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Seat Belts
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SEAT BELTS

1. Seat Belt Standards Issued, Safety Standards. Bur. of Labor Statistics, U. S. Dept. of Labor (U.S. Govt. Print. Office, Washington, D. C. 20402) Vol 14, No. 2, p. 10, March-April 1965.

The U. S. Department of Commerce recently announced the publication of standards for motor vehicle seat belts. The action was taken to meet the requirements of Public Law 88-201 which directed the Department to issue standards "to provide the public with safe seat belts so that passenger injuries in motor vehicle accidents can be kept to a minimum." The detailed standards, published in the Federal Register of Dec. 11, 1964, cover three types of seat belt assemblies: a lap belt, a safety harness for adults, and a safety harness for children. The technical work for the standards was done by the National Bureau of Standards in cooperation with the Society of Automotive Engineers and an ad hoc committee of representatives of interested Federal agencies. The standard is essentially the same as SAE Standard 54 b.

Beginning Dec. 11, 1965, the manufacturer, sale, or transportation in interstate commerce of seat belts which do not meet the standards will be unlawful. Proposed additions were to be published in the Federal Register for public comment about April 1, 1965. It is expected that a dynamic test simulating collision will be included in the seat belt specifications which at present are based on static tests.

2. Seat Belt Utilization, Arthur Stern, Automotive Crash Injury Research, Cornell Aeronautical Laboratory, Inc. (P. O. Box 225, Buffalo, N. Y. 14221), Bulletin No. 8, Jan. 1966, 7 pp.

The present report reviews ACIR seat belt usage date for cars well over ten years old up to 1965 models, thus covering both the period of optional seat blet installation and that during which belts become standard equipment. Therefore, it is possible to check numerically the opinion held in some quarters that seat belt usage decreases disastrously as soon as installation is mandatory. Seat belts have become available to so many that the net usage rate (percentage of all occupants using the belt) has displayed a sharp increase in spite of the fact that the usage (percentage of all seat belts actually used) has decreased.

Since in new cars the occupants have available the potential protection of a seat belt, the need of promotion of actual use of the belt is now greater than ever. The tragedy of death is so much more grim if an unused seat belt is lying there.

3. Investigation and Testing of the Car Safety-Belt Under Accident-Like Conditions by Means of the Drop-Weight Test, A. Slattenschek, W. Tauffkirchen, and H. Tur. Materialprufung (VRI Verlag GmbG, 4 Dusseldorf, 10, Germany), Vol. 8, No. 1, pp. 19-30, Jan. 1966. (In German).

A method is described which, by a suitable combination of calculation and experiment, permits a drop-weight test of automotive safety belts under accident-like conditions. Because the drop-weight test is simple to carry out and can be reproduced at will, the method might particularly be suited for a standardized dynamic belt test. Suggestions for establishing such a standard are given.

4. Standards for Safety: Seat Belts, Magazine of Standards (10 E. 40th Street, New York 16, N. Y.), Vol. 34, No. 1, pp 12-13, January 1963.

Nationwide safe-driving campaigns that urge the use of seat belts now are strengthened by a certification program identifying seat belts equipment that meets standard performance requirements. According to the American Seat Belt Council, 68 models of seat belts have been granted the Council's Seal of Approval on the basis of standard tests. The tests, carried out by an independent testing laboratory, have shown that these 68 models meet the performance requirements specified in the Society of Automotive Engineers' standard, Motor Vehicle Seat Belt Assemblies SAI J4-1961. The Council's red, white and blue Seals of Approval are now beginning to appear on belts offered for sale.

Under the Council's certification program, tests are made periodically and on a continuing basis on samples selected at random at members factories or purchased on the open market.

The SAE standard spells out performance requirements for lap-type seat belt assemblies and specifies laboratory test procedures. It should be noted that the tests specified in the SAE standard and used by the testing laboratory on behalf of the American Seat Belt Council do not offer any assurance concerning the strength of the installation in the car itself. As pointed out in the SAE standard, generally a test of an installation in a car is necessary to determine the adequacy of the reinforcing plates. "For recent models," the standard points out, "data on tested anchorage installations can be obtained from the vehicle manufacturer." In those States which require the use of seat belts, it is expected that the motor vehicle authorities will include requirements and testing for seat belt installation as well as for the belts themselves.

Four States now have laws requiring the use of seat belts--all of them different requirements. In these States, the Council's Seal of Approval is not considered sufficient guarantee of adequate performance, it was pointed out.

Recognizing the difficulties involved if the trend toward varying and conflicting States standards continues, the American Seat Belt Council has engaged a legislative consultant who presents model legislation to the States for consideration before any new law is adopted, representatives of the Council explained.

Research is now being undertaken to prepare performance requirements for children's harnesses. The American Seat Belt Council has announced award of its first research grant to the Institute of Transportation and Traffic Engineering, University of California for this purpose.

5. Michigan, Third to Pass Seat Belt Law, Today's Traffic (National Safety Council), Vol. 10, No. 12, p. 1, December 1955. Highway Research Abstracts, March 1956.

On November 10th, 1955, Michigan became the third state to enact seat belt legislation. The new law reads as follows:

"No person shall sell, offer or keep for sale, or install for use in any motor vehicle to be operated on the highways of this state, any safety belt, safety restraining device, or attachments thereto as referred to in this section, unless of a type conforming to standards and specifications established by rules and regulations which have been established by the commissioner of Michigan State Policy."

Illinois and California have also enacted legislation regarding seat belts.

6. Human Decelerator Which Duplicates Crash Landings Tells How Much Stopping Force Man Can Withstand, Central Air Documents Office. Technical Data Digest, Vol. 15, No. 2, February 1, 1950. Highway Research Abstracts, March, 1950.

The Air Materiel Command's Aeor Medical Laboratory has devised a new human deceleratory which is expected to increase crew members' chances for survival after an aircraft crash. The device scientifically duplicates crash-landing conditions.

Early experiments have given aero medical scientists much information previously unobtainable. They now have a good idea of exactly how much decelerative force a man can withstand, safely. This decelerative force is similar to the tendency to hurl forward in an automobile when the brakes are applied at high speed. In crashing airplanes, the hurling-forward effect is naturally much greater.

The decelerator was built under Aero Medical Laboratory supervision by Northrop Aircraft, Inc. of Hawthorne, Calif., and has been installed at Edwards (formerly Muroc) Air Force Base. It consists primarily of a 1500 lb. carriage slipper-mounted on a 2000 ft standard gage railway track supported on a heavy concrete bed, and a 45-ft. mechanical braking system believed to be the most powerful ever constructed. Four slippers secure the carriage to the rails while permitting it to slide freely.

The carriage is rocket-propelled into the series of preadjusted mechanical brakes. Conditions of deceleration are controlled by varying the number of rockets and the number and pattern of brake sets used. Tests have shown that if proper body support is provided, the human body has an amazing toughness in withstanding the tremendous forces of a crash.

Human volunteers have already completed one series of tests in gradual increases up to 35 g in both forward and backward facing positions. When subjected to this much deceleration force, the volunteers' body is momentarily pressed against this seat support or harness by a pressure equal to 35 times the weight of his body. In the case of a man weighing 175 lb., this pressure would be 6125 lb. If unprotected, he would be hurled against the aircraft structure with the same force.

A deceleration of this type is obtained by slowing the carriage and rider from 150 mph to 75 mph in one-fifth of a second. The volunteer experiences the same sensation an automobile driver would have if he stopped his car, which was traveling 75 mph, in just nine feet.

In tests involving the forward-facing position, the volunteers are provided witha modified seat harness consisting of web straps pressed over the lap, around each thigh, and over each shoulder. The thigh straps were found to be needed to prevent the lap belt from riding up and striking the abdomen in case of a crash.

Seated in a backward-facing position, with the back of the seat providing support during the deceleration tests, the volunteers withstood 35 g easily. Most of today's military and civilian transports are fitted with forward-facing seats stressed to take 6 g or less.

In a test run, the volunteer is first subjected to a thorough physical examination, and then strapped in position. He may be facing forward or back, or even be lying down because the Aero Medical Lab's technicians are considering that position for certain crew members.

Instruments to measure forces and pressures are fastened to the individual, as well as his harness and seat. All changes during the experiment are transmitted as radio signals and recorded in the control room. High-speed movie cameras also provide valuable data to evaluate the immediate effect on the decelerator rider.

The 1000 lb thrust rockets are fired simultaneously at the rear of the carriage as the volunteer braces himself. The carriage then roars down the track to the braking area. Braking is accomplished by 45 sets of brakes, each consisting of two clasping pairs of brake surfaces 6 x 12 in., installed on the roadbed between the rails. These brake pairs clasp the 11-ft. long braking plates attached underneath the carriage chassis to apply the desired deceleration.'

By varying the number and pattern of brake sets and the number of carriage-propelling rockets (there are four), controlled decelerations from 6 to 50 g are possible. The maximum velocity of the carriage as it enters the braking area may be as great as 240 mph.

7. Automobile Seat Belts: A Way of Living, Edward R. Dye and Alvin C. Smith, Cornell Aeronautical Laboratory, Buffalo, New York, December 1954. Highway Research Abstracts. March 1955.

This booklet describes recommended minimum requirements for the atuomobile seat belt and is based on the results of several years of automobile crash research by the laboratory. The strength requirement of the seat belt is the focal point, since only a belt strong enough throughout will play its proper life-saving role.

It is stated that the belt should have a closed or buckled loop strength of 3,000 lb., enough to withstand a crash up to 15 G's. In a 15-G automobile crash, a 200-lb man would need a belt of that strength to remain in place. Fifteen G's represents a very severe crash, above which the auto's body structure would probably collapse.

The authors also write that although a number of satisfactory methods of attachment to the car exist, the load must ultimately be taken to the strongest anchorage possible - the frame of the vehicle. A seat belt should never be fastened to the seat alone.

It is also recommended that only one person should be restrained by each blet; that the belt should be adjusted snugly when worn to allow not more than 4 inches forward hip movement; that fittings, attachments, take-up devices and buckels resist slippage and failure under heavy tensile loads, and that belt parts in contact with the body be not less than 2 nor more than 4 inches wide. Simplicity in operation of the buckle is another recommendation.

A special section of test methods describes four ways of determining whether a belt will meet the recommended minimum. Tests of fabric, assembly and anchorage are included.

8. Open Door Branded a Killer, Automotive News (Slocum Publishing Co., 2666, Penobscot Bldg., Detroit 26, Mich.), Vol. 30, No. 3549. p. 58, May 7, 1956, Highway Research Abstracts, June 1956.

Two cars collide. The chassis buckle; the doors pop open, and driver and passengers are hurled from their seats.

That is a primary cause of "moderate-though-fatal" injuries says the annual report of the Cornell University Medical College Division of Automotive Crash Injury Research.

Seat Belts for both front and rear seat passengers would play a major role in reducing this injury potential, the research group noted.

In its survey for the year ending April 1, the researchers found that the cause of the accident was one thing; the cause of the injury was another. "An injury in an automobile accident," it said, "is caused by bodily contact with a specific object, and there is no reason to doubt the frequency and severity of injuries can be reduced through redesigning of the injury-producing objects.

"However, these injury-producing items must be identified objectively in terms of their relative importance."

The survey, it declared was aimed at achieving this proper identification. It was conducted in 10 states and the City of Minneapolis.

One subject discussed was a comparison of the injury potentials of standard two-door and four-door sedans. Types and severity of accidents were found to be the same, but differences were found upon examination of details.

Rear-seat occupants of four-doors were found to have a significantly higher injury risk than rear-seat occupants of two-doors because of the tendency of doors to pop open.

The researchers found the average speed of cars before involvement in injury-producing accidents to be about 41 mph. As speeds increase, injury accidents increase.

Among the recommendations made by the research group were: (1) There is urgent need to expand current efforts in collecting accident injury facts to evaluate current and future safety designs. (2) A nonpartisan safety group should be organized to act in an advisory capacity on the problem of current and planned occupant-restraining system. (3) Research to establish a simple and inexpensive dynamic test to be used by various agencies for evaluating seat-belt installations. (4) A nation-wide survey to determine if there could be public acceptance of the shoulder harness. (5) Research to develop a possible seat design that would be strong enough to permit the attaching of seat belts directly to the seat. (6) Research to determine whether the present minimal loop-load specifications for seat belts are adequate, or if the deceleration forces in auto crashes are so great as to require belts stronger than those patterned on CAA standards.

9. Reduction in Crash Forces, James J. Ryan, The Fifth Stapp Automotive Crash add Field Demonstration Conference, Sept. 14-16, 1961, pp. 48-89. University of Minnesota, Center for Continuation Study of the General Extension Division, Minneapolis, Minn. 1962.

It is the sense of the Stapp Conference that when automobile accidents occur, injury and death should be reduced to a minimum.

It was the purpose of this Research Project to invent and test mechanical designs to reduce the destructive forces of collision on the automotive passengers. The developments which have been produced in this laboratory include engineered automatic slef-tightening seat-belts, hydraulic shock-absorber and a retracting steering wheel rim for the driver, and a dash recessed under the windshield in front for the passenger. With judicial padding, flailing arms and legs of the body held by the seat-belt are further protected from injury.

Tests have been made in a car with a driver and a paasenger safely impacting a rigid barricade at 20 mph; stopping a cart with a bumper at 18.75 mph having a free-swinging live passenger on a seat-belt; and having a seat-belted human safely decelerate on a cart with a bumper from 25 mph, aided by an energy absorbing collapsible steering wheel with a large central pad. From the instrumentation and photographic records of these and other tests, design data has been acquired which would make possible a reduction of injuries and deaths in automotive accidents.

It is the thesis of this paper that if the forces of impact on the human body can be minimized, and these controlled forces applied on pressure resisting areas, the yearly injuries and deaths would be reduced by about one-half.

In cost, the addition to safety would not be appreciable. Since a standard 3,600 bl car costs about $3,000 each pound would have a cost of 83.3 cents. In appearance, the difference between a safe car and one that is unsafe could be made to be undetectable.

In deaths, a decrease of one-half would be about equal to 19,000 each year-about one-hundred times as many as are killed in commercial air crashes. It is indicated that Federal control is necessary, as in the CAA.

It is not only of interest to special groups but to everyone that the reduction in forces on the human body in an automotive crash will increase the resistance to injury and the chances to survival. It is a matter in which all of us can participate by supporting the necessary Federal legislation. It is important that there be instituted a mechanical reduction of impact forces by automotive design.

10. The Seat-Belt Syndrome, John W. Garrett and Paul W. Braunstein, Journal of Trauma (Williams & Wilkins Co., Baltimore 2, Md.), Vol. 2, No. 3, pp. 220-237, May 1962.

While it is acknowledged that seat belts play an important role in protecting car occupants, some concern has been expressed over the possibility that the introduction of belts might increase the frequency or severity of certain injuries, particularly those in the abdominal region. It is well known that in any prophylatic or therapeutic regimen, the introduction of a new variable usually leads to modification of clinical picture. In brief, it was suspected that a "seat belt syndrome" might appear.

A review of the literature uncovered little evidence to support these suspicions. Actual case reports of seat belt-caused injureis were rare and difficult to find and few of the reports that were reviewed documented serious injuries.

The data examined in this study were based on accident and medical records drawn from a total of 2,778 automobiles in each of which at least one occupant was wearing a seat belt when an accident occurred. These cars contained 3,673 occupants; 3,325 occupants wore seat belts and of these, 944 were injured.

A total of 150 occupants received some injury to the lower torso; 26 of these injuries were regarded as serious. No fatal lower torso injureis were found except in one case, but the injury was not related to seat belt use; both car and occupant were completely crushed in a collision with a bus. The frequency of lower torso injuries among injured seat belt users was essentially similar to that observed among occupants in a injur-producing accident without belts (about 15 percent for both).

In the majority of the 26 cases where serious lower torso injuries occurred, accident circumstances were rather severe. Only 7 of these patients showed any evidence of severe seat belt application-brusies, concusions, etc.

Only 29 instances of belt failure, less than 1 percent, were found among 3,325 belt users. Examination of belt failures revealed that in only one case did an occupant sustain an intra-abdoinal injury. Belt failure, like lower torso injury, was usually associated with high speed, severe accidents. The ability of the human to resist forces exerted on the lower torso, without serious injury, exceeded the resistance of the belt to damage in 28 of the 29 cases observed.

11. Psychological Resistance to Seat Belts, George W. Blomgren, Jr., and Thomas W. Scheuneman. Research Project RR-215, Traffic Institute Northwestern University (1804 Hinman Ave., Evanston, Ill.), 1961, 42 pp.

Seat belt acceptance has been disappointingly low, even when measured by the effect of vigorous but limited promotional programs. Several explanations of this problem have been advanced, but it seems that the most plausible and representative interpretation puts the problem in terms of consumer psychological resistance factors.

An experiment was conducted which exposed employees for four district offices of a large firm to two types of seat belt promotional material. Concurrently employees were offered a special discount on the purchase of belts. One approach stressed the chances of having an accident and the grim results which might be expected. It presented the seat belt as being an injury and death preventive device. The other approach identified seat belts with the professional racing driver. It was hyposthesized that this letter approach would be superior for several reasons: (1) the effect of identification with a male ego-ideal, and subsequent motivation to accept the communication offered; (2) the effect of a credible communication source upon communication acceptance; and (3) the lack of anxiety arousing content associated with the other approach.

A third group served as a quasi-control, being exposed to a varied polythematic approach-the sort invariably used-in the promotion of seat belt sales.

12. Passengers Are "Packaged" in New Safety Automobile, Automotive News (2666 Penobscot Bldg., Detroit, Mich.), Vol. 32, No. 3626, pp. 4, 58, October 28, 1957.

A car designed with only one goal in mind-safety- has been shown by Liberty Mutual Insurance Co. and Cornell Aeronautical Laboratory, Inc. The car represents the culmination of a five year research program sponsored by Liberty and carried out by the safety design research department of the Cornell Laboratory at Buffalo, under the direction of Edward R. Dye.

To eliminate or reduce the severity of accidents, Liberty and Cornell developed the concept of "packaging" the passengers in much the same way that fragile merchandise is packed to prevent damage in shipment.

Externally, the car resembles a contemporary American automobile. Most radical innovation has been the elimination of the steering wheel in favor of a lever-controlled hydraulic system, and the relocation of the driver's seat in the center of the car.

The driver is provided with a bucket seat (all seats are of the bucket type), flanked with a bucket seat on either side, three inches to the rear and three inches lower than the driver's.

Rear-seat passengers are protected by seat belts which reel up when released. The belts will unreel completely when a release button is pushed, facilitating getting out of the car in case of fire or upset. In addition, rear-seat passengers are protected against "whiplash" injuries by nylon harnesses to support the head.

Front-seat passengers, including the driver, are restrained in their seats by U-shaped webbing yokes which are supported on movable and adjustable panels.

A pull-up harnest to protect against "whiplash" injuries is built into the rear of the driver's seat. A soft pad in front of the driver's chest gives additional protection against chest injuries.

The two steering-control handles and all other necessary driving controls are mounted on the same movable panel which contains a driver's body restraining yoke. To steer the car, the driver grasps the two horizontal control handles and moves them as though steering a sled.

Gear shifting is controlled by four buttons located on the back right side of the panel. Light buttons are located in the same relative position onthe left side.

The windshield is shaped to a constant radius of curvature and does not distort the view on either side. It allows approximately 180 degrees of vision for the driver. The five windshield wipers retract out of sight when not in use. Three wipers are used on the back glass for good vision to the rear.

Each door consists of two sections, hinged at the center and to the rear body post. These open and close like telephone booth or bus doors. The lower edge of the doors is three bolt bars designed to keep the doors closed in a collision.

13. Ejection and Automobile Fatalities, Boris Tourin. Automotive Crash Injury Research, Cornell University Medical College, New York, N. Y. Reprint, Public Health Service, Washington, D. C.), Vol 73. No. 5, p 381-391, May 1958.

In a sample of injury-producing accidents analyzed in the cornell University Medical College study (3,261 passenger cars, each of which contained at least 1 injured person) 13.6 percent of all occupants were completely ejected from an automobile.

Ejected occupants of passenger automobiles had a much higher risk of fatality than those not ejected. This increase was demonstrated to be statistically significant and not due to chance.

The frequency of ejection from doors opened under crash impact conditions varied according to accident severity and seat occupied. Fatality risk was also influenced by these two factors.

Observed and expected fatalities based on a simultaneous consideration of ejection risk, accident severity, and seat occupied demonstrated that prevention of ejection from passenger cars could have reduced fatalities among passenger car occupants in the study of 25 percent.

It is conservatively estimated that about 23,700 of the approximately 40,000 lives lost annually occur among passenger automobile occupants involved in traffic accidents. Of these fatalities, about 20,000 occur involved in traffic accidents. Of these fatalities, about 20,000 occur in rural areas.

Elimination of ejection in passenger automobile accidents on a nationwide scale would save a conservatively estimated 5,500 lives yearly if the level of annual fatalities persists at about 40,000.

Ejection from automobiles can be prevented by the use of properly designed and installed seat belts, further refinements of the safety door lock which was standard equipment in 1956 and 1957 cars, and auxiliary devices designed to keep doors closed in older cars.

14. Belts Overrated, California Highway Patrolman, Vol. 19, No. 8, p. 12, 57, 80, October 1955. Highway Research Abstracts, Jan. 1956.

Safety belts are being over sold as a cure-all for preventing injuries to car occupants involved in accidents. This was discussed by Andrew J. White, director of Motor Vehicle Research, In., of New Hampshire, at press conference. He told of his personal experiences during safety belts and safety harnesses during crash tests in Connecticut recently. White said: "The crash barrier tests conducted by Motor Vehicle Research for the Bureau of Public Roads and the University of New Hampshire afforded me the opportunity to evaluate the effectiveness of safety belts and safety harnesses. I crashed a barrier with a "g" forces in two planes in a modified and instrumentized automobile, wearing a 4-inch lap safety belt installed with anchorage points at the car frame. When the car crashed the barrier, I could not brace myself against the forces involved, and the seat belt prevented the lower section of my body from going forward. However, the flexion or jack-knifing action that occurred at my waist allowed my upper torso and head to go forward and downward into an energy absorbing assembly installed on the dashboard.

"In a series of other tests, I wore a nylon safety harness, known as the Griswold Harness. This assembly prevented any upper body movement and no contact with the dash was made. Several other crashed proved the effectiveness of the harness over the safety belt.

There seems to be a definite lack of general information as to proper anchorages for lap safety belts in all vehicles and proper positioning of the belts to prevent interabdominal injuries and other injuries caused by the rotational effects of the body during a crash deceleration.

"There has been a great deal of discussion of late in automotive circles pointing out that legislatures should require the installation of safety belts in all automobiles but no basic standards have been established by the industry for proper anchorage points, buckels and positioning to provide a maximum of safety."

White also suggested that manufacturers who create safety belts and advertise them as having the ability to prevent injury should subject themselves to actual crash tests in automobiles to prove that advertising before their product is installed in automobiles used by the American public.

15. Human Vibration and Impact Protection by Airbag Restraint Systems. Carl C. Clark and Carl Blechschmidt. Martin-Baltimore Eng. Rept. 13539. Life Sciences Dept., Martin Co., Baltimore, Md., June 1964. 5 pp. 5 figs.

Manned impact tests of airbag restraint systems in a preliminary experimentation box, a spacecraft simulator, and a passenger airplane simulatory have been carried out to show the conceptual feasibility of such active elastic restraint systems, whose restoring forces can be varied by varying bag pressures to insure the prevention of "bottoming." These systems can isolate from high frequency (above 5 cps) vibration and impact loads, transmitting less than 50 percent and often less than 25 percent of the loads on the "vehicle." Rebound effects occur at a low enough frequency (near 3 cps) that they are physiologically acceptable, without any bag pressure dumping or valving.

Manned impact tests in the passenger airplane simulatory involved -40Gx on the vehicle, but on -10Gx on the man's hip.

All of those in safety work are concerned with the 40,000 deaths a year in automobile accidents in the United States alone. Inflated airbags surrounding the passengers indeed could save many of these lives, but a problem is to safely inflate the bags in anticipation of a crash. The warning time is so short and the driver so involved in other things that for manual initiation of the inflation the bags would have to fill in a fraction of a second to be useful. This filling rate could by istelf throw about the passengers not properly seated. Automatic initiation of filling, perhaps by any abrupt driver control such as his slamming on the brakes, or in a later period by separation distance radar or malfunction of the automatic control expected on super-highways, could allow safer inflation rates. Abrupt restraint of the driver may also contribute to the accident; lap belt and shoulder straps for drivers are probably preferable to airbags, at least until driver controls are put in hand grips, replacing large steering wheels.

16. A Survey of Seat Belt Ownership in Six California Communities, Dean I. Manheimer and Glen D. Mellinger. Traffic Safety Research Review (425 North Michigan Ave., Chicago 11, Ill.) Vol. 8, No. 1, pp 3-9 March 1964. Highway Research Abstracts, July 1964.

A questionnaire survey in late spring, 1963, found that 23 percent of the 7,546 licensed drivers sampled owned seat belts. The survey was conducted in Oakland, California and neighboring communities by the California Department of Public Health in cooperation with Calif. Department of Motor Vehicles. Striking differences were found in level of seat belt ownership according to drivers' education and occupational, and also according to year and type of car driven. Ownership was very high among drivers in professional occupations (43 percent). Smaller differences were found with respect to drivers' age, number of miles driven per year and marital status. Levels of ownership were relatively high among drivers in the 20-24 age bracket (30 percent) and those who drive at least 22,500 miles per year (32 percent). Conversely, ownership was relatively low among drivers who are divorced or separated (14 percent) or widowed (16 percent).

17. Automobile Side-Impact Collisons, Series II, D. M. Severy, J. H. Mathewson and A. W. Siegel. Traffic Safety Research Review (425 N. Michigan Ave., Chicago, Ill. 60611), Vol. 8, pp. 99-107 No. 4.

Engineering methodology and research techniques, applied to 12 intersection-type automobile collision experiments, provided data on four speeds and three positions of impact. Anthropometric dummy motorist provide collision force and kinematic data for several conditions of restraint. Advanced photographic equipment identified new approaches to solution of the motorist-collision-injury problem.

Specific data include tri-axial acceleration patterns for motorists' head and chest and for the car passengers compartment; identification of many factors associated with door latch failure and motorist ejection; demonstration of protection provided by the shoulder strap and lap belt combination; preliminary findings on tempered side window glass breakage and related head impact accelerations; collisions dynamics and the reason why modern car design has reduced probability of intersection collision roll-over. Car collision deformation, skid patterns and repair costs are given for these controlled exposures. Successful programming of collision transducer patterns for data reduction by a 7090 computer is also described.

18. Second Annual Seat Belt Installation and Use Poll, Auto Industries, Highway Safety Committee (2000 K. St., N. W., Washington 6, D.C.), Press Release No. 97, August 24, 1962, 2 pp.

Results of the second annual nationwide seat belt installation and use poll indicate nearly 4½ million automobiles are equipped with seat belts. This estimate, an increase of two and one-half million during a one year period, is further evidence of growing public acceptance of the importance of seat belts.

This second nationwide poll was again conducted during May and June in connection with the National Vehicle Safety-Check program.

The fact that 54.3 percent of the drivers participating in the poll indicated they always use seat belts in local travel, and 71 percent always use them on long trips, is a significant increase over 1961's 34.5 pereent who responded to the regular seat belt use question. Results of the 1962 poll are as follows:

<u>1962 Nationwide Poll of Seat Belt Installation and Use:</u>
Compiled by: Auto Industries Highway Safety Committee

<u>Installation</u> 6.9 Percent

Total Vehicles Included in Seat Belt Poll	982,762
Total Vehicles Having Seat Belts	68,681

<u>Use</u>

76 percent of the drivers of the 68,681 vehicles equiped with seat belts responded to the following questions regarding seat belt use:

	Local Travel	Long Trips
1. Always use seat belts	58.3%	71%
2. Sometimes use seat belts	28.9%	17.7%

19. Seat Belt Specifications and Installation Standards Aid to Federal Agencies, Safety Standards (U. S. Govt. Print. Office, Washington, D. C.), Vol. 9, No. 5, pp. 5-6, September-October 1960.

The Federal Government, through the General Services Adm. has issued specifications and installation standards for the use of all agencies whose safety policies now call for, or may in the future requiee, automobile seat belts for the protection of drivers and passengers in government-owned vehicles.

The 2 documents, issued January 19, 1960 are: Federal Specification JJ-B-185a "Belt: Seat, Passenger Type, Automotive, Methods of Installation." Single copies of each for use by bidders and Federal agency personnel may be obtained from the regional offices of the General Services Administration, located in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D.C.

The detailed specifications cover design and construction factors such as webbing, color, sewing, thread, hardware, anchorage and finish of metal parts. Performance specifications include webbing breaking strength, elongation, colorfastness, abrasion resistance, tensile strength of common anchorages, loop strength of belt assembly, release machanism under load, release and latching mechanism under no load, and corrosion resistance. The specification also sets forth sampling inspection, and test procedures.

Used in conjunction with the specification, the Federal Standard governing methods of installation will facilitate the work of property personnel.

20. Auto Seat Belts? Government Safety Engineers and Research Experts Say: "YES.", Safety Standards (U. S. Govt. Print. Office Washington 25, D. C.) Vol. 9, No. 5, pp. 1-4, Sept-Oct. 1960.

The use of seat belts to lessen injury and reduce the number of deaths caused by traffic accidents has received official approval from the Federal Government's top safety experts. Endorsement came in the form of a recommendation by the Federal Safety Council to install safety belts in vehicles owned by the Federal Government.

The action aligns the Council with the National Safety Council, the American Medical Association, the American College of Surgeons, the U. S. Public Health Service and other organizations, concerned with public health and safety, favoring the use of seat belts.

Nearly 2 decades of crash injury research demonstrates that such belts reduce accident severity by restraining auto passengers in their seats. This restraint prevents them from being thrown about the vehicle or hurled out onto the pavement.

At present no uniform, government-wide policy exists on the use of safety belts. Feeling grows, however, for government-wide use of seat belts.

Last year Secretary of Health, Education, and Welfare, Arthur S. Flemming, directed that belts be installed "as rapidly as possible in all vehicles owned and operated" by HEW.

In June a program was started to use belts in patrol and passenger cars of the National Park Service.

A safety representative of the Forest Service reports expansion of the agency's seat belt program, now 3 yr. old. Some 5,500 passengers and pick-up vehicles are now equipped with 11,776 belts, leaving about 2,500 vehicles still unequipped. Based upon field reports the use of belts in 98 crash scenes helped to avert serious injury.

The foregoing-illustrative rather than exhaustive-reflects growing concern among Federal officials to enlist seat belts in the drive to reduce motor vehicle deaths and injuries.

21. Car Seat Belts: An Analysis of the Injuries Sustained by Car Occupants, R. D. Lister and Barbara M. Milsom, The Practitioner (5 Bentinck St., London, W. 1), Vol 191, pp 332-340, Sept. 1963.

The details of 600 car accidents in which 837 drivers or front seat passengers were wearing seat belts have analyzed. The types of seat-belt in use and the injuries sustained by the wearers of these belts are described, as well as the injuries sustained in the same accidents by 56 drivers or front seat passengers who were not wearing their seat belts, or for whom there were no seat belts available. The seat belts were of types approved by the British Standards Institution, conforming to B. X. 3254.

The wearing of seat belts resulted in a considerable reduction in injuries for the driver and front seat passenger. The overall reduction in injuries resulting from the wearing of seat belts was 51 percent, with a greater reduction in the serious injuries than in the slight injuries.

The percentage of persons not injured when wearing seat belts was about the same for each of the four different types of belt. Those wearing the seat belts that gave more restraint to the upper part of the body had fewer head and neck injuries but more chest injuries (including brusing caused by the seat belt assembly). The percentage of injuries to the legs was about the same for all types of belt, and was only slightly greater when seat-belts were not in use at the time of the accident.

Sixty percent of the impacts were frontal and nearly one quarter of the cars overturned. The speeds of the cars at the time of the collison, estimated by the persons making the reports, showed as would be expected, that the proportion of serious injuries was greater at the higher speeds.

This survey shows that in August 1962, about 7 percent of the cars studied were fitted with seat belts and that in the case of the drivers nearly 30 percent were not wearing the seat belts. Thus, in spite of the considerable benefits to be derived from their use, seat belts are still not widely fitted and worn.