

STATEMENT OF WILLIAM HADDON, JR., M. D.
PRESIDENT, INSURANCE INSTITUTE FOR HIGHWAY SAFETY

BEFORE THE
HOUSE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
SUBCOMMITTEE ON COMMERCE AND FINANCE

March 23, 1973

Mr. Chairman and members of the Committee, I am here today at your invitation to present the results from a new phase of the Institute's low speed crash test program. Earlier phases have involved impacts primarily of American-made cars. This new phase examines, for the first time, the designed-in fragility of a range of foreign-made vehicles widely marketed in the United States, comparing them with the results from the 1973-model domestic cars that we have previously tested.

The Institute is an independent, nonprofit scientific and educational organization dedicated to reducing the losses -- deaths, injuries and property damage -- resulting from crashes on the nation's highways. We are supported, indirectly or directly, by insurance companies writing most of the auto coverage in this country.

We began our low speed crash test program in 1969, as one in a range of research and educational programs to reduce human and economic damage arising from motor vehicle use. Our tests then and in more recent years demonstrated to the Congress and to the public the built-in fragility of automobiles, and their resulting unnecessary damage in the low-speed collisions that are so common on American streets, parking lots and driveways.

The results are a matter of record before this Committee, as well as before its Senate counterpart.

On January 31 of this year, at the invitation of the Senate Commerce Committee, I reported the results of our crash tests of seven representative 1973-model automobiles of U.S. manufacture. Contrasting the results with those of earlier-year crash tests, I told the Committee:

"... there has been noticeable progress in designing and making the front and rear ends of domestic automobiles to be less fragile in low-speed crashes. But the improvement is still far short of what has long been readily achievable -- the design and production of vehicles immune to all damage at these low crash speeds."

The test results I will report today, involving six foreign-made vehicles of the current model year, are no more encouraging. In brief, vehicles made abroad and sold in this country are no better as a group than their American-made counterparts in terms of the designed-in fragility that creates needless damage at low speeds.

As with the domestic cars, we found that most of the tested imports were able to pass the Department of Transportation's current standard for protection of so-called "safety related" components in very low-speed impacts -- and still suffer needless designed-in damage. In each impact test under this federal standard (FMVSS 215), five of the six cars passed. Yet we found damage in these tests as follows:

--- Two of the six cars tested suffered no damage at all in the 2-1/2 mile an hour rear-into-barrier speed -- a speed equivalent to a man landing after jumping off a step 2-1/2 inches high. The two damage-free vehicles in this test demonstrate that zero-damage capability can be designed into cars for crashes at this speed. Even this slight amount of basic protection in rear-end impacts has been withheld from the other four. (Among the American-made cars, one out of seven suffered no damage.)

--- Not a single one of the six foreign-made cars was designed so that it could emerge damage-free from the five mile an hour front-into-barrier crash speed -- a speed equivalent to that of a man landing after jumping off a step ten inches high. (Two of the six American-made cars suffered no damage in this test.)

--- As with the American cars, not one of the foreign-made vehicles tested was able to emerge without damage in a five mile an hour rear-into-barrier impact. This is the speed called for by next year's federal standard. Five of the six foreign-built cars can already meet that test, a year in advance. Nonetheless, all six sustained damage, exceeding two hundred dollars in three cases.

In short, cars from abroad have shown that they are, on balance, about as fragile as those made in the United States -- that they have designed-in fragility, comparable to the domestically made automobiles, that will inevitably lead to needless crumpling in low-speed collisions.

In a moment, we will look at filmed excerpts from the tests. Before viewing them, note the conditions under which our tests are conducted. The vehicles are all new cars, purchased at retail through dealers who have no knowledge of their end use. During the tests, the cars are traveling with motors running. The speeds are very precisely controlled. After each crash, a panel of experienced appraisers estimates repair costs. The estimates are based on last year's conservative labor cost of \$8 per hour -- considerably lower than the auto repair labor rate prevailing in many parts of the country.

The 1973-model year tests include a new inter-vehicular crash test series involving low-speed corner impacts. This is of particular interest in view of data from a recent study by four insurance companies, as well as very similar data from a study conducted by Ford Motor Company, both showing that approximately forty per cent of real-world collisions involve the corners of vehicles.

In these new tests, the impacting cars were moving at only 10 miles per hour; each hit the right front corner of a car parked at a 30-degree angle. Each test involved a pair of the same make and model vehicle. As the result of inappropriate design, you will consistently see bumper mismatch and override between the two impacting cars, even though each pair was designed and built by the same manufacturer.

I am going to show you the highlights of the results. Research films of the entire test series are available for Committee viewing should you wish to see them.

In the films, by the way, you will note that the slowness of the speeds used in our tests is illustrated variously by a toddler, a man walking and jogging, and football players running. Also, in most tests, the very low-speed nature of the crash is underscored by a technician accompanying the car on foot to its impact point.

We use these parallels to show, in a meaningful way, how very low are the speeds at which contemporary vehicles are unable, as a matter of their designs and the management decisions they represent, to take the impacts of everyday use without damage.

Distinct from the question of speed is the companion question of impact protection: Structure that routinely experiences impact can and should be protected routinely against avoidable damage. Shock-absorbing landing gears, for example, totally eliminate the possibility of sheet-metal and structural damage in the touchdowns of planes with weights ranging from those of automobiles up to those of the most massive jet transports.

Yet basic, long-understood ways of managing impact energy without damaging structure -- ways that routinely protect people and planes -- still are not being applied, as they could and should be, to preclude all damage whatsoever to cars in their millions of low-speed impacts each year.

The vehicles in this test series of imported cars were the Volkswagen Superbeetle, Volvo 142, Toyota Corolla 1600, Opel 1900,

Saab 99 and Datsun 510. In previous years, we have tested various models of the Volkswagen and Toyota. The other four were tested this year for the first time. Attachment A documents the damage susceptibility in low-speed impacts of these 1973-model foreign-made cars, as measured by their estimated repair costs. Attachment B gives similar data for the 1973-model domestic cars tested earlier, as well as for cars covered in our previous low speed crash tests of 1969, 1970, 1971 and 1972 model vehicles.

Now, you will see the film showing the "worst" and "best" in each category of impact tests covered by the federal standard for this year and next year, as judged by damage repair cost estimates. You will see all the cars tested in the new corner impact series, and in the final barrier crash test of 15 miles per hour front impact.

[FILM BEGINS]

VIDEO

AUDIO

MAIN TITLE

2-1/2 MPH REAR/BARRIER

Two and a half miles per hour . . .

CHILD

the speed of a toddler walking . . .

the speed of the federal rear-into-barrier requirement . . .

OPEL

This car, like nearly all the others we tested at this speed, met the federal standard. But note the damage that the standard permits -- in this case twenty-two dollars in repair costs.

We found damage to the rear body panel and floor pan, and a bumper out of alignment.

VOLVO

It doesn't have to be that way. This car . . . less delicately designed . . . produced absolutely NO crash damage repair costs in this test.

5 MPH FRONT/BARRIER

The federal standard's five mile an hour front-into-barrier speed . . .

WALKER

. . . that of a man strolling.

OPEL

Yet look at this . . . the Opel produced needless damage that topped two hundred dollars. Not even one dollar's worth of damage is excusable at this speed.

A smashed front due to the fragility of design . . . Even the frame members bent.

SAAB

Saab claims, in a news release, "the first bumpers in the industry capable of withstanding impacts up to five miles per hour without any damage to the car." This was not the case here. . . \$26.30 in damage.

Unlike two of the U. S. - made cars we tested, not a single one of the cars in this test was able to survive this crash with no damage.

Incidentally, the damage here was to the bumper.

5 MPH REAR/BARRIER

Here is the rear-into-barrier crash speed called for by the federal standard for next year . . .

TOYOTA

. . . a test that most of the imports already pass, including this one.

Yet look at this enormous cost . . . \$231. That's almost eight times as expensive as the same car's front impact at this speed.

We see damage to the quarter panel from a rear bump . . . the bumper itself separated.

VW

The Volkswagen is a car we have tested in previous years. Here, a repair cost of \$54. The proper amount for such a crash would be zero.

Notice here how the bumper itself is flattened out.

10 MPH CORNER

Ten miles an hour . . . the speed of a man jogging.

VOLVO

The first of our corner impact tests illustrates sadly why front-bumper protection does not mean side or corner protection . . . The liquid flying from the partially-torn bumper is a fluid used in the bumper's energy-absorbing system itself.

In the front-into-barrier crash at this speed, the Volvo emerged with the lowest damage. . . but that is of little consolation to the Volvo owner struck at the same speed from an angle.

SAAB

The Saab -- while still costly -- demonstrates how design can make a difference in reducing damage. The bumper configuration on these two cars produced a damage of \$45.80 on the striking car and \$114.85 on the struck car . . . far and away the lowest in this series.

But it still is too high compared with the achievable cost of such a crash -- which is absolutely nothing. For example, here the bumper punches unnecessarily into sheet metal.

TOYOTA

This corner impact produced a phenomenon that we saw on some of the American models. . . indifferent design allows one bumper to override another, even of the same make. The result is a cost of \$220.80 for the striking car and \$118.39 for the struck car, for a total of \$339.19 -- all needless.

DATSUN

Once again we see how sheet metal, drawn out for decorative effect, gets punched back. The total cost is \$287.18 -- \$151.13 for the striking car and \$136.05 for the struck car.

The cars are separated . . . and we see the damage.

The metal sculpture is an expensive work of art.

VW

Here we have one of the most common foreign cars on the U. S. roads . . . Is it too much to expect that when a matching pair is involved in a collision at this jogging speed, their design should preclude any damage?

Instead, we have a total damage of \$229.70. . . the bumper digging into the metal below the light.

OPEL

The Opel performed either worst or second-worst in all but one of the eight tests of foreign-made cars . . . in this case . . . \$254.65 plus \$227.55 for a total of \$482.20.

That fragile front design virtually guarantees the resulting damage.

The struck car fared no better.

15 MPH FRONT/BARRIER

Fifteen miles per hour . . . a speed at which football players regularly collide without injury.

SAAB

This automobile produced a whopping \$930 worth of damage from a front-end crash at this running speed.

VOLVO

Here is the Volvo in a head-on impact at 15 miles per hour. The result is \$620.35 worth of damage.

DATSUN

This car's design produced \$652.20 worth of damage.

That flood you see is from a cracked radiator . . . the kind of disability that causes innumerable, wasteful traffic jams after low-speed collisions. Every radiator was damaged in these running-speed crashes.

TOYOTA

This is the second make that we tested previously . . . it showed an improvement . . . but far below the capability of modern technology that is lying unused on the shelf. Damage totaled \$623.37 in this case.

Look at the crumpled hood.

VW

Watch that flying strip of chrome . . .

One would hope that in a real-world situation, that sailing blade of metal would not strike a pedestrian on its way down.

This crash not only cost \$521.10 . . . it started the windshield wipers . . . and immobilized the wheel.

OPEL

Finally, the Opel had the dubious distinction of being the only foreign-made car tested to top one thousand dollars in crash costs . . . \$1,047.48, to be exact.

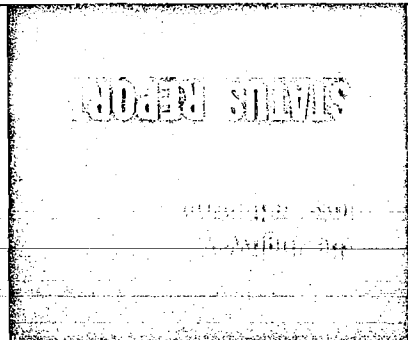
The crash cracked the radiator . . . immobilized the wheel . . . and started the turn signal blinking.

[FILM ENDS]

Incidentally, we repeated the last test you saw -- with strikingly similar results. After the Opel recorded the highest damage of the six cars tested, we procured another Opel and crashed it into the same barrier at the same speed. The two damage estimates were within eight dollars of each other. (The second crash, which was the lower in costs, was used in the film.)

In conclusion: we found the tested foreign-made cars of the 1973-model year to be no better in general than American-made cars in reducing the designed-in fragility. Within the group of imported cars, we found wide variations in the vehicles' resistance to damage in these low-speed crashes.

Overall, the imported cars -- like their American counterparts -- reflect a distressing insensitivity to the consumer, in their designs that allow needless damage at these extremely low speeds. The foreign makers and the domestic producers share the same failure to apply the available technology, long on the shelf, to reduce crash damage and resulting costs.



EXEMPT

FOR IMMEDIATE RELEASE

INSURANCE INSTITUTE
for Highway Safety

March 26, 1973

Vol. 8, No. 7

1973 Imported Cars Crash Tested

A group of imported 1973 model cars, tested by the Insurance Institute for Highway Safety as part of its low speed crash test program, performed "no better in general than American-made cars" in their designed-in vulnerability to needless damage.

"Overall, the imported cars — like their American counterparts — reflect a distressing insensitivity to the consumer, in their designs that allows needless damage at these extremely low speeds," Dr. William Haddon, Jr., Institute president, told a congressional committee.

Haddon was appearing before the House Committee on Interstate and Foreign Commerce to report the results of a new phase of IHS's low speed crash test program — a phase examining, for the first time, "the designed-in fragility of foreign-made vehicles widely marketed in the United States, comparing them with the results from the 1973 model domestic cars that we have previously tested."

The results of IHS's tests involving 1973 model domestic cars were reported on Jan. 31, 1973, to the Senate Committee on Commerce. (See *Status Report*, Vol. 8, No. 3, Jan. 31, 1973.)

Detailing the results of the more recent tests of six foreign-made cars (see charts on pages 3 and 4), Haddon told the House group, "As with domestic cars, we found that most of the tested imports were able to pass the Department of Transportation's current standard for protection of so-called 'safety related' components in very low-speed impacts — and still suffer needless designed-in damage. In each impact test under this federal standard (FMVSS 215), five of the six cars passed."

Yet, Haddon noted, "we found damage in these tests as follows:

• "Two of the six cars tested suffered no damage at all in the 2½ mile an hour rear-into-barrier speed — a speed equivalent to a man landing after jumping off a step 2½ inches high. The two damage-free vehicles in this test demonstrate that zero-damage capability can be designed into cars for crashes at this speed. Even this slight amount of basic protection in rear-end impacts has been withheld from the other four. (Among the American-made cars, one out of seven suffered no damage.)

• "Not a single one of the six foreign-made cars was designed so that it could emerge damage-free from the five mile an hour front-into-barrier crash speed — a speed equivalent to that of a man landing after jumping off a step ten inches high. (Two of the six American-made cars suffered no damage in this test.)

• "As with the American cars, not one of the foreign-made vehicles tested was able to emerge without damage in a five mile an hour rear-into-barrier impact. This is the speed called for by next year's federal standard. Five of the six foreign-built cars can already meet that test, a year in advance. Nonetheless, all six sustained damage, exceeding two hundred dollars in three cases.

The Insurance Institute for Highway Safety is an independent, nonprofit, scientific and educational organization. It is dedicated to reducing the losses—deaths, injuries and property damage—resulting from crashes on the nation's highways. The Institute is supported by the American Insurance Association, the National Association of Automotive Mutual Insurance Companies, the National Association of Independent Insurers and several individual insurance companies.

"In short, cars from abroad have shown that they are, on balance, about as fragile as those made in the United States — that they have designed-in fragility, comparable to the domestically made automobiles, that will inevitably lead to needless crumpling in low-speed collisions."

Introducing filmed highlights of the imported-car crash tests to the committee, Haddon observed that in the films "the slowness of the speeds used in our tests is illustrated variously by a toddler, a man walking and jogging, and football players running. Also, in most tests, the very slow-speed nature of the crash is underscored by a technician accompanying the car on foot to its impact point.

"We use these parallels to show, in a meaningful way, how very low are the speeds at which contemporary vehicles are unable, as a matter of their designs and the management decisions they represent, to take the impacts of everyday use without damage.

"Distinct from the question of speed is the companion question of impact protection: Structure that routinely experiences impact can and should be protected routinely against avoidable damage. Shock-absorbing landing gears, for example, totally eliminate the possibility of sheet-metal and structural damage in the touch-downs of planes with weights ranging from those of automobiles up to those of the most massive jet transports.

"Yet basic, long-understood ways of managing impact energy without damaging structure — ways that routinely protect people and planes — still are not being applied, as they could and should be, to preclude all damage whatsoever to cars in their millions of low-speed impacts each year."

The vehicles in the test series of imported cars were the Volkswagen Superbeetle, Volvo 142, Toyota Corolla 1600, Opel 1900, Saab 99 and Datsun 510. Copies of the complete testimony are available by writing to "1973-Model Imports," Watergate 600, Washington, D.C. 20037.

ATTACHMENT A

**INSURANCE INSTITUTE FOR HIGHWAY SAFETY
1973 MODEL LOW SPEED BARRIER CRASH TEST RESULTS
IMPORTED SERIES**

	2.5 MPH REAR INTO BARRIER	5 MPH FRONT INTO BARRIER	5 MPH REAR INTO BARRIER	10 MPH FRONT INTO BARRIER	15 MPH FRONT INTO BARRIER
VOLKSWAGEN SUPERBEETLE	\$ 8.00	\$ 52.70	\$ 54.35	\$430.90	\$ 521.10
VOLVO 142	\$ 0.00	\$ 29.04	\$152.40	\$ 62.86	\$ 620.35
TOYOTA COROLLA 1600	\$ 0.00	\$ 29.30	\$231.68	\$276.03	\$ 623.37
OPEL 1900	\$22.00	\$205.75	\$216.80	\$590.05	\$1,047.48
SAAB 99	\$ 3.36	\$ 26.30	\$214.90	\$228.29	\$ 930.51
DATSUN 510	\$15.60	\$ 28.96	\$ 63.04	\$339.33	\$ 652.20
AVERAGE	\$ 8.16	\$ 62.01	\$155.53	\$321.24	\$ 732.50

March 23, 1973

**INSURANCE INSTITUTE FOR HIGHWAY SAFETY
1973 MODEL LOW SPEED CAR-TO-CAR CRASH TEST RESULTS
IMPORTED SERIES**

	10 MPH FRONT-TO-REAR			10 MPH FRONT-TO-SIDE			10 MPH FRONT-TO-CORNER		
	FRONT DAMAGE	REAR DAMAGE	TOTAL DAMAGE	FRONT DAMAGE	SIDE DAMAGE	TOTAL DAMAGE	FRONT DAMAGE	CORNER DAMAGE	TOTAL DAMAGE
VOLKSWAGEN SUPERBEETLE	\$ 41.95	\$138.35	\$180.30	\$ 78.35	\$340.45	\$418.80	\$ 52.40	\$177.30	\$229.70
VOLVO 142	\$ 26.00	\$128.96	\$154.96	\$ 26.00	\$437.06	\$463.06	\$ 77.46	\$208.70	\$286.16
TOYOTA COROLLA 1600	\$250.31	\$263.74	\$514.05	\$ 46.50	\$359.58	\$406.08	\$220.80	\$118.39	\$339.19
OPEL 1900	\$141.45	\$341.20	\$482.65	\$158.40	\$219.56	\$377.96	\$254.65	\$227.55	\$482.20
SAAB 99	\$295.94	\$41.80	\$337.74	\$ 8.10	\$418.68	\$426.78	\$ 45.80	\$114.85	\$160.65
DATSUN 510	\$ 88.02	\$ 79.35	\$167.37	\$ 78.57	\$361.17	\$439.74	\$151.13	\$136.05	\$287.18
AVERAGE	\$140.61	\$165.57	\$306.18	\$ 65.99	\$356.08	\$422.07	\$133.71	\$163.81	\$297.52

March 23, 1973

ATTACHMENT A (Cont'd)

**INSURANCE INSTITUTE FOR HIGHWAY SAFETY
1970-72 MODEL LOW SPEED BARRIER CRASH TEST RESULTS
IMPORTED SERIES**

		2.5 MPH REAR INTO BARRIER	5 MPH FRONT INTO BARRIER	5 MPH REAR INTO BARRIER	10 MPH FRONT INTO BARRIER	15 MPH FRONT INTO BARRIER
VW SUPERBEETLE	1971	---	\$130.75	\$ 59.05	\$347.85	\$615.20
VW BEETLE	1970	---	\$120.25	\$ 64.45	\$322.35	\$518.70
TOYOTA COROLLA	1972	\$ 8.36	\$251.46	\$214.78	\$657.00	\$872.20
---	1971	---	---	---	---	---
TOYOTA CORONA	1970	---	\$133.70	\$ 69.30	\$410.94	\$486.86

March 23, 1973

**INSURANCE INSTITUTE FOR HIGHWAY SAFETY
1970-1972 MODEL LOW SPEED CAR-TO-CAR CRASH TEST RESULTS*
IMPORTED SERIES**

		10 MPH FRONT-TO-REAR			10 MPH FRONT-TO-SIDE		
		FRONT DAMAGE	REAR DAMAGE	TOTAL DAMAGE	FRONT DAMAGE	SIDE DAMAGE	TOTAL DAMAGE
VW SUPERBEETLE	1971	\$ 81.10	\$181.75	\$262.85	\$126.35	\$227.45	\$353.80
VW BEETLE	1970	\$156.75	\$ 71.45	\$228.20	\$194.75	\$186.80	\$381.55
TOYOTA COROLLA	1972	\$206.62	\$368.28	\$574.90	\$209.91	\$328.34	\$538.25
---	1971	---	---	---	---	---	---
TOYOTA CORONA	1970	\$129.51	\$176.06	\$305.57	\$150.26	\$166.08	\$316.34

*CORNER IMPACT TESTS NOT CONDUCTED FOR THESE MODEL YEARS

March 23, 1973

the highway
loss reduction

STATUS REPORT

INSURANCE INSTITUTE

for Highway Safety

Vol. 8 No. 3

EXCERPT

January 31, 1973

1973 Model Crash Results

Needless Damage Found, Despite Improvements

Public, congressional and insurer pressures have brought about "noticeable progress in designing the front and rear ends of domestic automobiles to be less fragile in low speed crashes," the president of the Insurance Institute for Highway Safety has told a Senate committee.

"But," Dr. William Haddon, Jr., added, "the improvement is still far short of what has long been readily achievable — the design and production of vehicles immune to *all* damage at these low crash speeds."

Haddon appeared before the Senate Commerce Committee to report the results of IIHS's low speed crash tests of seven 1973 model cars of domestic manufacture. (See charts on 2 and 3.) He told the committee that results for 1973 model foreign cars will be released later.

Noting that IIHS first began low speed crash testing of cars in 1969, Haddon recalled, "Those early tests of 1969 model cars first demonstrated to Congress the built-in fragility of automobiles, and their resulting unnecessary damage in the low speed collisions that are so common on American streets, parking lots and driveways. The results astonished the public, and led to consumer and insurer demands for cars designed to withstand these low speed crashes without damage." (See charts on 4 and 5.)

One response to the demands, he said, was the Department of Transportation's issuance of a standard requiring that 1973 model cars be able to withstand crashes of five miles per hour front-into-barrier, and 2.5 miles per hour rear-into-barrier, without damage to "safety related" parts.

Describing the standard as "simply a reflection of the existing state-of-the-showroom automobile — allowing continued fragility and resulting costly damageability in new cars," Haddon said that IIHS's tests of 1973 model U.S. cars showed that "it is entirely possible for a vehicle to meet the federal standard — and still suffer costly damage." Specifically, the tests showed that: