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SEAT BELTS: 1949-1956

Larry Ronan

Lexington Technology Associates
10 Wingate Road
Lexington MA 02173

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FINAL REPORT

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Larry Ronan

9. Performing Organization Name and Address
Lexington Technology Associates*
10 Wingate Road
Lexington MA 02173

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16. Abstract

The aircraft industry was responsible for the development of seat belts and much of the early research relating to injury, deaths and accidents. Early advocates of belts included safety researchers, engineers and doctors. In 1955, there were a number of barriers to the adoption of belts, including poor design, high cost, installation problems, the lack of a sales effort or consumer information campaign, and the lack of a consistent set of standards. Moreover, consumers held many misconceptions. By 1955, seat belts were at the center of a hotly contested behind-the-scenes controversy over safety in the automobile industry. In this struggle, Ford played the role of a strong advocate for safety and seat belts; GM was an adversary. Ford undertook a program, the "Safety Campaign," in order to sell various safety features on its 1956 models. The campaign was short-lived, the industry claiming that safety did not sell. However, there is much to suggest from Ford's experience that safety does indeed sell. Ford's reversal on the safety program set back the seat belt movement for a number of years.

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PREFACE

In the future, further reductions in fatalities, fuel consumption, and emissions associated with automobile use will be needed. To insure that these goals are achieved, it is necessary to understand more thoroughly the process by which the development, implementation, and adoption of innovative automobile technology occurs. The current study, focusing on seat belts during the critical years 1949-56, provides an important link in addressing these questions. It assesses the impact of the consumer misconceptions, the lack of a seat belt standard, corporate attitudes towards safety, and the role of safety advocates. In addition, the study assesses the validity of the oft-stated hypothesis "safety doesn't sell" by examining the results of Ford's 1956 safety car campaign.

This work was carried out as part of the Implementation of Innovation in the Motor Vehicle Industry Program (HS-928), at the Transportation Systems Center, under the sponsorship of Mr. Sam Powel, III, Office of Research and Development, National Highway and Traffic Safety Administration. The contract technical monitor was Dr. Bruce Rubinger.

Although the author takes sole responsibility for the information contained in this report, he wishes to acknowledge the assistance of Dr. William Abernathy, Lexington Technology Associates, who was responsible for the direction of the study. The guidance and suggestions of the contract monitor, Dr. Bruce Rubinger, are also gratefully acknowledged.

EXECUTIVE SUMMARY

The aircraft industry was responsible for the development of seat belts and much of the research relating to injury, deaths and accidents. Early advocates of seat belt use and installation included safety researchers and engineers, as well as the medical profession, which by 1955 had concluded that properly engineered seat belts would reduce deaths and injuries.

In 1955, there were a number of barriers to the adoption of seat belts - e.g., poor design, high cost, installation problems, the lack of a consumer information effort, and the absence of a consistent set of standards. The consumer, moreover, held certain misconceptions about seat belts. People thought that a passenger stood a better chance of surviving an accident if he were ejected from the car and that a passenger using belts would be fatally trapped if the car sank or caught fire. The belts of this period, moreover, were uncomfortable and hard to use and tended to damage clothing.

Seat belt adoption was at the center of a hotly-contested, behind-the-scenes controversy over safety within the automobile industry. Ford had concluded that seat belts, along with a number of other safety innovations, could substantially reduce the number of highway injuries and deaths. With the support of Robert McNamara, vice-president of Ford Division, and Alex Haynes, chief safety engineer, Ford undertook a program to sell safety. This program strongly backed seat belt use. By contrast, GM consistently contested the value of belts, tried to minimize their importance for the industry, and attempted to discourage their adoption. The chief formulators of GM's policy toward safety and, in particular, seat belts were C.A. Chayne, GM's engineering vice-president, and Howard Gandelot, GM's safety engineer.

Despite industry claims that "safety did not sell", and that seat belts invariably met with stiff sales resistance, Ford discovered that belts were extremely attractive to customers.

Indeed, Ford found that one out of every seven buyers of new cars ordered belts. The demand from the public far exceeded Ford's expectations.

Ford's reversal on the 1956 safety campaign set back the safety movement for years, delaying action on auto safety for almost another decade. For the seat belt movement Ford's reversal was a particularly heavy below. The advantages of belts had long been established. There were no significant technical or cost barriers to adoption. The major barriers to belt installation and use were consumer indifference, lack of information, and misconceptions. Unlike small seat belt suppliers, Ford had the resources to overcome these problems. It is conceivable that Ford's change of heart is responsible in part for bringing about government regulation of the industry.

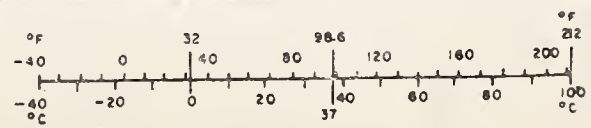
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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ABBREVIATIONS

ACIR	Automotive Crash-Injury Research
AMA	Automobile Manufacturers' Associaton
ASA	American Standards Association
CAA	Civil Aeronautics Administration
CU	Consumers Union
FAA	Federal Aviation Agencies
USAF	United States Air Force

1. INTRODUCTION

1.1 EARLY HISTORY

The first patent for a safety belt, designed to allow free movement and personal protection "for tourists and others" was granted to Edward J. Clayborn in 1885. It was composed of an inner and outer belt. While no use of this belt has been recorded, some of the early gasoline-engine, horseless carriages came equipped with restraining belts to keep passengers from falling out of the low-sided, often doorless vehicles when traveling over rough, rutted roads. What we now refer to as a safety belt - a restraining device of the lap-strap kind - was first used not in automobiles, but in airplanes. Lt. Benjamin O. Foulis equipped his U.S. Army Aeroplane No. 1 with a leather strap fashioned by a cavalry saddle-maker. In 1915, Glenn H. Curtiss, the pioneer aircraft designer and builder, advocated seat belt use following his hospital interview with one of the first survivors of an airplane crash. Curtiss immediately recognized that ejection from an airplane meant a major threat to life and that seat belts could provide a substantial deterrent.[1]

By 1920, seat belts began to appear in civil aircraft. Manufacturers associated with the aircraft accessories industry were known to have produced belts that were occasionally installed in cars. Barney Oldfield, in 1922, introduced seat belts to racing cars, ordering aircraft seat belts equipped with special fittings. Other race car drivers and a few motorists followed suit so that by 1927 one seat belt producer was selling over 250 belts a year.

In the mid-thirties, various individuals - primarily physicians, pilots, and safety engineers - began championing the cause of seat belts in automobiles. The founder and first president of the Automobile Safety League of America installed aircraft seat belts in his car and advocated factory installation. Also at this time, the first direct research on human tolerance to crash forces was undertaken in Germany by aeronautical engineers. The

immediate aim of this research was to cut deaths and injuries in airplane and glider crashes.

1.2 1940s RESEARCH

The roots of the fifties' interest in seat belts was in crash research done in the aviation field during the previous decade. In 1940, Hugh DeHaven initiated the Crash Injury Research Program at Cornell. Its primary goal was the prevention of injuries, as distinguished from the prevention of accidents, in aviation accidents. Throughout the early forties, high manpower losses in air crashes led to separate research programs undertaken by the U.S. Armed Forces. In 1945, the Armed Forces and Federal Aviation Agencies joined in research on "crash worthiness" of aircraft. Later, the Division of Flight Safety, USAF, evaluated safety belts and harnesses in military aviation accidents. Finally, the U.S. Air Force in 1947 conducted dynamic stress analyses of the human body. Using rocket sleds to study the effect of deceleration forces, the project found that the human body could withstand forces up to 4870 pounds without injury if restrained properly by a belt and harness.

These early studies in the aviation field had a direct effect on thinking about automobile safety. They were responsible in part for changing the focus from accident prevention to minimization of injury. This change led to more intense investigation and criticism of car design. In addition, the cumulative evidence from the USAF, FAA, and Cornell studies of airplane crashes laid the groundwork for the "packaging" theory formulated later by DeHaven, which held that restraining devices sharply reduced fatality and and injury rates. Automobile safety experts adopted this principle of occupant restraint in arguing their case for safety belts.

2. DEVELOPMENT OF THE AUTO SEAT BELT

2.1 DeHAVEN's RESEARCH

Hugh DeHaven began work in the early forties on the need for restraint of the human body within a vehicle. DeHaven's interest in passenger restraint was piqued by the fact that people falling from great heights often survived under certain circumstances. Under a wartime project for the Air Force, DeHaven pursued the study of this survivability, centering on data from airplane accidents. This preliminary work established the basis for the "packaging principle" - the idea of protective restraint for motor vehicle passengers. Moreover, DeHaven's work demonstrated that injuries could be substantially reduced when the body was held in place by seat belts.[2]

In 1951, Liberty Mutual Insurance Company and the Hickok Manufacturing Company, a leading producer of seat belts, requested Cornell University to undertake a study to determine how people are injured in automobile crashes. This study collected for its data base such facts as direction, external forces, and probability of striking objects in the interior of the car. DeHaven's project, now better funded and staffed, broadened its research scope to include highway accidents. This larger study, named the Automotive Crash-Injury Research Project (ACIR), conducted numerous analyses of automobile accidents in an attempt to identify the causes of injury to passengers. ACIR also evaluated by means of statistical analyses possible remedies for these injuries. In 1953, with Hugh DeHaven as director, ACIR initiated an accident data collection in selected counties of Indiana, Maryland, and North Carolina. This effort was the first statistically valid data collection on accident injury. ACIR's study was sponsored by the Commission on Accidental Trauma of the Armed Forces Epidemiological Board and the Surgeon General of the Department of Army. ACIR's special accident data collection was an extension of an earlier crash research project undertaken in 1949 by Sgt. Elmer Paul of the Indiana State Police. Sgt. Paul's work depended on officers investigating

accidents to report detailed information on injuries to passengers. DeHaven was attracted to what Sgt. Paul's data revealed. For the first time, it became clear that there was a pattern of injuries from ejection and from striking the internal structure of the automobile. Moreover, Sgt. Paul's work clearly pointed to increased survivability with the use of restraining devices.[3]

Sgt. Paul's work was limited to fatal injuries in survivable accidents. ACIR expanded the investigation to include the entire range of injury, as well as fatality causation. For sixty days, highway patrolmen and doctors filled out exhaustive report forms listing in minute detail the damage done to both automobiles and human subjects in every wreck that occurred in the sample areas. Study of these reports, first published in December 1954, substantiated Sgt. Paul's findings that the major cause of auto injury was occupant ejection. ACIR estimated that 20 percent of crash victims were injured because they were thrown out of their cars. This fact challenged a popular misconception. Prior to ACIR's report, it was widely believed that being thrown clear of the car during an accident would generally save one's life.[4] ACIR's report indicated that those ejected from the car fared much worse than passengers who were not thrown from the car. Indeed, ejection more than doubled the risk of significant injury.

The ACIR study suggested as possible remedies two design changes in automobiles: safety door latches and seat belts. Seat belts, the report said, could minimize injury and fatalities in automobile accidents in two ways: by reducing ejections of passengers from cars and by mitigating the buffeting of passengers inside of crashing cars.

After the release of their report, the Cornell project refused to estimate quantitatively how much the universal use of seat belts would reduce accident deaths and injury. Estimates by others ranged from a 35 to 50 percent decrease in deaths and a larger reduction in injuries.[5] John O. Moore, DeHaven's replacement as director of Cornell's ACIR project, summed up his project's position:

> I can't agree with those who at this point in time predict the exact number of fatalities that safety belts can reduce. Nor can I agree that these belts are the end-all of what can be done to give our autos increased survivability. With this understood, I think it is safe to say that the safety belt is the most fundamental device used now while we wait for refinements and the ultimate in protection.[6]

In 1953, Cornell released a report by Hugh DeHaven, Boris Tourin and Salvatore Macri called "Aircraft Safety Belts: Their Injury Effect on the Human Body." The result of a study of 1,039 survivors of light plane crashes, the report demonstrated with impressive statistics the protection afforded by safety belts in airplane crashes.[7] Automobile safety authorities hailed the report as having a direct bearing on the proposed application of seat belts to automobiles.[8]

Besides Cornell, other groups at this time also looked into the problem of automobile injury. The Institute of Transportation and Traffic Engineering of the University of California embarked on a program of automobile crash injury research. Moreover, the School of Aviation Medicine, USAF, discovering automobile crash injuries to be the primary cause for admission to Air Force hospitals and an important cost factor to USAF in manpower losses, established the USAF Automobile Crash Reseach Program with Colonel John Stapp as project officer. In addition to the Air Force's work with rocket sleds to determine human tolerance, the program included contracts with the University of California and the University of Minnesota for crash tests.[9]

Perhaps doctors were the one group most impressed and spurred to action by Cornell's findings. By the early fifties state medical societies, the American Medical Association, various medical committees, and individual doctors began to focus their attention on the issue of auto safety, many medical organizations passing resolutions that urged the industry to take immediate action and to install seat belts. In its meeting in San Francisco,

June 21-25, 1954, the American Medical Association's Committee on Hygiene, Public Health and Industrial Health offered the following resolution which was adopted by the House of Delegates:

> Resolved that the American Medical Association recommends to the Motor Car Manufacturers of America that they consider equipping all automobiles with safety belts and furthermore that they give increasing emphasis to safety in design of all automobiles.[10]

And, on February 19, 1955, the Board of Regents of the American College of Surgeons at its meeting in Cleveland, Ohio approved the following resolution:

> Be it resolved that the Committee on Trauma of the American College of Surgeons requests that the Board of Regents of the College recommend to the Motor Car Manufacturers of America that they stress occupant safety as a basic factor in automobile design, to include: (1) doors which will not open on impact; (2) seats and cushions which will not become displaced on impact; (3) energy absorbing interiors; (4) adequate safety belts or other passenger stabilizing devices that will resist impacts of at least 20 G's.[11]

Earlier, in 1953, the Colorado State Medical Society, acting upon the report of a committee on the traffic death and injury problem, issued a recommendation to the Motor Car Manufacturers of America on October 15, urging that all automobiles be equipped with seat belts that would meet Civil Aeronautics Administration specifications for aircraft belts (3,000 lbs. load).[12] Individual doctors in journal articles and editorials also recommended that the industry adopt seat belts as standard equipment for all cars.[13] It is important to note that all of these recommendations by the medical profession were appeals to the manufacturers to recognize and to act voluntarily on safety.

Not only did various medical associations urge automobile manufacturers to equip all automobiles with safety belts, but they

called on state motor vehicle departments, including the State Police, to keep accurate accident reports as to whether a car involved was equipped with belts and whether the persons involved had belts fastened at the time of the crash. The American Medical Association asked the National Safety Council to endorse this accident report program.

Individual doctors were outspoken on the issue of safety belts. At a clinical congress of the American College of Surgeons held in November 1954, one of the speakers, Dr. Horace Campbell, delivered a speech later published in the December issue of the College's journal, Surgery. In the article, Campbell noted that for the preceding twenty years over 38,000 people had been killed and 1,500,000 injured annually in automobile accidents. Dr. Campbell charged:

> These deaths, for the most part, occur because the motorcar manufacturers make no provision whatsoever for the control of the occupants when they must decelerate rapidly. What happens to the motorcar rider under conditions of rapid deceleration is left entirely to chance, with the results recorded previously. Anywhere from 70 to 80 percent of these deaths and injuries need never have occurred if the most rudimentary provisions had been made for the control of decelerations, that is, the safety belt as used in airplanes.[14]

Campbell, noting the universal use of seat belts in airplanes, urged physicians to lead in the public's adoption of safety belts for automobiles.

By the end of 1955, the medical profession's private appeal to the manufacturers was being replaced by a public appeal to the government. At a meeting of the American Medical Association in Boston in November 1955, Dr. Clarence Owen of the Michigan delegation introduced a resolution calling for Federal regulation of automobile safety standards. Dr. Owen's resolution strongly urged the President of the United States to request legislation from

Congress authorizing the appointment of a national body to approve and to regulate safety standards of automobile constraints.[15]

Seat belts, by the mid-fifties, had found widespread support. Aside from being endorsed by the American Medical Association and the American College of Surgeons, seat belts were advocated by the National Safety Council. In a policy statement adopted October 16, 1955, the Council recommended:

> ....the use of seat belts in motor vehicles, recognizing that belts will not prevent accidents but that they may reduce the severity of injuries in certain types of crashes.[16]

Moreover, by December 1955, bills had been introduced in the U.S. Senate and in several state legislatures requiring seat belts or provisions for them in all cars.[17] Major insurance companies were also beginning to endorse seat belts. At least one company cut its premium by 10 percent for the policy holder who installed two or more belts in his car.[18] Finally, influential consumer groups like Consumers Union, which had long advocated that belts should be incorporated in the design of new cars, became more outspoken on their behalf.[19]

Thus, by 1955, a sizeable corps of researchers, engineers, consumer groups, and doctors asserted that properly engineered and installed seat belts reduced deaths and injuries. While proof of the efficacy of the seat belt awaited accurate recording and statistical evaluation of practical highway experience, engineers based on tests, could say that an effective restraining device, such as an approved seat belt, could reduce the seriousness of injury in case of an accident if so installed and worn as to prevent the person from being thrown against unyielding objects inside the car or from being thrown from the car onto the pavement. Studies estimated that the routine use of seat belts would save at least 15,000 lives and prevent nearly 1,000,000 injuries annually.[20] This, indeed, would be a sizeable improvement in the situation. In 1954, 10 percent of all cars were involved in

accidents; 1,500,000 people were injured, with 100,000 people totally disabled and 38,000 people killed.[21] The universal use of seat belts, claimed its advocates, could potentially reduce automobile accident deaths by about one-half and substantially cut down on the number and severity of injuries.

By spring of 1955, the Armed Forces Epidemiological Board, the principal sponsor of Cornell's ACIR program, acted on Cornell's findings, recommending that the Defense Department adopt seat belts for all its military vehicles. A favorable decision by the Defense Department would have affected the lives of hundreds of thousands of military men who drove trucks and cars owned by the Army, Navy, and Air Force. Moreover, another possible effect of the Defense Department's action on seat belts might have been to spur the adoption of seat belts in other areas of the government. In a memorandum to Dr. Frank B. Benny, Assistant Secretary of Defense (Health and Medical), the Epidemiological Board recommended:

> ...that seat safety belts be installed and used in ground vehicles of the Armed Forces in order to reduce the incidence of death or injury resulting from motor vehicle accidents involving military personnel.[22]

Other government agencies were considering seat belt installation for their fleets. As early as 1954, the U.S. Forest Service installed belts in cars and some trucks.[23]

2.2 THE AUTO MANUFACTURERS

In 1955, Ford and Chrysler became active supporters of crash injury studies. Cornell's work on auto accidents in the early fifties had been strongly supported by the government, which saw in Cornell's research hope of reducing injuries to service personnel. But by 1955, Ford, which had been conducting its own crash studies, became intrigued by Cornell's preliminary results. Anxious to verify Cornell's findings, Ford offered to expand the program with a large contribution for a study of the effectiveness of seat belts, improved door latches, and interior padding. John

O. Moore, then director of the ACIR program, refused to accept Ford's donation on the grounds that a one-company offer might appear to bias ACIR's report. However, A. L. Haynes, Ford's executive safety engineer, was so intent on continuing and expanding the ACIR project that he arranged for Moore to see executives in Chrysler and General Motors to solicit industry-wide support. Chrysler immediately agreed to match Ford's grant. By contrast, GM's refusal was unqualified. GM's engineering vice-president, Charles A. Chayne, informed Moore that GM had no interest in Cornell's project. Moore appealed Chayne's decision to GM's Alfred P. Sloan, Jr., honorary board chairman, and later to Harlowe Curtis, then GM president. Both men refused to reverse it. Consequently, from 1955 through 1957, Ford and Chrysler alone contributed a total of $600,000 to Cornell's ACIR project - half the total budget. It was not until the Automobile Manufacturers Association took over Ford's and Chrysler's support of ACIR in 1958 that GM took an indirect part in backing Cornell's research.[24]

Research findings provided by private and academic safety groups found their way to industry offices, reaching a somewhat sympathetic audience on the part of Chrysler and Ford. GM, by contrast, seemed bent on not recognizing the legitimacy of these studies and on minimizing their importance for the auto industry. When asked by a reporter whether findings received from such groups as ACIR had not provided evidence that people were being thrown out of cars in large numbers of crashes and that ejections doubled the risk of injury, GM's safety engineer, Howard K. Gandelot, replied:

> I don't know what to believe. You take all this talk about door openings. No one knows exactly what happens in an accident. A lot of people probably figure that the best thing to do is to get out of the car as fast as you can. They reach over and open the door and flee out. Then the Cornell people tell us it's a door opening and they were thrown out.[25]

Through statements like this, GM consistently tried to minimize the importance of the crash-injury studies for the automobile industry.

GM's negative attitude toward seat belts during this time was cause for concern. Because of its position as industry leader and the immense resources it controlled, GM could bring to bear enormous pressures on the rest of the industry to follow its direction. GM's influence was evident in the study of seat belts undertaken in 1955 by the industry's organization, the Automobile Manufacturers Association. The AMA began the study "in view of increasing indications that the industry may need to take an official position" on the seat belt issue.[26] Ford at the time was not an AMA member. With GM in the dominant position, the chairman of the AMA's special seat belt committee became GM's Howard Gandelot. Gandelot invited Ford to participate in the study. Rumor had it before the report was finished that the committee was biased against belts and that it would not recommend the industry's adoption of them. The report, signed by various engineers from Chrysler, Ford, American Motors, GM, Studebaker, and Packard, was never made public. Among its conclusions were these:

> The vehicle safety committee, with some engineers having upward of 40 years' driving experience, including years of test driving, is of the opinion that seat belts are not essential for safe driving.
>
> The principal concern of the engineers is the possible effect of seat belts on occupants of automobiles which encounter major collisions.
>
> Until it is factually known whether seat belts, during major collisions, provide increased protection for the wearer or cause increased bodily injury, it would be unethical for the engineers on the vehicle safety committee to recommend their use; further, it would not be legally justifiable for auto manufacturers to equip their cars with seat belts or offer them as optional equipment.[27]

The report was a restatement of GM's position and represented a sharp denial of documented evidence. The impact of this study could have been overwhelming, given the time of its release and its spokesmen. As one critic points out, adoption of the report might have reversed the trend toward seat belt use for years.[28] However, Ford and Chrysler refused to accept the committee's findings and, consequently, the report was neither released nor embraced as the industry's official position.[29]

2.3 FORD'S WORK

As early as 1951, A.L. Haynes, Ford's executive safety engineer, realized that the industry must direct its efforts to minimize and to prevent injuries. Haynes, it is interesting to note, had an aeronautical engineering background and had joined Ford in 1945 after eight years in the aviation industry.[30] He was a strong advocate for seat belts. Intrigued by Cornell's work, he and Fletcher N. Platt, manager of traffic safety and highway improvement, initiated Ford's crash-injury research project in 1951. They focused their research on the very same problems under study by Cornell - the forces that the human body encountered in accidents and what could be done through better design of certain parts inside the car to reduce these forces to tolerable levels. Ford's research represented a radical change in the auto industry's self-perception, for it implicitly conceded what heretofore had been denied or unquestioned by the automakers - that is, crashes were bound to occur and much could be done by the automakers with the automobile's design to minimize the severity of injuries.

On February 22, 1954, Haynes presented the preliminary results of his crash-injury research project to the Ford Product Planning Committee. From his studies of collision tests, Haynes perceived the necessity of developing protective design features, particularly as concerned the steering wheel, door locks, and instrument panel. Haynes found an avid supporter for his work in Robert McNamara, then vice-president in charge of the Ford Division. McNamara, like Haynes, had been impressed by Cornell's studies on interior design.[31]

The committee liked Haynes' ideas and gave him approval to continue his work and expand his research.[32]

About this time Ford looked extensively at occupant restraint systems, including shoulder harnesses, lap belt/shoulder harness combinations, and simple lap belts.[33] Fletcher Platt explained Ford's position on belts at this time: "Any force that acts to restrain a person in a crash would tend to reduce the severity of injuries."[34] Platt thought that belts could potentially prevent some accidents as well, since they "help a driver keep control of his car when he's driving on a rough road or hits a boulder or pot hole."[35] Platt further explained that Ford did not see seat belts as the final solution to the safety problem, but only one device among others which minimized the risk of injury in an automobile accident.[36]

In 1955, Ford began clinical tests of the effectiveness of restraining devices in reducing the severity and hazards of injury to the occupant. Taking 81 cars with safety belts in them and 81 cars without belts, Ford matched the cars by make, weight, year of manufacture, and occupant seating area. The sample took into account similarity in type of accident, area of principal impact, duration of principal force, the speed of the impact, and the frequency of doors opening. By holding all of these things equal and allowing only one variable (seat belts) to exist between the two groups, Ford had a valid comparison test that measured the effect of seat belts. The results registered a demonstrable improvement of about 60 percent for any degree of injury with the use of seat belts.[37] Because of these tests, as well as all of the research evidence provided by other organizations like Cornell, Ford announced it would offer seat belts as optional equipment on its 1955 cars.

At this same time, Chrysler took a stance similar to Ford's toward seat belts. James C. Zeder, Chrysler's engineering vice-president, commented:

> We benefited a great deal from the studies of such organizations as Cornell University, the Indiana State Police, and the University of California at Los Angeles, but it may be many years before we have really conclusive answers as to the degree of added protection seat belts do afford. However, the findings of these and other reputable safety groups, together with our own laboratory and proving grounds test data, convince us now that we should make seat belts available to the motorists who desire them.[38]

Chrysler announced in April of 1955 it would provide seat belts through its MoPar accessory division as dealer-installed optional equipment - the first major automaker to do so since Nash in 1949. Chrysler said that it would eventually provide kits for older models later in the year.

In contrast to Ford and Chrysler, GM had a quite different attitude toward the safety issue. As John Moore put it, the industry leader's position at this time was in essence a harsh refusal to recognize that outsiders had any legitimate interest in car design.[39] GM saw safety in terms of accident prevention and not injury reduction. Accident prevention, according to GM, was not the industry's responsibility. Rather, it rested with groups responsible for driver education, better law enforcement, and better road systems design. One explanation for GM's attitude was that it felt that, were manufacturers to take up the safety issue, it would necessarily engender a psychology of fear in the consumer, adverse to industry sales. As one critic puts it:

> General Motors had a strong feeling that if you said or did anything that made it look like driving cars was anything but fun - the most fun of anything in the world - you were hurting business.[40]

Seat belts became the center of the safety controversy. GM, in defiance of documented evidence, denied the importance of belts, attempted to block their adoption by the industry, and tried to discourage the belts' growing popularity. GM's opposition centered

on two main points: safety belts, rather than reducing injury, could contribute to it; and despite evidence as to seat belts' efficacy, consumers invariably rejected them.

Not enough was known, said GM, about the problems involved in belt use. C. A. Chayne, GM's engineering vice-president, said of safety belts:

> They just define where you will fold under pressure, and the sudden pressure of the belt in many types of accidents can cause serious damage.[41]

GM gave the appearance of having suspended judgment about seat belt use until the potential injuries belts could cause were determined. When asked by a reporter about GM's attitude toward seat belts, Gandelot replied:

> General Motors hasn't said they're no good. We're just waiting to find out if they are any good. Nobody knows.[42]

There was little to provide rational support for GM's fears about the injury potential of belts. The Automobile Manufacturers Association report in 1955 mentioned a study made at Ohio State University that provided information on internal injuries produced by safety belts, especially to the heart. Gandelot had declared that the AMA's Vehicle Safety Committee was "deeply impressed by these medical research findings."[43] However, the Ohio State report was of questionable relevance. It involved crash tests in which doped dogs were belted into a drop cage which was then sent crashing down. Autopsies revealed that the dogs, as a consequence of the fall and pressure of the belts suffered a variety of problems, including swelling of the heart, hemorrhage of the heart muscle, congestive heart failure, inflammation of the stomach, and internal hemorrhage. The tests hardly provided evidence for the injury potential of automotive seat belts for human beings. As one engineer pointed out, the tests's restraining devices were window-washer's safety belts strapped laterally across the dogs' stomachs. Another engineer intimated that Gandelot was purposely overemphasizing the role of seat belts in extreme impact and ignoring the belt's

real purpose in cutting down injuries in the larger number of moderate accidents.[44] Moreover, there was evidence that was contrary to the position that seat belts were an injury hazard. Edward R. Dye, head of the industrial division of the Cornell Laboratory, had said:

> For years the Cornell Committee for Transportation Safety Research at the Cornell Medical College has been collecting information on aircraft crashes. They have found that injury by a seat belt is so rare as to be practically non-existent.[45]

Later research bore out Dye's findings. John Moore, in testimony before the Roberts Subcommittee on Seat Belts in 1956, commented that in all the years of studying the problem of restraint, the Cornell people could see no basis for associating belts with the ability to produce injury in and of itself.[46]

It was clear to the media that GM awaited no new medical evidence or research in order to formulate its policy toward seat belts. Gandelot and Chayne had defined GM's official adversary position. Three weeks after Automotive News reported that "Chayne commented that he thought safety belts offered little promise and that GM does not plan to provide them,"[47] the journal pointedly challenged GM's position in an editorial:

> In view of the vital importance of safety considerations and all that has been said and written about seat belts, it would be unwise for automotive men to continue to pooh-pooh them. Make no mistake, it will take courage for any one company to stand alone in offering belts now.[48]

2.4 SALES RESISTANCE

While safety groups and others concerned with the safety problem recognized the desirability and value of seat belts, GM argued it was unclear that, if belts were made available, the general public would be ready to use them. To date, seat belts were in very little demand by the motoring public. The experience

of Nash Motors in the late forties was cited as evidence for the contention that the biggest barrier to seat belt use was that belts met with insurmountable sales resistance. In 1949, Nash had installed belts in 40,000 cars and reported that when it checked a year later only 1,000 had been used.[49] George Romney, in a statement before the 1957 Senate and House Subcommittee on Traffic Safety, commented concerning the industry's experience with belts at this time:

> We put safety belts on cars back in the late forties, and the public did not want them, and the dealers found that the customers wanted them taken out, and they did not want them in the vehicle.[50]

However, until 1955, there had not been a serious, well-financed and widespread education or sales effort undertaken in support of seat-belt installation and use. Indeed, much had occurred in the ensuing six years since Nash's experience to prepare the way for educating the public as to the value of seat belts. This was not to deny that much needed to be done yet to overcome widespread lack of information and misinformation.

2.5 MISCONCEPTIONS

There were misconceptions that kept belts from becoming as acceptable as their merits suggested they ought to be. Some people thought belts were dangerous. Were a driver caught in a fire or submerged in water, it was widely believed that belts could conceivably prevent a quick escape. However, according to ACIR, only two-tenths of one percent of the vehicles caught fire after an injury-producing accident; and only three-tenths of one percent of injury-producing accidents involved submersions.[51] In addition, a strong case could be made that in such situations a belted driver had a better chance of remaining conscious and hence was better able to extricate himself.

Many consumers believed belts to be uncomfortable. Cornell safety experts, however, pointed out that this need not be the case. The occupant could buckle the belt with enough slack to

allow as much as 4 inches of forward hip movement. Engineers also felt that properly installed belts gave a feeling of security to the driver and occupants. For the driver, they prevented dangerous lurching back and forth and tended to reduce fatigue by securing the driver without strain in a comfortable upright position, thereby reducing the tension of staying in place on normal stops and turns.

Another obstacle to the general use of seat belts was the consumer's fear that belts stained clothing, especially in summer when light-colored clothes and perspiring at the belt were usual. This fear was not entirely unfounded. A Consumers Union test of thirty-nine brands of seat belts available on the market in 1956 looked at, among other things, belts' color transference to other fabrics when dry and when damp with perspiration. While the test indicated that some webbing in lighter colors like beige and grey bled color only slightly, it reported that "all colors tested in all brands stained the six-fiber test fabric to some degree under both circumstances."[52]

2.6 INCONVENIENCE

Despite evidence to the contrary, many people believed that the buckling and unbuckling of a belt each time they entered and exited their cars was more trouble than it was worth. It was felt that to constantly fasten and unfasten a seat belt would be time-consuming. However, most seat belts equipped with quick release buckles could be fastened in about two seconds and released with a flick of the wrist. When Consumers Union tested thirty-nine brands of belts on the market for ability to release quickly and easily, only three of the thirty-nine brands failed to open satisfactorily.[53]

2.7 COST

The matter of cost was a substantial obstacle to consumer acceptability. Seat belts were expensive. Ford seat belts cost approximately $30.00 for a set of two for the front seat, installed.

If the belts were not ordered with the car and financed along with other options, seat belts could be expensive. In a Consumers Union list of acceptable belts available on the aftermarket in 1956, list prices for individual belts ranged from $4.95 to $17.00, with the average about $10.00.[54] This was a significant investment when one multiplied the price by the number of passengers in one's car. Furthermore, these prices did not include installation.

2.8 INSTALLATION

Installation was also a problem. Seat belts, besides being an expensive accessory, were a nuisance to install and required a lot of obstructing hardware. Labor time ranged from 2 to 3 hours. New car dealers at the time installed belts, Ford charging $12 per pair for installation and Chrysler and American Motors charging $10 per pair. Garages installed belts as well, but it took two hours of a mechanic's time to drill through the car's floor pan, to hook up an eye bolt with a reinforcing plate, and to secure it with a lock washer and nut. Many seat belt manufacturers encouraged do-it-yourself installation. While there was no major reason an experienced home mechanic could not properly install belts, the car owner had to be careful because structural variations in car models made installation difficult and, in some cases, dangerous. For example, the front seat design of the 1956 Chevrolet and Buick was such that a belt, in passing up from the floor anchorage to the seat, had to cross sharp metal edges at the seat base. Unless the home mechanic took time to bend and to cut out some of this metal, it was possible the metal edge would shear the belt's webbing.[55] Furthermore, it was dangerous for the home mechanic to drill through the car floor because of the possibility of damaging fuel lines or the exhaust system.

2.9 STANDARDS

There was also a problem of standards. Although belts had been used in aircraft since the early decades of the century, there were no standards for the manufacture or installation of

automobile seat belts. As of late 1955 and early 1956, the issue of a proper set of standards or specifications for auto seat belts was still not resolved. During this time the number of safety belt manufacturers had increased from eight to thirty-six, the new manufacturers introducing a sizable increase in the kinds of belts offered to the consumer. On November 30, 1954, the American Standards Association (ASA), 43 belt manufacturers, and insurance, safety, and auto industry representatives met at the request of the Association of Casualty and Surety Companies in order to begin work on a set of standards. Although the ASA held three subsequent meetings with most members agreeing on the necessity of the ASA's establishing standards, two organizations, the Society of Automobile Engineers and the Automobile Manufacturers Association, still under GM's direction, did not believe the project should be initiated.

The GM-dominated AMA told the Standards Association that "it would be premature and not a productive expenditure of time and effort for the ASA to call a general conference on this subject in the immediate future."[56] The reason the AMA gave for its opposition to ASA's setting standards was that such work would duplicate the efforts of the Society of Automotive Engineers, although the AMA conceded that SAE's work would not be completed until the late fifties. The AMA's opinion prevailed, so that when the issue was eventually submitted to the Highway Traffic Standards Board of the ASA for a ballot vote, it was decided that there was not a consensus of opinion in favor of an ASA standard, and the project was dropped.[57]

In November 1955, the SAE published recommendations for seat belts with specifications based on the old CAA standards and the available information from crash studies conducted by universities and car manufacturers, as well as product development and testing by seat belt manufacturers.[58]

There was real need for standards. The year before Ford's safety promotion in 1956, there were about eight automotive accessory manufacturers and parachute harness producers making

belts.[59] When automakers began offering belts as optional equipment in 1956, the number of manufacturers jumped to 125.[60] Seat belts were relatively new to and untried by the consumer and many kinds were being put out quickly on the aftermarket. Belts were available retail, wholesale, and by mail order, in a variety of models, ranging in price from $4.79 (Sears model 643) to $18.95 (Tulareloft's model 500 belt). Since the purchaser could not readily ascertain by inspection a belt's quality or adequacy, there was a clear need for a recognized set of standards and specifications to protect the consumer.

Safety engineers generally agreed that a belt had to be wide enough (at least 2 and no more than 4 inches) to be comfortable and to minimize injury. The seat belt had to be strong enough to restrain the individual. CAA recommendations required closed buckle and seat assemblies to have a tensile strength of at least 3,000 lbs. Many of the belts on the market came in different kinds of webbing material - cotton, nylon, rayon, and various combinations of these materials. No evidence had proved a clear case for one material over another. Buckles were of two kinds: the "cam" type, through which a strap was passed, and the metal-to-metal buckles which clipped together. Engineers felt that a good buckle should remain fastened under a 3,000 lb. load and then release upon hand pressure with a force of no more than 45 lbs. Finally, a good belt should be securely anchored to the automobile so that when a load was applied, the belt would not tear out of its moorings. The cardinal rule of installation was that belts should never be attached to the seats. Beyond that methods varied widely. In one case, cables attached to the back of the front seats to receive the straps. In another, the belts were anchored through the car floor and into the crown of an inverted reinforcing "hat" beneath. Other belts anchored to the floor only, using a metal bar and washer for strengthening.[61] Without any definite specifications for automobile seat belts, most automobile safety engineers looked toward the CAA set of standards, adopted by the CAA on July 1, 1950, for belts used on civil aircraft. The CAA

set standards for material strength, durability, adjustment slippage, the buckle mechanism, and webbing width. Ford, Chrysler, and American Motors, none of which waited for the SAE committee to complete its report, offered belts in 1955 that conformed to CAA's standards.

However, early in 1956, Consumers Union bought 39 brands of seat belts available on the aftermarket and put them through a series of tests devised by the Cornell Aeronautical Laboratory. The belts ranged in price from $4.95 to $15.95 with most brands in the $7-$11 bracket. Two-thirds of the 39 belts tested failed to meet minimum performance standards. The types of failure that occurred under test conditions included broken buckles, torn stitching, webbing failure at door bracket, floor bracket rupture, web slippage due to anchorage deformation, and ripped metal sleeves. CU's results were particularly disturbing because among the 26 brands judged "not acceptable" were belts offered as optional equipment on Chevrolets, Pontiacs, Studebakers, and Packards.[62]

2.10 THE MID-FIFTIES: THE CRUCIAL YEARS

1955 was a critical juncture for the auto industry with regard to seat belts and the safety issue as a whole. At stake was whether or not progress in auto safety was going to be based on competition in the marketplace or would come as a result of government regulation. The technology had been developed and its potential benefits communicated to Detroit by the various research projects. There were problems, but none was insurmountable. It was clear that the issue of seat belts and safety was political. Many safety advocates had already appealed for government regulation. In this context, Ford's decision to offer a special "safety package" for its 1956 cars was highly significant.

3. THE FORD SAFETY CAMPAIGN

3.1 THE 1956 FORD

Ford's early safety research, directed by Haynes and Platt, led to the development of the "safety package" for 1956 model-year cars. The package included new door latches with hardened steel plates that engaged the lock to prevent the door from being sprung open in a crash; seat belts anchored securely to the car's structure; crash cushioning above the instrument panel and in the sun visors; deep-well steering wheels, with the hub of the steering post six inches below the rim of the wheel so that on impact the wheel would collapse slowly, absorbing most of the pressure; and rearview mirrors that had plastic backing to reduce the possibility of the glass flying out when shattered. The door latches, steering wheels, and rearview mirrors were standard equipment on all Ford cars. Optional were the belts and crash pads, supplied at cost by Ford. Retail prices were $25 for belts and padding, and $16 for padding alone.[63] Aware of the public's lack of education about the benefits of seat belts and unsure of the consumers' response to belts, Ford did not offer belts as standard equipment. The economic risk was great: seat belts cost the auto manufacturer about $5 per belt. Five belts per car cost $25. Ford anticipated total auto sales in 1956 to be over 1.5 million cars. This would mean an investment of more than $37.5 million dollars toward a safety device the public was not educated to use.

Ford calculated that its safety package could reduce crash injuries 35 to 50 percent.[64] Moreover, Ford believed that the general adoption of seat belts in all motor vehicles would alone reduce annual deaths in accidents from 40,000 to 20,000 and injuries from 1,800,000 to 500,000.[65]

3.2 FORD's ADVERTISING CAMPAIGN

Robert McNamara, who had become a Ford vice-president in 1955, assigned Ford's public relations department the responsibity of developing a massive promotional campaign in cooperation with the J. Walter Thompson advertising agency.[66] The week of September 24, 1955, Ford introduced its 1956 model-year car. In the promotion preceding the new model introduction, Ford departed from the industry's traditional advertising pattern of emphasizing style and performance to sell safety as a theme. On September 18, six days before the new models were to appear, Ford, in a number of full-page advertisements in leading daily newspapers and popular magazines, announced: "Coming Friday, the first major contribution to your driving safety - Ford Lifeguard Design."[67] The advertisements emphasized Ford's safety door latches, safety rearview mirror, deep-center steering wheel, and optional seat belts and dashboard padding. Ford's promotion was indeed a bold, unprecedented step. At no time in automobile advertising history had the general theme of safety been advertized or funded as a major selling point.

Ford's advertisements on introduction day featured an amalgam of themes - "Thunderbird" styling, high performance, and "Lifeguard" safety design. The Ford Division, as well as Mercury and Lincoln, had adopted campaign plans that called for an advertising mix made up of approximately equal parts of emphasis on stlying, safety, and performance. In order to cover the new promotional costs, Ford increased its total advertising budget by 30 percent to $21,792,797 and set aside one-third of this budget for promoting safety.[68]

In the ensuing two months, Ford launched an intensive promotional campaign stressing the new safety features. Newspapers and popular magazines advertised Ford's "Lifeguard" design. In the early fall, Ford, in a national television special it sponsored, had the new models introduced for the first time by Cornell's ACIR director, John Moore. In addition, Ford issued bimonthly borchures filled with comparative crash pictures of Fords and

Chevrolets which were sent to dealers for showroom display. Many of Ford's advertisements pointed out that the 1956 model incorporated design suggestions made by the American College of Surgeons. Ford also arranged live television tests of the strength of seat belts in which a crane lifted the car off the ground by hooking into the seat belt.[69] Ralph Nader summed up Ford's promotional strategy during this period in this way:

> Ford ads conveyed the undiluted message that when their cars got into crashes the new safety features not only would help diminish the new owner's injuries, but would do so in ways superior to their competitors' cars.[70]

It was obvious that Ford was using safety as a major selling point, and there was evidence that Ford's safety advertising met with good public reaction. One national survey conducted a month after the new models came out showed that almost 60 percent of all car owners understood what the safety package was designed to do and associated it with the Ford Motor Company.[71] A second survey taken at the Chicago Automobile Show revealed that 31 percent of those who indicated that they would like to buy a Ford gave safety as their major reason.[72]

In contrast to Ford, GM's Chevrolet Division employed the industry's traditional promotional campaign, advertising its car as "the hot one's even hotter." GM stressed added horsepower, better performance and new styling.[73] Moreover, Chevrolet had invested heavily in performance and racing cars that year and had started a series of wins at a number of well-known stock car races. In their promotion of the 1956 model-year cars, Chevrolet's advertising department made these wins a central theme.[74] The issue of safety was not a factor in Chevrolet's early advertisements.

GM's promotional campaign was consistent with the industry's trend toward larger and faster cars. White points out that between 1949 and 1959, low, medium, and high price makes grew in size, weight, horsepower and speed.[75] The "horse power race" had begun with the recent development in the late forties of high-

compression V-8 engines. The new engine produced big increases in power; one notes in Figures 1 and 2 the sharp increase in horsepower from 1950 through 1957 in most car models. Table 1 documents the increases in horsepower and cubic-inch displacement of engines for various car models in 1954 through 1957. Competition for sales during this time was not based on sound engineering and safety, but on the relative appeal of body styling and performance.

There were indications, however, that safety, like styling and horsepower, had become - at least temporarily - a hotly competitive and highly salable product. After Ford launched the safety theme as part of its 1956 introductory promotion, the competition, including GM, followed suit, putting more time, space, and effort into their safety features. With regard to seat belts, GM earlier had taken the position that it would not offer them. By late fall 1955, it decided to go along with the rest of the industry and offer belts as optional equipment.[76] Ford's advertising commitment to safety had forced its competitors to address themselves to the safety issue and to adopt sales strategies with some emphasis on safety.

One common explanation for Ford's safety campaign was that McNamara was promoting safety in order to bolster the declining sales of a Ford model-year that offered little in the way of styling changes relative to its competitors.[77] Ford was anticipating a disastrous sales year. GM had substantially restyled its Chevy line, while Ford had hardly altered its cars from 1955.[78] The GM changes were mostly cosmetic, including a new paint and trim treatment, interior decorating, wider grilles, hood front fenders and rear quarter panels. GM also offered an impressive array of 20 models - the widest model selection in the company's history - including a completely restyled Corvette sports car. McNamara, realizing Ford did not compare with the rakishly styled Chevrolet, enthusiastically supported the "safety package" as one way to mitigate Ford's anticipated heavy losses in its sales battle with GM.

There was also much to suggest that McNamara was genuinely interested in selling safety for its own sake. He shared many of

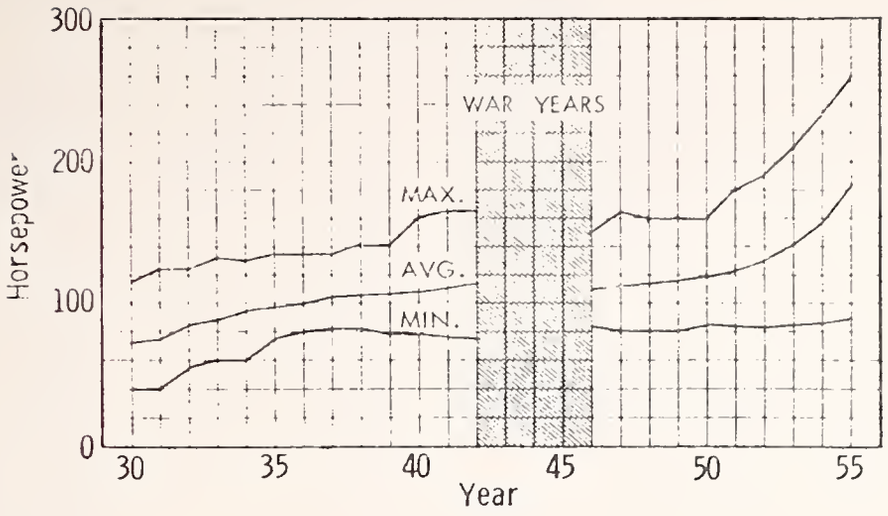
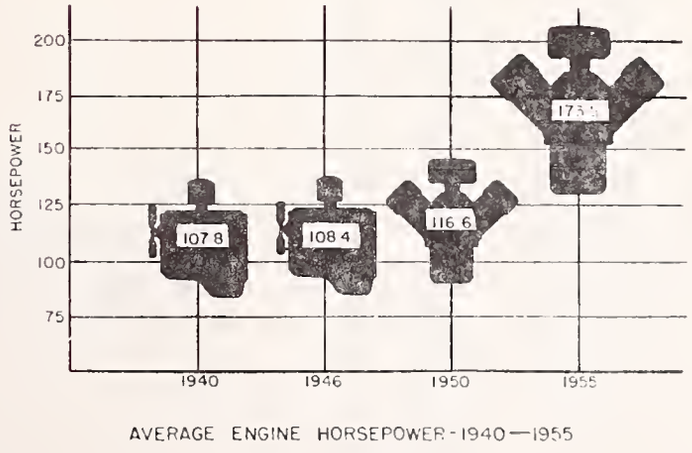


FIGURE 1. HORSEPOWER TREND: 1930-1955



Source: GM Research Laboratories, cited in Automotive News (1956 Almanac Issue), p. 20.

FIGURE 2. AVERAGE ENGINE HORSEPOWER: 1940-1955

TABLE 1. CHANGES IN HORSEPOWER AND CUBIC-INCH DISPLACEMENT FOR VARIOUS CAR MODELS: 1954-1957

	Horsepower * 1955	Horsepower * 1954	Displacement Cubic Inches 1955
PACKARD	260	212	352
CADILLAC	250	230	331
IMPERIAL	250	235	331
CHRYSLER	250	235	331
CLIPPER	245	165	320
BUICK	236	200	322
LINCOLN	225	205	341
NASH	208	140	320
HUDSON	208	170	320
OLDSMOBILE	202	185	324
DeSOTO	200	170	291
MERCURY	198	161	292
DODGE	183	150	270
PONTIAC	180	127	287
STUDEBAKER	175	120	259
PLYMOUTH	167	100	260
FORD	162	130	272
CHEVROLET	162	125	265
KAISER †	140	140	226
WILLYS	115	115	226
RAMBLER { Hudson / Nash	90	85	196

	Horsepower* 1956	Horsepower* 1955	Displacement Cubic Inches 1956	Displacement Cubic Inches 1955
Packard	310	260	374	352
Cadilloc	305	250	365	331
Lincoln	285	225	368	341
Imperiol	280	250	354	331
Chrysler	280	250	354	331
Clipper	275	245	352	320
Studeboker—President	195	175	289	259
Golden Howk	275		352	
Buick	255	236	322	322
DeSoto	255	200	330	291
Oldsmobile	240	202	324	324
Pontiac	227	180	317	287
Mercury	225	198	312	292
Hudson	220	208	352	320
Nash	220	205	352	320
Dodge	218	183	315	270
PowerPok	230	193	315	270
Ford	200	162	292	272
Thunderbird	225	198	312	292
Plymouth	187	167	277	260
PowerPak	200	177	277	260
Fury	240		303	
Chevrolet	170	162	265	265
PowerPak	205	180	265	265
Corvette	225	195	265	265
Rambler	120	90	196	196

* Highest-Powered Standard Models.

	Horsepower 1957	Horsepower 1956	Displacement Cubic inches 1957	Displacement Cubic inches 1956
Buick	300	255	364	322
Cadilloc	300	305	365	365
Chevrolet	185	170	283	265
Chrysler	325	280	392	354
DeSoto	295	255	341	330
Dodge	260	218	325	315
Ford	212	200	292	292
Hudson	255	220	327	352
Imperial	325	280	392	354
Lincoln	300	285	368	368
Mercury	290	225	368	312
Nash	255	220	327	352
Oldsmobile	277	240	370.7	324
Packard	275	310	289	374
Plymouth	215	187	301	277
Pontiac	244	227	347	317
Rambler	190	120	250	196
Studebaker	210	195	289	289
Golden Hawk	275	275	352	289

Source: Automotive News (1955 Almanac Issue), p. 18. Automotive News (1956 Almanac Issue), p. 20.

Alex Haynes's attitudes toward the safety issue, believing that the problem of automobile injuries was serious and that the industry had a social responsibility to do all it could to remedy the problem.[79] McNamara, known to be highly critical of the industry's emphasis on speed, horsepower, and racing, initially met with stiff resistance to his safety advocacy among many of the older Ford and former GM executives at Ford.[80] These men shared the belief that references to and concentration on the issue of safety or the possibility of accidents was detrimental to sales.[81] In selling them on this proposal for the adoption and promotion of safety devices, McNamara pointed to Cornell's ACIR reports and various other studies.[82] He also argued, with much foresight, that if the industry did not voluntarily step in on the safety issue, the government would shortly intervene.[83] McNamara's arguments were persuasive, and he won approval for his safety proposal.

Chevrolet took an early lead in the sales race. Ford's competitive position, however, was strong until late December 1955 when GM began to surge ahead. At this point, Ford apparently began an examination and reevaluation of its entire sales effort, including its advertising campaign. Ostensibly because of Ford's change in competitive position, Ford's top management in late January ordered the public relations department to deemphasize the safety theme and to promote performance and styling.[84] New advertising programs were developed without the safety theme and were quickly introduced in March. By late summer, Ford advertisements made no mention of safety and highlighted styling, horsepower and speed. While sales picked up later in the year - as was usually the case with the industry - Chevrolet for the remainder of the season maintained its substantial lead. The following year Ford, while retaining the safety package, did not introduce any new safety features and returned to the industry's traditional selling approach emphasizing styling and performance.

Declining sales were the reason given by Ford executives for scrapping the safety campaign. The implicit rationale was that

safety hurt sales. But it is not at all clear that the safety campaign was responsible for Ford's sagging sales. Instead of hurting sales, the safety campaign, according to some Ford Division officials, had helped in a bad sales year to sell about two hundred thousand more cars than expected. It had been an important fact, some Ford executives felt, in preventing a disastrous sales year.[85]

When compared to the previous year, it was a generally poor sales year for the entire industry. Automakers had turned out about 6,084,316 units in 1956, 1,046,109 less than in 1955. While sales declined for the industry as a whole, market penetration for each manufacturer remained about the same. By February 1956, Chevrolet's new passenger car registrations for the preceding months were only 72,000 units greater than Ford's. GM's market share, based on monthly registrations of new cars, was 53.5 percent. Ford's proportion hovered around 27 percent.[86] By the model year's end GM's proportion was approximately 51 percent while Ford's share was about 28.5 percent. (See Table 2.) These market proportions between Ford and GM as a whole did not vary greatly from market penetration of the previous two years.

TABLE 2. NEW CAR REGISTRATIONS IN THE U.S.

	1956	1955	1954
GM	50.8	50.8	50.7
Ford	28.4	27.6	30.9
Chrysler	15.5	16.8	12.9
AM	1.9	1.9	2.1

Source: Ward's Automotive Yearbook, Robert B. Powers ed., Detroit, 1957, 19th edition, p. 129.

Ford's factory sales of passenger cars in 1956 were 1,668,340, a decline of 25.5 percent from sales in 1955. But this decline was not necessarily related to the safety issue. Overall industry factory sales were down 26.6 percent.[87] For this poor sales year,

GM dropped from 3,669,120 units in 1955 to 3,024,286 units in 1956.[88] Additionally, it must be noted that Ford's market share in the years 1954 and 1955 was inflated. (See Table 3.) Between 1953 and 1954, Chrysler lost almost 50 percent of its market share; Ford captured a large portion of this loss. Aside from 1954, 1956 was Ford's highest market share in all sales years since 1928.

TABLE 3. MARKET SHARES FOR AUTOMOBILE MANUFACTURERS: 1946-1957

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Ford	21.9	21.1	18.82	21.3	24.	22.16	22.8	25.1	30.8	27.6	28.4	30.4
Mercury						4.6	4.5	5.	5.9	5.2	4.6	4.35
Ford						17.	17.6	19.45	25.3	21.9	23.1	25.
Lincoln						.5	.7	.68	.65	.49	.72	.62
Chrysler						21.8	21.3	20.3	12.9	16.8	15.5	18.3
GM						42.8	41.7	45.1	50.7	50.7		
Chevrolet						21.8	20.5	23.4	25.6	22.8	26.3	24.3
Oldsmobile						5.4	5.2	5.3	7.3	8.22	7.35	6.2
Pontiac						6.7	6.4	6.7	6.4	7.4	6.2	5.3

Source: L. White Appendix.

Other explanations were suggested for Ford's withdrawal of the safety campaign. A number of critics believed GM used its influence with ex-GM Ford executives and the old guard at Ford to pressure McNamara into ending the safety campaign.[89] Nader writes that in December 1955, a GM executive, acting with the approval of Harlowe Curtis, called Walker Williams, Ford's vice-president of sales, to express GM's strong disapproval of the safety campaign.[90] Nader also writes that GM executives appealed to Ford's chairman of the board, Ernest Breech, one-time chief financial officer for GM; Dale Harder, Ford's head of manufacturing, who had held a similar position at GM; and Louise Crusoe, executive vice-president of the car division, who was formerly with GM's collision division.[91] GM's position in these appeals was that the safety issue damaged the consumer's attitude toward driving in general and was thus detrimental to industry sales as a whole. As Nader writes:

> Ford was taking the romance out of cars, injecting collision, and casualties and other unpleasantness into the motorist's decision about which car to purchase.[92]

GM, disturbed by this threat, used its influence as industry leader and acted successfully to put a halt to Ford's safety campaign.

Whatever the reasons behind Ford's quick change of heart on the safety issue, the consequences were staggering. Ford's support for safety had been unprecedented in the industry's history. It came at a time when there was mounting pressure on the automakers to recognize legitimate social needs and to voluntarily act on them. Ford's safety campaign was significant in this context because it meant that competitive forces in the marketplace could bring automakers to innovate in designing cars which reduced automotive deaths and injuries. As one writer puts it:

> Ford's safety campaign was the beginning of an historic, market-propelled shift of auto safety engineering advances fully ten years before the passage of the Federal Auto Safety Act of 1966.[93]

However, Ford's reversal set back the safety movement for years. It would delay action on auto safety for almost another decade. The attendant toll on lives and property is incalculable. Using Ford's estimates, the ten-year delay in adopting seat belts resulted in 200,000 unnecessary deaths. Furthermore, Ford's reversal had the effect of solidifying the industry's adversary position on safety and is conceivably responsible for bringing about government regulation.

3.3 IMPLICATIONS OF WITHDRAWAL

After Ford's switch in early 1956, the industry and its supporters perceived the safety package as a sales failure. Consequently, Ford's experience became a symbol for the industry's argument that "safety doesn't sell." Comparing it to Nash's disastrous experience with seat belts in the late forties, industry

spokesmen saw in Ford's safety package proof of consumer indifference to and rejection of safety devices.

For the seat belt movement Ford's reversal was an especially heavy blow. The advantages of seat belts had been well established. There were no technical or cost barriers to adoption. The major barriers to their installation and use were consumer indifference, lack of information, and misconceptions. Small suppliers and seat-belt manufacturers lacked the resources to overcome these barriers. As yet, the government was not involved in the safety issue, preferring to leave safety to the mechanisms of the marketplace. In this context, Ford's work on and support of seat belts was important. Ford had the resources and ability available to a major automaker to become a strong and efficacious advocate for safety, to educate the public, and to create and shape demand for new and untried devices like seat belts.

Was, as the industry argued, the safety package unsalable, little in demand by motorists, and detrimental to Ford sales? Were seat belts overwhelmingly rejected by the consumer? Despite the industry's position, Ford's experience in fact proved the contrary. Safety seems to have been very marketable and seat belts were very much in demand. In a press release by the Ford Division dated November 18, 1956, under a section entitled "Public Will Buy Safety," Ford stated:

> Since two of the five features - crash padding and seat belts - were optional with the customer, it is possible to measure demand by totaling up the number sold. No optional feature in Ford history caught on so fast in the first year. For example, 45% of all 1956 Fords were ordered with safety padding. When tinted glass was first introduced in 1952, only 6% of the customers wanted it. Even Fordomatic (automatic transmission), one of the most popular options, was ordered by only 25% of the customers when it was introduced in 1951. Power steering, introduced in 1953, was ordered by only 4%. During the first year, one of every seven buyers ordered seat belts. [emphasis added][94]

To Ford's surprise, a substantial number of consumers demanded safety features. Moreover, McNamara in 1957 released questionnaire data demonstrating that 14 percent of Ford purchasers in 1956 indicated that safety was their most important motive in selecting the Ford car.[95]

Seat belts were indeed very salable. McNamara, testifying before the Roberts Subcommittee of the House of Representatives in the summer of 1956, explained that there was an acute shortage of belts after Ford introduced them on its 1956 model. Seat belt popularity caught the company by surprise. As McNamara testified:

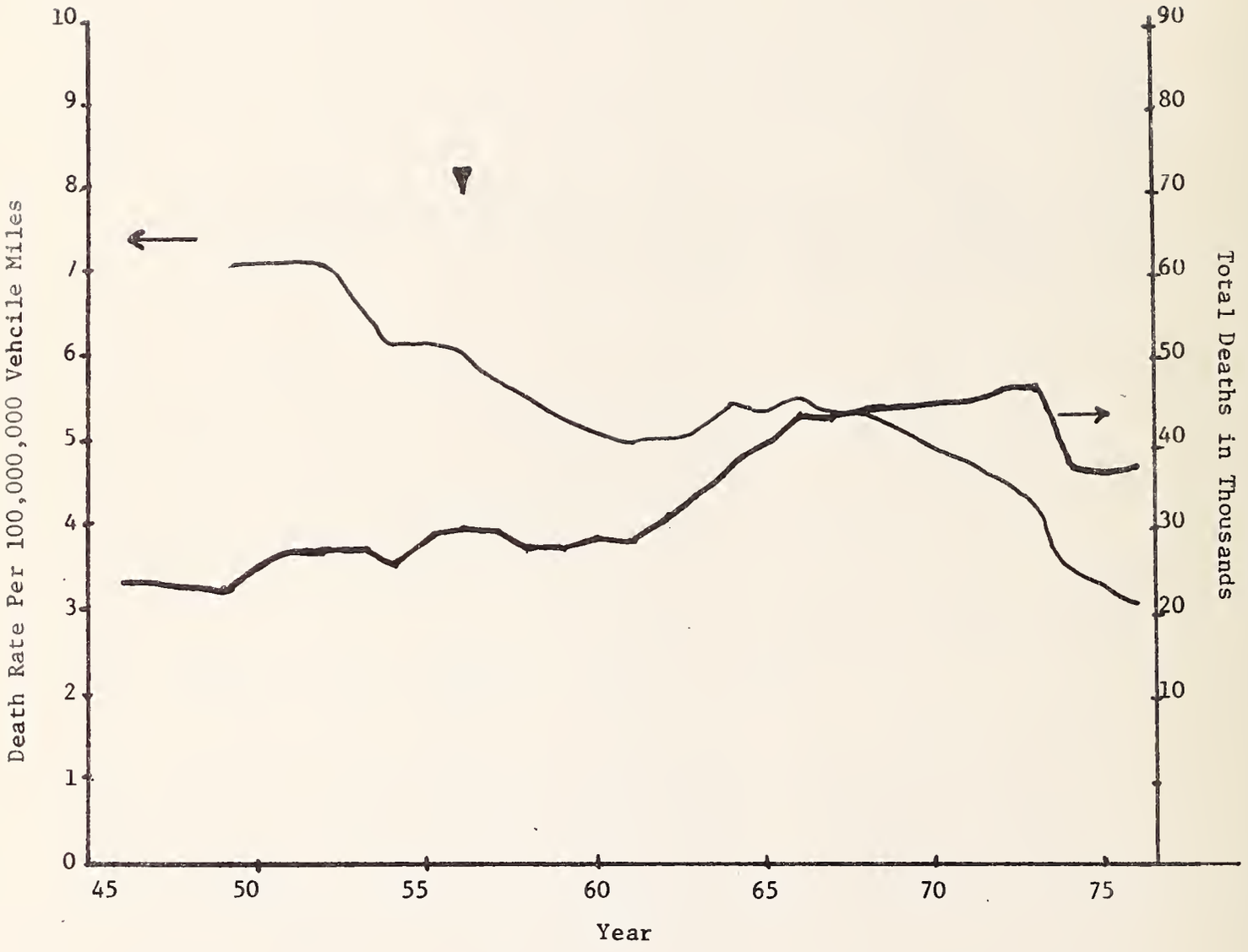
> ...the demand from the public far exceeded our expectations. The manufacturers of seat belt buckles up to that time were, of course, manufacturers who previously had directed their efforts toward supplying the aircraft market. All of a sudden, instead of supplying 50 belts a month, or 50 buckles a month, we demanded 1,000 buckles a day. The result was that it was impossible for us to supply our dealers with stocks adequate to meet the demand at that time. (emphasis added][96]

11.2 percent of Ford's 1956 models were ordered with seat belts.[97]

3.4 INDUSTRY'S TOTAL SALES OF BELTS IN 1956

It is more difficult to determine the exact number of seat belts purchased with the industry's total sales of 1956 cars because at some companies belts were factory-installed, and at others were dealer-installed. One must also recall that seat belts were provided by automakers as optional equipment. It is likely that not more than 5 to 7 percent of the 1956 model-year car buyers purchased belts.[98] This would indicate approximately 304,215 seat belts were sold. Ford Division, the foremost proponent of belts, reported that about 11 percent of its 1,468,730 customers asked for seat belts. Studebaker sold belts to 4.7 percent of its 3,827 customers, and Ford's Lincoln Division sold 2,526.[99] Most other company figures were below these.

There was evidence, too, that safety features on the 1956 cars had cut down substantially on injuries due to automobile accidents. According to the Cornell University Medical School researchers, subsequent studies of thousands of accidents involving 1956 Fords showed that door openings were reduced up to 60 percent; chest injuries were cut in half by the safety steering wheel; and safety belts were 60 percent effective in reducing injuries.[100] In the following graph (Figure 3) of death rate per 100 million vehicle miles, one notes the sharp decline in the rate during the years immediately following Ford's safety campaign. These results prompted John Moore of the Cornell study to point out that if all cars, old and new, had the safety features, each year a half-million people would escape injury and many of those now killed would suffer only minor injuries.[101]



Source: Motor Vehicle Facts and Figures, 1977, Motor Vehicle Manufacturers Association, Detroit, Michigan

FIGURE 3. TRAFFIC FATALITIES AND RATES

4. SUMMARY

Source of Innovation

The aircraft industry was responsible for the development of belts and much of the research relating to injury, deaths and accidents.

Advocates

Early advocates of seat belt use and installation included safety researchers and engineers, as well as the medical profession which by 1955 had concluded that properly engineered seat belts would reduce deaths and injuries.

Barriers to Adoption

In 1955, there were a number of barriers to the adoption of seat belts including poor design, high cost, installation problems, the lack of a sales or consumer information effort, and the lack of a consistent set of standards. Moreover, consumers held certain misconceptions which prevented easy adoption. Among these misconceptions were that a passenger in an accident stood a better chance of surviving if ejected from the car; that belts would fatally lock in a passenger in accidents involving submersion or fire; and that belts were uncomfortable, hard to use, and damaging to clothing.

Role of Corporate Personality/Advocates and Adversaries

Seat belt adoption was at the center of a hotly contested, behind-the-scenes controversy over safety within the automobile industry. Ford had concluded that seat belts, along with a number of other safety innovations, could substantially reduce the number of highway injuries and deaths. With the support of Robert McNamara, vice-president of Ford Division, and Alex Haynes, chief safety engineer, Ford undertook a program to sell safety. This program strongly backed seat belt use. By contrast, GM consistently contested the value of belts, tried to minimize their importance for the industry, and attempted to discourage their adoption. The

chief formulators of GM's policy toward safety and, in particular, seat belts were C.A. Chayne, GM's engineering vice-president, and Howard Gandelot, GM's safety engineer.

Market Pull

Despite industry claims that "safety did not sell", and that seat belts invariably met with stiff sales resistance, Ford discovered that belts were extremely attractive to customers. Indeed, Ford found that one out of every seven buyers of new cars ordered belts. The demand from the public far exceeded Ford's expectations.

Implications of the Case

Ford's reversal on the 1956 safety campaign set back the safety movement for years, delaying action on auto safety for almost aonther decade. For the seat belt movement Ford's reversal was a particularly heavy blow. The advantages of belts had long been established. There were no significant technical or cost barriers to adoption. The major barriers to belt installation and use were consumer indifference, lack of information, and misconceptions. Unlike small seat belt suppliers, Ford had the resources to overcome these problems. It is conceivable that Ford's change of heart is responsible in part for bringing about government regulation of the industry.

APPENDIX A

TEXT FOOTNOTES

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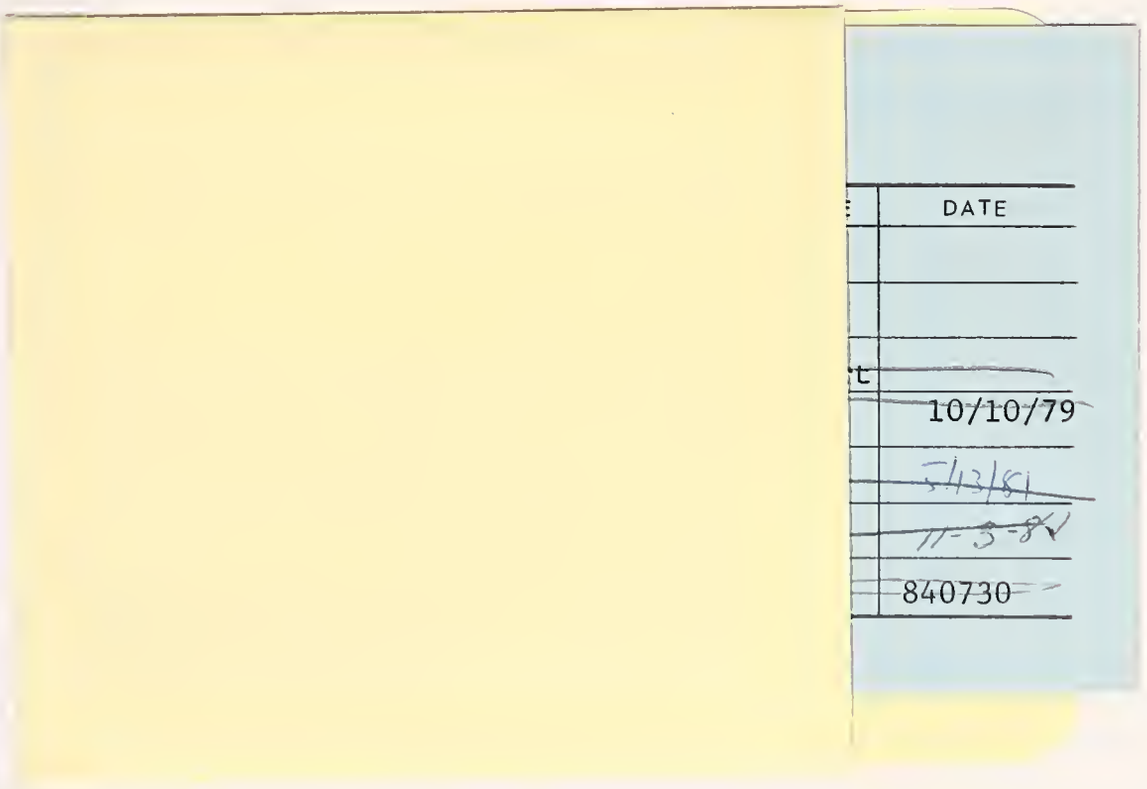
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