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From the Battlefield to the Soccer Field

The history of the SUV as a tragedy of the commons

It's just before 9 p.m. on a warm spring Friday in Oakley, CA, on April 15, 2005, and a Honda Accord four-door sedan with four teenagers inside is mid-U-turn onto Main St. A Dodge Durango sport utility vehicle fails to avoid the Accord, which has just pulled into its path, and the Durango plows into a passenger side door.

Ambulances, fire and police respond, and in the end, three of the four teenage Accord passengers are dead and one is severely injured. The driver of the SUV walks out of the hospital that same night with minor injuries.

It's the kind of horrific crash that highlights the stakes in the ongoing debate about the safety of what has been the best-selling vehicle design in America and what will be a presence on U.S. roads for years to come: the SUV. Critics would say the crash offers a textbook example of the incompatibility with smaller passenger cars that SUVs bring to the highways. Their high-set grills deliver blunt force trauma to the heads of lower-sitting sedan occupants. SUV owners and their defenders point to the same attributes in crediting the design for saving lives, as was the case for the driver of the Durango in the Oakley crash.

From their origin as an unintended offshoot of fuel conservation laws passed in the 1970s to current efforts to overhaul standard safety tests for these vehicles, SUVs have been the object of rhetorically charged claims and counterclaims concerning the safety (and fuel-efficiency) of their design. They were marketed in America in billion-dollar ad campaigns promoting them as a safe choice, shielded from foreign competition by tariffs and subsidized by various loopholes in the tax laws and environmental regulations. By 2004, their vehicle class (which includes pickup trucks and vans) constituted half of the vehicles sold every year in the U.S. and, despite fewer sales in 2005, their production is slated to increase through the decade.

Although traffic safety research going back to the 1970s undermined the modern "safe SUV" marketing claims, these criticisms were outweighed by the apparent linkage, in the public mind as well as among many respected researchers, between vehicle heft and safety. That changed after hundreds of rollover deaths in the 1980s and 1990s

caused the kind of public attention that led federal regulators to propose more stringent rules. Still, the complexity of the makeup of the nation's vehicle fleet, the difficulty in collecting clear-cut safety data on different vehicle types, the widespread popular appeal of SUVs and light trucks, and the mixture of politics and big business that they represent have made it difficult to achieve broadly accepted findings about the safety of these vehicles and, in turn, to devise policies that are science-based and effective and to implement them.

For example, limited access to research data and the incomplete or imprecise nature of the data sets as well as differences among SUV models make it difficult to reach clear conclusions about SUVs' relative safety as a class of vehicles, notes Lawrence Berkeley National Laboratory's Tom Wenzel. He spoke about his research at a UC Berkeley Traffic Safety Center Seminar on February 15, 2005, in a talk entitled "Are SUVs Really Safer Than Cars?"

On one hand, SUVs pose more danger to cars in a collision than other cars do, he said. However, compared to light trucks, SUVs are safer and more readily re-designed for safety improvements.

Another example comes from Michelle White, an economist at UC San Diego, who warned of the difficulties of generating conclusive findings from the data sets in her UC Berkeley Traffic Safety Center lecture on March 14, 2005, titled "The 'Arms Race' on American Roads: The Effect of SUVs and Pickup Trucks on Traffic Safety." More detail is needed to correlate factors like seat-belt use, drinking and driving, and driver age with vehicle type before definitive conclusions can be drawn, she said.

However, her analysis of data that are available strongly suggests that, as was approximately the case in the Oakley crash that occurred only weeks later and just 35 miles away, every fatal crash of a "light truck" or SUV (White considered light trucks, SUVs and minivans together in her study) avoided comes at the expense of at least 4.3 additional fatal crashes for occupants of cars. White suggests that getting people out of SUVs and into cars would be comparable to the safety increase of wearing a seat belt.

To reiterate: the primary data sets both White and Wenzel worked with are not detailed enough to tease out some variables important for determining the safety of SUVs relative to other vehicles. One of the leading databases for crash research, the Fatal Accident Reporting System (FARS) of the National Highway Traffic Safety Administration (NHTSA), as well as data collected by the Insurance Institute of Highway Safety (IIHS), a leading participant in crash analysis, can lead to different conclusions depending on how the numbers are analyzed. Even studies from noted traffic safety researchers like Leonard Evans, president of the non-profit research group Science Serving Society and a former GM researcher, have produced disparate conclusions about SUV safety. Evans has in the past held that heavier, SUV-like vehicles keep their passengers safer in collisions, while his more recent findings suggest that weight can be less important than design, a development that will be

explored in greater depth later in this article.

In the long view, the three goals of fuel economy, passenger safety, and safety for other road users continue to enjoy support from the public, but the public wants all three at once, despite some level of incompatibility among these goals. The critical task for regulators and for industry is to develop approaches to meet each goal simultaneously, for example, improving safety for occupants without sacrificing fuel economy and without reducing safety for others.

The SUV's Roots in the 1930s

Looking back at the history of the SUV can tell us something about how we arrived at the present juncture. The concept dates back to the early 1930s when a vehicle with high axle clearance for rough roads and off-road travel, built on a truck frame, with an enclosed rear cargo area (as opposed to a pickup's open bed), and optional four-wheel drive was marketed to urban consumers. It was the Chevrolet Suburban, and it was especially popular with undertakers.

“Undertakers discovered that with all but the front seats removed, the back of a Suburban was precisely the right length and height for carrying the dead, either in bags or in coffins,” says longtime *New York Times* automotive writer Keith Bradsher in his 2002 book, *High and Mighty – SUVs: the World’s Most Dangerous Vehicles and How They Got That Way*.

By the 1980s, what came to be called SUVs began to gain popularity among general consumers, and carmakers raised their prices, but not before another automaker helped nurse to life another precursor-SUV: the Jeep, whose transition to the mass market was not as smooth.

As Bradsher explains it, after World War I, the U.S. military sought a mechanical replacement for mules and a more rugged and more versatile alternative to reconnaissance motorcycles on battlefields. Willys-Overland came up with the Jeep. It proved to be extremely well-suited to combat use in World War II. After the war, Willys-Overland marketed it to American families, but the boxy design failed, Bradsher states, in the face of more baroque, post-War tastes in vehicles.

Jeeps and SUVs with similar designs made in Europe and in Japan continued to be manufactured into the 70s, but were marketed mainly to government off-road users like forestry agencies and police departments. A stiff 25 percent tariff on imported light trucks limited foreign SUVs' presence in the U.S. market.

SUVs didn't really catch on as a conventional consumer product until American Motors bought the Jeep brand in 1969 and began redesigns to make it more marketable to an urban consumer. The standard canvas top became metal, canvas seats became leather, wheelbases were widened to reduce rollovers, and roll bars were installed.

Spacious showrooms replaced mom and pop dealerships, and sales of Jeeps quadrupled in the following decade.

However, it was still a niche product, marketed to buyers with large disposable incomes who wanted a rugged-looking, if not entirely practical, vehicle. Jeeps experienced rollover problems and were poised to come in conflict with new emissions and fuel-economy regulations that were looming by the mid-1970s. The latter difficulty was eliminated when lobbying efforts permitted Jeeps to be classified as light trucks under government regulations and thereby exempt from Clean Air Act requirements imposed on cars when the legislation was passed in 1970.

Regulatory Loopholes Lend a Hand

Jeeps and their ilk avoided another set of regulations inspired by the gasoline shortages of the early 1970s, the Corporate Average Fuel Economy standards, or CAFÉ. CAFÉ was intended to double the U.S. passenger fleet's gas mileage by setting fleet-wide goals for each manufacturer, while leaving it up to them to decide how to allocate the savings among the vehicles they sold.

But the 1975 CAFE standards contained concessions to business. Though the concessions were intended for light trucks in order to avoid unfairly penalizing vehicles used for businesses, the SUV makers were able to exploit them. They made their SUVs tall enough to be considered capable of off-road operation and thus earn a "light truck" designation. They also made them so heavy, more than 3 tons (or 6,000 lbs.), that they could take advantage of other "truck" loopholes despite the fact that they were largely passenger vehicles. The situation was compounded by light truck exemptions of up to \$7,700 in taxes for "gas-guzzler" vehicles with the worst fuel economy. By the end of the 1970s, CAFÉ rules said cars must get 27.5 miles per gallon by 1985, whereas light trucks would only need to achieve 20.5.

By the early 1980s, federal regulators at the National Highway Traffic Safety Administration (NHTSA) were already seeing that certain models of Jeeps were involved in a disproportionate number of rollovers compared to their 1 percent share of annual U.S. vehicle sales. NHTSA went so far as to suggest a ban on Jeep ads. But Jeeps easily met the longtime static standard for rollover risk, involving a ratio of height to wheelbase, and attempts by NHTSA to impose a more realistic dynamic rollover test, which would have been harder for SUVs to pass, were thwarted. Instead, automakers were required to put warning stickers on the sun visors of SUVs; they remain a standard feature to this day.

"The stickers became a selling point for American Motors, giving an aura of danger to the vehicles," Bradsher reports. "Guess what happened? Sales soared, the kids loved them, it added to the excitement," an automotive executive tells the author.

"Sport Utility" Is Born

The term “sport utility vehicle” was actually first made common in the press in the middle of the 1980s amid a Reagan-era freeze on regulations of emissions, fuel efficiency and safety and an economic boom. Bradsher argues that the oil embargo that triggered the 1970s CAFÉ laws either forced consumers into tiny, dangerous and uncomfortable econo-cars that met then-strict new conservation guidelines or the opposite—big, gas-guzzling vehicles exempt from CAFÉ. “[A]uto executives attribute the rise of SUVs to the federal government’s insistence on preserving strict gas-mileage standards for cars while not raising gasoline taxes. The combination of cheap gasoline and stringent curbs on gasoline consumption by cars forced automakers to transform the family vehicle of choice from a car into an SUV, they contend, with considerable accuracy,” Bradsher reports. Domestic markets were also protected from foreign competition by the decades-old 25 percent tariff on light truck imports.

SUVs first established a strong sales beachhead in the midsize family and luxury class, as evinced by what happened when General Motors bought American Motors and Jeep in 1987 for \$1.5 billion. Sales of Jeep models rose from 1.8 percent of the light truck market at the beginning of the decade to 6.5 percent at the end. More specifically, midsize family SUV sales jumped from 0.1 percent of light truck sales in 1980 to 3.55 percent in 1989, a 30-fold increase. This growth was at the expense of sales of cars in the luxury bracket, priced at \$26,000 and higher. In a decade cars went from making up practically all the sales of vehicles in this price range, actually 95 percent of them, to 44 percent, as lavish SUVs took their place in consumers' preferences.

The Clean Air Act gave SUVs at least twice the pollution credits as cars, but those weren't the only advantages that their vehicle class received during the first big decades for SUVs. Tax code changes in depreciation regulations around 1984 severely crimped deductions for purchasing business vehicles (\$17,500 spaced evenly over five years), unless the purchased vehicle weighed more than 3 tons. The rationale was that farmers buying trucks needed a break on depreciation. A luxury tax enacted in 1990 for vehicles costing more than \$30,000 also exempted vehicles over 3 tons, another nod to farmers and other business buyers. Few SUVs were that big or costly when these incentives began in 1990, but they would be by the end of the decade, and people would want to buy them.

The big three automakers marketed these vehicles successfully using campaigns built on intense market research, including 115,000-person surveys, focus groups, and detailed information on samples of 10,000 people (compared to just 1,200 for typical political polls). Automakers spent \$9 billion on SUV ads from 1990 to 2001, a full tenth of all advertising spending in that period.

Annual profits from selling SUVs increased ninefold from 1990 to 2000. For each Expedition it sold, Ford cleared \$12,000 in profit courtesy of the vehicle’s cheaper,

older truck manufacturing technique. The Michigan Truck Plant, which was where Expeditions (in addition to trucks) were made, became the single most profitable factory in any industry anywhere in the world in the 90s. The factory's annual production, which included other profitable trucks as well, was worth \$11 billion, or \$2.4 billion in after-tax profits in 1998. Such prosperity trickled down to assembly line workers, some of whom pocketed \$100,000 a year as factories ran around the clock. Bradsher attributes much of the mid-90s economic boom in the Midwest not to dot com companies, but to the SUV boom and the immense profits for Ford.

Certain researchers and other groups had known since the 1950s that the inherent design behind SUVs made them rollover-prone and that they were outsized compared to the rest of the fleet on the road and therefore a safety hazard to other types of vehicles. However, such safety issues failed to resonate with the public until SUV designs represented a significant percentage of annual vehicle sales and had already irrevocably reshaped the landscape of the highway.

"Nothing is a serious problem if it's in small enough numbers," Bradsher told the online magazine *Salon.com* in 2002. "It's different when you have 10 percent of the vehicle fleet that is designed in a way that is fundamentally incompatible with the cars that are already out there."

Insurance Institute for Highway Safety (IIHS) data as early as 1980 indicate that SUVs rolled over twice as frequently as cars. In that same year, 1980, CBS would win awards for a 60 Minutes documentary on how Jeeps roll over on a dry open road if the driver jerks the steering wheel around.

The Ford/Firestone Lawsuit

But by the mid-90s, an even bigger development would tarnish the "safe SUV" reputation. The rumblings sounded by the data from the IIHS and others were compounded by the rollover deaths of hundreds of people in the 1990s while they were riding in Ford Explorers equipped with Firestone tires. The resulting lawsuit filed by the attorneys general of the 50 states of the U.S. netted a settlement of more than \$50 million for misleading advertising and negligence.

Meanwhile, some researchers in Europe began intense study of the emerging issue of "incompatibility," crashing SUVs into cars to see if there were differences in injuries suffered by the occupants compared to those in a sedan-on-sedan crash.

"Mercedes was the only automaker that was paying attention to this problem in the mid-90s," Bradsher told *Salon.com* in the 2002 interview. "There was a German motoring group that did some crash tests. For example, they crashed the Nissan Patrol, a full-size SUV, into the Volkswagen Golf. The Nissan Patrol leaped right over the hood of the Golf in a head-on impact and smashed into the passenger compartment. It did more damage to the dummy in the Golf than anything this motoring

association had seen in any of its crash tests before. The same crash killed the dummy in the Nissan Patrol too? Why? Because the front end of the Golf got under the Patrol and drove the steering column up and impaled the driver.”

Nevertheless the auto industry maintained a strong public insistence on the safety of their popular vehicles. The crux of their argument was based on FARS data and the work of Leonard Evans and others that appeared to support a simple formula: heavier equals safer.

Safety of Occupants

The “heavier = safer” interpretation ignored certain key subtleties involved in overall safety, including the safety of other road users. A more holistic look that included them in the equation yielded startling new conclusions: SUVs might be slightly safer for their occupants during certain types of crashes, but they increased risks to other road users, including those riding in non-SUVs. Both conclusions (about safety for those inside SUVs—under certain conditions—and increased risk for those outside SUVs) can be supported using FARS and both suffer from certain limitations, especially because they don't adequately consider the contribution of driver characteristics— age, seat belt usage, likelihood of driving after drinking, and the like.

On the vehicle side of the argument, consistent, repeatable safety tests by regulatory agencies have been slow in coming. Rollover propensity is determined by a static measure, an equation based on wheel base width and height. NHTSA is just now returning to the 25-year-old idea of a presumably more realistic and more accurate dynamic measure of a vehicle's propensity to roll over.

In addition, manufacturers are starting to change the way they engineer SUVs, creating vehicles that answer more fully to concerns about passenger safety, fuel economy and compatibility with other vehicles on the road.

The 20-year rise (and, perhaps, fall) of the SUV illustrates how the unintended consequences of public policy meant to produce a common good, combined with well-orchestrated marketing that can exploit consumer demand, can create a tragedy of the commons writ large on the shared space of the nation's roadways. Such a tragedy is beginning to undo itself through technological innovation and new regulations, but as an accompanying article indicates, the light truck, with an even more dangerous and incompatible vehicle design, is coming onto the market in increasing numbers without pressure from the public or regulators to improve like the once-admired, now-scolded SUV.