the same suits to protect themselves. More recently, the focus on quality in the auto racing world falls on comfort while maintaining protection. The heavy layers were replaced with lighter more breathable Nomex fabric. These new suits go through a rigorous process of washing, drying, and testing at 600 to 800 degrees Celsius (Redbull.com).

Tires are another factor in auto racing that has seen an evolution of quality. Tires have a large impact on racecars' ability to win. In 1958 Dunlop introduced the use of nylon fabric reducing weights by 12 lbs. Per tire (Stuckey.com). The weight saving capabilities helped propel racecars to win. In 1972 Michelin began making the first radial slicks. These radial tires have and the inherent advantage of improved traction and braking, and improved compound durability (Stuckey.com). This allowed cars to go faster, brake better and last longer on the track, which proved to be a powerful tool in winning races. Today's tires use advancements in material quality to gain an edge on the track. Companies experiment with woven steel belts, and Kevlar to add weight saving properties while increasing durability (Hankooktire.com).

C)

Quality in the auto racing world has evolved over the years. Racing protection/fire suits have changed a lot since the 1950's. For example, in the 1950's drivers often just wore what was comfortable. Polos, slacks, and work jackets were commonplace among racers. After many dangerous and deadly accidents race officials mandated fire safety features must be worn. This started as bulky layers using materials worn by NASA astronauts at the time. Eventually, teams began using Nomex fabrics to cut down on weight and add comfort.

Quality in race tires is another aspect to auto racing which has seen an increase in quality. Dunlop pioneered race tires by adding nylon for support and weight saving capabilities. Next Michelin began producing the radial slick tire. This tire gave teams the ability to cut the weight of the car while adding to their performance. This higher quality tire gave them better braking, accelerating, weight and durability factors, which in turn resulted in better lap times.

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Data Analysis

According to the Bureau of Transportation statistics,⁸ the United States averaged 6.1 million traffic accidents per year over the period 2001–2008. This number includes minor fender-benders to major events. Those accidents resulted in an average of 42,000 fatalities per year. Meanwhile, NASCAR averaged about 220 crashes per year over the 9-year span of 2001–2009. Based on the ratio of one fatality per 146 accidents on U.S. roads, a similar fatality count in NASCAR would have amounted to 15 deaths since Dale Earnhardt's in 2001. The range

of expected deaths plus or minus one standard deviation would lie between 11 and 19. In fact, if the chances of dying in a NASCAR crash were the same as for all other crashes, the odds of having zero fatalities over that many crashes would be more than three million to one.

In NASCAR races, the average crash is likely to be much more violent than the average U.S. road accident, but these numbers still provide some perspective on the unlikelihood of observing zero fatalities over a 10-year period. The fact that there have been zero fatalities does not necessarily mean that NASCAR miles driven are less lethal than typical miles driven, but it should not be ruled out, especially in light of the crash data in the preceding section.

These drivers are still traversing heavy traffic (43 cars start each race) at speeds around 200 miles per hour. So besides the increased safety technology, what else is keeping NASCAR drivers alive at a higher rate than people involved in other crashes? It might help to look at some of the extenuating circumstances in fatal vehicle crashes and compare those to the circumstances of a NASCAR race:

1. The drivers are not intoxicated. NASCAR does have a drug and alcohol testing policy⁹ for drivers and crew members. Alcohol is not permitted before or during a race. Strangely, the banned drug list is actually more extensive for crew members than for drivers, but suffice it to say that narcotics are illegal for all. Intoxicated driving is not legal for regular drivers on U.S. roads, of course, but that still did not stop an estimated 16,200 deaths per year from 2001–2008 due to alcohol- and drug-related traffic accidents (according to definitions by the National Highway Traffic Safety Administration¹⁰).
2. Distracted drivers accounted for almost 5,500 fatalities in 2009, which was approximately 16% of the total motor vehicle deaths.¹¹ NASCAR drivers experience many events that could be termed “distractions” during a race, but they all have to do with the drive. They are surrounded by hyper-aggressive drivers moving at very high speeds and they have crew members’ voices in their ears at all times. However, the crew member is not asking about where he should take Nana for her birthday – he is informing the driver of pertinent information regarding track conditions, the driver’s vehicle and other vehicles on the course.
3. They are not racing motorcycles. Motorcycles account for only about 2% of all vehicles on the road, but they contribute more than 10% of the U.S. motor vehicle fatalities per year.¹²
4. These vehicles are well maintained. It is estimated that only about 5% of accidents in the United States are caused by equipment failure.¹³ If we extrapolate that to then include 5% of motor vehicle fatalities, then that is another area where NASCAR has an advantage. Each driver has a team of maintenance experts thoroughly examining the vehicle before and during each race.
5. Road conditions are necessarily better and more predictable in NASCAR races than in the outside world. It is not possible to accurately gauge the number of fatalities due to

snow, fog, rain or other inclement weather events because the National Highway Traffic Safety Administration's view is generally to categorize those fatalities as driver error (driving too fast to control the vehicle given the conditions). However, in NASCAR the race is either slowed or (more rarely) stopped while a significant weather event is occurring or if debris needs to be cleared from the track. Also, the tracks are known to the drivers. They are allowed practice runs, and qualifying runs are mandated before races – and the course does not change mid-race. Most tracks are laid out so that cars move counterclockwise in an oval pattern. Track distances vary, but most tracks follow this pattern.

6. The drivers in NASCAR are all going in the same direction during the race. This limits the opportunity for head-on collisions and other ultra-violent circumstances that are more likely to happen in the outside world.
7. NASCAR drivers are professionals who are trained and experienced in driving under precisely the conditions that the races present. This does not mean they are physically more likely to survive a horrific collision, but they should be more adroit than a typical driver at avoiding the worst possible collisions and maintaining their wits to stay safe in the aftermath of one.

Other Considerations

A renowned underwriter once said, "Underwriting is an art." The guidelines for underwriting a policy go beyond "Is the applicant a driver in NASCAR or not?" The fact that the insured is a driver in the NASCAR Sprint Series is only one piece of the broader puzzle. One could argue that the NASCAR lifestyle is being penalized as much as the extra mortality due to racing. The job of an underwriter is to gather all information and assess each individual risk. For example, if a driver is also a private pilot and/or races in multiple racing leagues (including other NASCAR series), the underwriter should review all risk factors and rate commensurate with the risk.

Conclusion

In the insurance industry, we are in the business of taking calculated risks. Drivers in the NASCAR Sprint Series present additional mortality directly related to occupational risk factors. Although safety innovations and more stringent safety regulations have improved the mortality over the past decade, there will always exist some additional risk in this high-speed sport because of its very nature.

HSITORY

Early automobile makers realized the value of proving the superior strength and speed of their products to a nation of buyers who wanted only the very best. So began the automotive phenomenon of promoting vehicle sales by winning races-"Win on Sunday, Sell on Monday."

The end result is that the automobile replaced the horse, not only as transportation, but also for competitive and profit purposes.

Buyers were swayed by the speed records various automakers' cars established, proving their worthiness. Endurance records were also being set to show the quality of the vehicles. These records not only drew attention to an automaker's vehicle for sales purposes, but also drew financial supporters and investors, who hoped to make a profit on the popularity of the brand.

While the technology and complexity of cars has increased a thousand fold, people still want to purchase the fastest, most durable vehicles, and automakers still try to sway buyers with the feats of their vehicles in the competitive arena.

Today, automobile racing has taken on many forms around the globe. From the Formula One circuit-which features multimillion-dollar cars piloted by millionaire drivers, sponsored by even wealthier owners-to the local drag strip where you or I can take our weekday wheels, plop down a few bucks for entry fees and go head-to-head against a similar vehicle for bragging rights-and maybe a trophy.

Figures are not easily obtainable to determine the dollars that professional racing generates, because of the closely guarded figures of individually negotiated sponsorship contracts. However, between the TV revenues, product and factory sponsorships, gate receipts and merchandizing, you can believe that figure is easily into the double digits of billions.

Television has made all sports, not just auto racing, a financially viable proposition. Before TV, sports revenues were limited to how many seats could be filled. Gate receipts determined a team's ability to pay salaries, overhead and ensure survival. Losing records meant fewer ticket sales and resulted in franchises disappearing from the sport. TV changed all that. Today, we can watch even the worst teams compete. Why? Because lucrative broadcast rights contract proceeds are split among all teams, giving revenue to the best and worst teams, thereby ensuring the survival of all.

Why, you may ask, are these contracts so large? Because sponsors will have the opportunity to showcase their products to huge national or global audiences. And, if they don't buy the airtime or signage, their competition will. As TV's popularity grew, so did sports broadcasting, and auto racing is a big part of it.

Today, commercially successful racing, as a competitive and spectator sport, has been narrowed to the three most popular types: stock car racing, open-wheel racing and drag racing.

In stock car racing, NASCAR is far and away the most popular national association, with its premier Winston Cup, Busch Grand National and Craftsman Truck series. NASCAR has grown to become the largest, most popular type of racing in America, with legions of fans in every corner of the country and around the world.

Events, merchandise, views online or tv,

In 1909, the American Automobile Association (AAA) established a Contest Board to sanction and organize races. The first big event was the initial International Sweepstakes Race, run at Indianapolis in 1911. Each year thereafter, a series of AAA-sanctioned races took place, but the Indy 500 remained the crown jewel of the series.

In 1955, when AAA decided to get out of the racing business, Tony Hulman, owner of the Indianapolis Speedway, formed USAC (United States Auto Club) to fill the void. In 1978, team owners formed CART in response to their displeasure with USAC, which retained the rights to sanction the Indy 500 and a handful of other races. Tony George, grandson of Tony Hulman, broke away from CART to establish the IRL in 1994.

Since the split, CART and IRL have battled for tracks, TV time, teams, sponsors and fans. Changes in management, engine suppliers and sponsors, plus expanding costs and shrinking budgets, have cast a shadow of doubt on the viability of supporting two American open-wheel racing series.

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E) Individual

Race suit

1950's:

Drivers wore whatever they wanted

-“ranging from Stirling Moss’s striking overalls to Fangio’s preferred racing attire of polo shirts, work jackets and slacks.”

60’ and 70’s:

fire retardant attire began to be worn.

many accidents involving fires

FIA implemented rules about fire suits in 1963. After Niki Lauda’s accident in 1976 teams switched their suits from cotton-based

“bulky and uncomfortable five-layer suit made to NASA specifications, using the same materials used to make astronaut suits.”

1994, the FIA mandated that the pit crews needed to wear the same suits

2018 comfort while maintaining protection.

lighter more breathable Nomex fabric.

Tires:

“In 1958 Dunlop introduced the use of nylon fabric reducing weights by 12 lbs. Per tyre.”

In 1972 Michelin began making the first radial slicks. These radial tires “have and the inherent advantage of improved traction and braking, and improved compound durability.”

Today’s tires use advancements in material quality

Companies experiment with woven steel belts, and Kevlar to add weight saving properties while increasing durability.

Carolina Contribution Research

- •SAFER (Steel And Foam Energy Reduction) track walls, commonly referred to as "soft" walls, because of their impact-absorbing nature.
- •Composite seats made of carbon fiber, designed to make the cockpits of cars safer.
- Incident data recorders (or "black boxes"), which produced a wealth of safety information that NASCAR collected and built into an "incident database."
- •Computer modeling for crash simulation that can create virtual on-track incidents, so the effects on cars and drivers can be studied extensively..
- •Studies of ways to maximize "fresh air" flow for drivers, in response to increasing concerns about air quality in the cockpit.
- •A new "bigger car" cockpit design, which was tested last summer. The project has been expanded to include possible roof-flap redesign and an overhead driver exit.
- •Over-the-wall pit crew members are now required to wear helmets
- •Held driver safety update seminars on safety-related equipment from industry experts.
- Arguably the most important safety improvement is the requirement of the HANS device. The HANS (head and neck support) device is a semi-hard collar made of carbon fiber and Kevlar, which is fastened to the upper body by a harness worn by the driver. Two flexible tethers on the collar are attached to the helmet to prevent the head from snapping forward or to the side during a wreck.⁵
- Another important safety improvement was the implementation of soft-wall technology. , developing energy-absorbing barriers, called SAFER barriers, for the Indy Racing League.³ He began work on his own design, installing crushable foam insulation behind a series of square steel tubes.¹ The first barriers went up at the Indianapolis Motor Speedway (IRL) in 2002, and NASCAR tracks began to follow suit 2 years later.³
- Track safety is affected by the degree of the track's **banking**, the steepness built into the track. Tracks with a steep banking allow cars to go faster, especially around the corners, which is where a lot of the fatal accidents have occurred. If a track's banking were 90 degrees, then the track would be perpendicular to the ground. Obviously, no tracks are banked at a perpendicular angle.

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