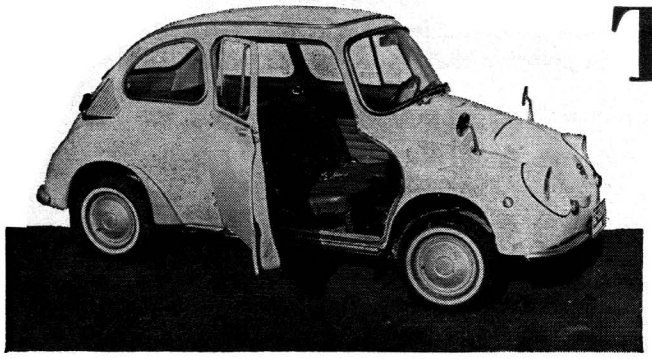


The Subaru 360 (*Not Acceptable*)

The minicar, like the miniskirt, was born in Europe. There, taxes favored vehicles with very small engines. A significant segment of the Continental motoring public, frugally forced to motorcycling, longed for an enclosed vehicle that would cost them little more than a motor bike to own and run. The result: the *Isetta,* the *Messerschmitt Kabinroller,* the *Maico,* the *Goggomobile* and other tiny cars whose power trains were based on motor scooters or motorcycles. Those tiny cars found their way to the U.S. in the mid 1950's, where they enjoyed a brief burst of popularity—more as novelties than as serious transportation.

But it's the serious transportation that's needed. Today's urban traffic congestion, limited parking and generally poor public transportation cry out for a very inexpensive car that takes up little road space, parks easily, maneuvers nimbly, and costs little more than bus fare to drive to the station or to work. At present, the only car aimed at this market being seriously sold in North America is the Japanese *Subaru 360,* a car that has been kicking around Japan for 11 years. Unfortunately, we rate the *Subaru* Not Acceptable.

Present Federal Motor Vehicle Safety Standards exempt cars weighing less than 1000 pounds. Our *Subaru* tipped the curb-weight scales just seven pounds below that magic figure. It makes no pretense of conforming to many of the standards. But, standards or no standards, the *Subaru* is, in CU's judgment, unacceptably hazardous.

Although most law enforcement agencies concentrate on speeding vehicles, vehicles moving substantially slower than the surrounding traffic are an even more frequent cause of road accidents, according to safety experts. They frustrate drivers behind them into rash passing maneuvers. The *Subaru 360* driver, alas, has no choice in the matter. The car's tiny engine simply cannot accelerate the car fast enough to keep up with today's faster-moving traffic, judging by our tests. From a standing start, the *Subaru* took an agonizing 37.5 seconds to reach 50 mph. A 1968 *Volkswagen* Beetle got to 50 mph in 14.5 seconds; our 1969 *Rambler,* in 11.5 seconds. Worse still, the *Subaru* ate up almost half a minute in accelerating from 30 mph to 50 mph. That's a lot of time to spend on the wrong side of a two-lane road, should one ever try to pass another car.

The *Subaru's* emergency handling was even scarier. If one had to make a sudden steering correction at top speed (about 55 mph) to avoid an accident, the result would very likely *be* an accident. Under such circumstances the car's outside rear wheel tucked under as the car's rear end hiked up, causing sudden violent oversteer. The front wheels lost their cornering bite almost simultaneously. That deprives the driver of any corrective tools. He must lift his foot from the accelerator and wait several seconds to see if equilibrium will be restored or whether the car will slide out of control—possibly even roll over. Just driving straight down an open road could be unsettling; crosswinds caused the car to swerve alarmingly.

Braking, too, could be disorienting, although the brakes themselves exhibited sufficient capacity to handle the car's inertia. We encountered no fade problems, but there was some directional instability. That, coupled with the car's habit of diving to its front suspension bumpers when the brakes were applied, made controlled short stops difficult. On slippery surfaces, the front brakes tended to lock, erasing steering control during such stops. Incidentally, the *Subaru* does not have the dual braking system required by Federal Safety Standard for most vehicles. Such a system maintains braking action on two wheels even when the other two wheels' brakes fail.

The car's defroster was only capable of defogging a small triangular patch of condensate from the interior of the windshield with its single outlet (see photo, page 221)—and we had to keep the engine speed up and use the auxiliary fan just to get even that much vision. Unless a window was partially open, most of the windshield and all of the other windows remained translucent in damp weather. As for defrosting snow and ice, forget it! We discovered quickly that the underseat lever controlling the direction of heated air vibrated itself from defrost to heat as we drove, further compounding the system's inadequacy. A pair of heater outlets under the front seat cushion distributed only enough hot air to take the chill out of the interior during freezing weather. The single-speed wiper cleared an insufficient portion of the windshield, and its speed was slower than the minimum required of other cars by Federal standard.

The *Subaru's* doors are hinged at their rear edges and open into the wind. They do not have burst-proof latches. The driver's door cannot be locked from inside the car. And woe to the hapless occupant who tries to close fully

a door found partly latched while underway—the air blast at even 20 mph is sufficient to tear the door out of one's hands and slam it back against the car's afterbody. We know; it happened to us.

The *Subaru's* bumpers are so low that the bumpers of U.S. cars will ride over them. The car's structure is lightweight; we judged it and the bumpers flimsy. In crash tests conducted for the National Highway Safety Institute (research arm of the National Highway Safety Bureau), the *Subaru* displayed shockingly deficient structural integrity. It and a U.S. car were towed toward each other, each at 30 mph, and allowed to collide head on. The U.S. car suffered minor damage. The *Subaru* was collapsed back to its windshield line, and the U.S. car's bumper ended up in the *Subaru's* passenger compartment. The dummy in the *Subaru* wound up enmeshed in metal; the dummy in the U.S. car only bumped its forehead. (We did not take part in these tests and their results only helped confirm our own engineering judgments.)

In the standard steering column penetration test performed by the safety institute, the *Subaru's* column suffered a rearward displacement of almost two inches more than the five inches allowed by U.S. safety standards. It is not a collapsible, energy-absorbing column, either.

Unlike most other present-day automobiles—both U.S. and imported—the *Subaru's* interior is replete with hostile knobs and edges. The front seats of CU's car were not equipped with head restraints, though there appeared to be sockets for their installation. The shoulder belts tended to slip off the shoulders of most users.

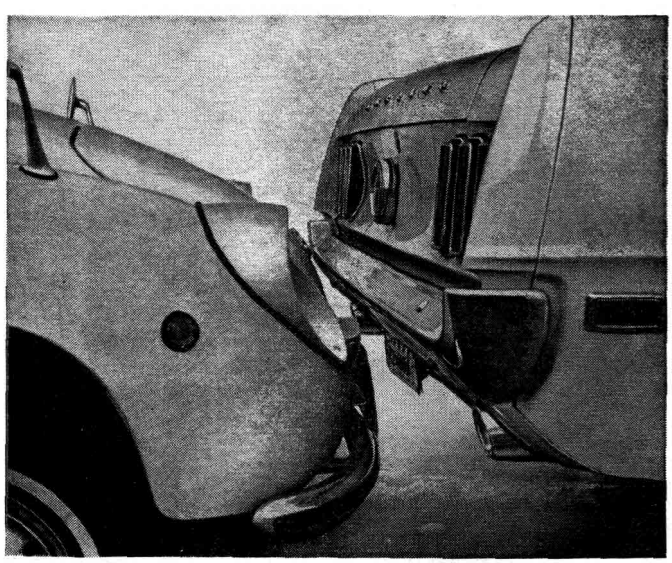
Just a cursory glance at the *Subaru's* complete owner's manual reveals many of the car's other limitations. Break-in of the tiny 22-cubic-inch two-stroke-cycle engine, for instance, is a laborious 1200-mile affair best performed, in our judgment, during cold winter nights on abandoned city streets to avoid piston seizure. Seizure, a well known two-stroke-cycle engine phenomenon, can cause sudden locking of the car's driving wheels and resultant loss of directional control, not to mention the unplanned stop in traffic and engine damage. Fortunately, the preventive recipe is spelled out on two door stickers and page after page of the owner's manual. But the recipe calls for careful oil selection, an initially over-rich oil/fuel mix (more smoke), prolonged warmup before driving off after a cold start, a top speed of 35 mph for the first 600 miles and 45 mph from 600 to 1200 miles, no steady top-speed driving, avoidance of steep hill climbing, and an idling period before engine shutdown. Break-in on U.S. roads is, in our judgment, a continuous hazard.

Economy, one of the primary reasons for considering a car of this size, was not a *Subaru* strong point. Its delivered price of just under $1400 is somewhat lower than other small imports—but for less than $400 more you can buy a usable automobile, the *VW* Beetle, for example, which costs no more to feed and has excellent resale value. If you can afford no more than $1400, it's hard to imagine buying a used U.S. car for that price that wouldn't be a better value (and we can imagine some pretty hairy used-car deals).

The *Subaru* advertises fuel economy of "up to 66 miles per gallon." In normal driving, our car delivered a tank mileage range of 25 to 35 mpg of fuel and consumed outboard motor oil at the average rate of one quart every 260 miles.

Outboard motor oil is not readily available at gas stations, and the *Subaru* burns only one brand (determined at first filling and adhered to throughout the car's life, according to owner's manual instructions).

Shoehorning an adult into the front seat of the *Subaru* is a difficult task. Sitting on the car's board-like front seat with knees jackknifed and feet stuffed into a pointed footwell just a foot or so behind the front bumper made most



The Subaru is highly vulnerable to the bumpers of U.S. cars. They override the Subaru's bumpers, which are virtually useless against anything more formidable than a watermelon

Even at maximum performance, the defroster/defogger on the Subaru cleared no more than this wedge-shaped piece of the windshield, leaving the rest of the car entirely fogged in

members of our staff psychologically as well as physically uncomfortable. The rear seat accommodations bothered even small children.

All controls were within reach of the properly restrained driver; some were too conveniently at hand—or knee. At night, our engineers often bumped off the headlights moving their right hand from a completed shift back to the steering wheel. Pumping the clutch resulted in sore left knees for our longer-legged drivers, who contacted the sharp bottom edge of the warning flasher/heater fan control panel. While bobbing along the road, we discovered that the front seat lap belts loosened at their outboard adjustment points. And the front seat adjusting mechanism often failed to catch—a fault that can result in loss of control when the seat slides forward under heavy braking. The inside mirror vibrated so much at the car's normal cruising speed of 50 mph that it was useless. At that speed, the cacophony of gear whine, power train noise and road roar forced communications to a shout.

It was a pleasure to squirm out of the *Subaru*, slam the door and walk away.

In sum, we rate the *Subaru 360* Not Acceptable. The National Highway Safety Bureau has long been considering removal of the 1000-pound exemption from its safety standards. We think it should. If the Bureau follows its usual pattern, though, any action it took would not be retroactive to the 6000-odd *Subaru 360s* said to be in the U.S.

FACTS AND FIGURES FOR THE SUBARU 360

MFR'S SUGGESTED RETAIL PRICE for a 2-door sedan.	$1357[A]
DIMENSIONS	
WHEELBASE (inches)	71
OVERALL LENGTH (inches)	118
OVERALL WIDTH (inches)	51
OVERALL HEIGHT (inches)	53
TURNING CIRCLE DIAMETER (wall to wall in feet)	28
ADVERTISED FUEL TANK CAPACITY (gallons)	6.6
LUGGAGE CAPACITY (2-suiters + weekend cases)	None
WEIGHT AND TIRES	
CURB WEIGHT (pounds)	993
PER CENT WEIGHT front/rear	41/59
TIRE SIZE (inches)	4.80x10
ENGINE[B]	
TYPE	2-stroke-cycle, 2 cylinder, air cooled
DISPLACEMENT (cubic inches)	22
COMPRESSION RATIO & FUEL REQ'D	6.7R
HORSEPOWER	25 @ 5500
ENGINE REVS PER MILE, HIGH GEAR	6532
PISTON TRAVEL PER MILE, HIGH GEAR (feet)	2570
FINAL DRIVE OVERALL RATIO	5.89
ACCELERATION	
ON LEVEL ROAD	
0-50 mph (seconds)	37.5
¼ mile from rest (seconds)	28.5
Speed at end of ¼ mile (mph)	47
30-50 mph (seconds)	26.4
BRAKING [C]	
LEVEL BRAKING FROM 56 MPH Minimum-distance controlled stop (feet)	136
FADE TEST (from 48 mph): pedal effort for initial ½ g stop (pounds)	60
Effort for 10th repeated stop (pounds)	60
ECONOMY	
RANGE OF GAS MILEAGE TO BE EXPECTED IN NORMAL USE (MPG)	25-35

[A] *Includes $30 for white sidewall tires and seat belts and $30 for dealer preparation.*

[B] *From manufacturer's figures.*

[C] *Car could not reach 60 mph on our test track.*

MFR'S SUGGESTED RETAIL PRICE. Includes Federal tax and import duty, but not inland freight, local taxes or dealer-preparation charge.

TURNING CIRCLE. Diameter of the path of the outermost tip of front bumper with wheels turned all the way left.

CURB WEIGHT. Measured weight of CU's car full of gas and oil.

ENGINE REVOLUTIONS AND PISTON TRAVEL PER MILE. A lower number means, in general, less engine wear, less noise, less acceleration in high gear, and better fuel economy.

ACCELERATION. 0-50 mph and ¼-mile runs with engine idling at start and transmission gears selected for optimum performance; 30-50 mph passing test with accelerator pedal floored and gears used to maximum advantage. Times are given to nearest 0.5 second.

BRAKING. The minimum-distance controlled stop was made from 56 mph and represents the shortest distance (to nearest 10 feet) achieved in several attempts, with the car stopping in a straight line and no uncontrolled skidding. Actual distance applies only to CU's test conditions, including its road surface. The fade test consisted of 10 moderate stops from 48 mph repeated at 1/3-mile intervals. The difference in pedal effort between the first and 10th stops represents the degree of fade. Pedal effort is to nearest 5 pounds.

ECONOMY. Low figure is for short-range stop-and-go traffic; high figure is for open-road, constant-speed trips. Miles per gallon to nearest 0.5.