Seltzer

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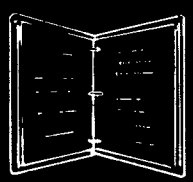
Field Notes



Automobile Fuel Economy in the Forest Service

Nomograph for Load Rating Log Stringer Bridges

Washington Office News

FOREST SERVICE JUNE 1978

U.S. DEPARTMENT OF AGRICULTURE

ENGINEERING FIELD NOTES

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AUTOMOBILE FUEL ECONOMY IN THE FOREST SERVICE

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Congress, in an effort to conserve gasoline and reduce air pollution, has enacted legislation which regulates the gasoline mileage of passenger automobiles sold in the United States starting with fiscal year 1978. These mileage requirements are averages for the entire production of each manufacturer. Each manufacturer is free to determine its product mix; producing some high-mileage cars and some low-mileage cars. However, the average gasoline mileage for the entire fleet produced in any one year must meet the Federal standards listed in table 1.

In order to set an example for the nation and to demonstrate the practicality of the Federal gasoline mileage standards, President Carter has issued an Executive order imposing additional gasoline mileage restrictions on all passenger automobiles purchased by government agencies. The Executive order requires government agency fleets to have an average fuel economy exceeding manufacturer fleet requirements for FY 1978 by 2 MPG, for FY 1979 by 3 MPG, and for FY 1980 and thereafter by 4 MPG (see table 1). Such rules do not apply to automobiles designed to perform combat-related missions for the Armed Forces or designed to be used in law enforcement work or emergency rescue work. Beginning in FY 1979, mileage standards for pickup trucks and vans (shown in table 2) also will become effective.

What does this mean for the Forest Service? It means that any passenger automobile or station wagon purchased in FY 1978 must be rated at 18 MPG or greater. In addition, all purchases during the fiscal year must average 20 MPG or more. To buy an automobile rated at less than 18 MPG requires the approval of both General Services Administration (GSA) and the Department of Energy. The Government is restricted to purchasing compact or subcompact sedans and station wagons only. In the coming years, the trend will continue toward smaller automobiles.

The Environmental Protection Agency (EPA) mileage and fuel cost estimates for all 1978 automobiles are shown in table 3. Any readers interested in the 1978 Gas Mileage Guide may obtain a copy by writing: Fuel Economy, Pueblo, Colorado 81009; for bulk copies write: U.S. Department of Energy, Fuel Economy Distribution, Office of Administration Services, Washington, D.C. 20585.

Table 1.--Passenger automobiles

Fiscal year	Manufacturer [1] fleet average (MPG)	U.S. Government fleet average (MPG)
1978	18.0	20.0
1979	19.0	22.0
1980	20.0	24.0
1981	22.0	26.0
1982	24.0	28.0
1983	26.0	30.0
1984	27.0	31.0
1985	27.5	31.5

[1] *Combined city/highway mileage*

Table 2.--Light trucks

Fiscal year	Gross vehicle weight on road (GVWR) (pounds)	Drive	Manufacturer [1] fleet average (MPG)	U.S. Government fleet average
1979	6,000	2 wheel	17.2	To be determined by GSA
		4 wheel	15.8	
1980	8,500	2 wheel	16.0	
		4 wheel	14.0	
1981	8,500	2 wheel	18.0	
		4 wheel	15.5	

[1] *Combined city/highway mileage*

Table 3.--Fuel cost estimates for all 1978 automobiles

MINICOMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System (0 = Number of barrels in the carburator)	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)	
AVANTI									
AVANTI II	16	$656	14	19	350/8	A	4	2DR-75/8	
DATSUN									
B-210	33	$318	28	40	85(1397CC)/4† (NOCAT)	M	2	2DR-68/7	
	40	$262	36	48	85(1397CC)/4 (CAT)	M	2	4DR-68/7	
	26	$404	24	28	85(1397CC)/4† (NOCAT)	A	2	HTBK-63/14	
200 SX	27	$388	24	32	119/4†	M	2	2DR-70/6	
	25	$420	23	28	119/4†	A	2		
DODGE									
CELESTE *	33	$318	29	39	98/4	M	2	HTBK-73/11	
	32	$328	29	38	98/4	A	2		
	31	$339	27	36	122/4	M	2		
	27	$388	24	31	122/4	A	2		
CHALLENGER	33	$318	29	40	98/4	M	2	2DR-77/8	
	30	$350	27	35	98/4	A	2		
	28	$375	24	35	156/4	M	2		
	24	$438	22	28	156/4	A	2		
COLT	38	$276	34	45	98/4	M	2	2DR-73/8	
	32	$328	29	38	98/4	A	2	4DR-73/8	
FIAT									
128	23	$457	20	31	79/4†	M	2	2DR-75/9	
								4DR-76/9	
								HTBK-72/13	
FORD									
MUSTANG II	26	$404	23	33	140(2.3L)/4	M	2	2DR-72/8	
	25	$420	22	31	140(2.3L)/4	A	2	HTBK-70/10	
	22	$478	20	26	171(2.8L)/6	M	2		
	18	$584	16	20	171(2.8L)/6	A	2		
	19	$552	16	23	302(5.0L)/8	M	2		
	19	$552	16	23	302(5.0L)/8	A	2		
PINTO	29	$362	25	35	140(2.3L)/4	M	2	2DR-75/8	
	24	$438	21	29	140(2.3L)/4	A	2	HTBK-74/9	
	20	$525	18	22	171(2.8L)/6	A	2		
HONDA									
CIVIC	32	$328	29	37	76(1238CC)/4†	M	2	2DR-65/5	
	25	$420	23	30	76(1238CC)/4†	S	2	HTBK-65/9	
	40	$262	36	44	91/4† (CVCC)	M	3		
	32	$328	29	35	91/4† (CVCC)	S	3		
LINCOLN-MERCURY									
BOBCAT	29	$362	25	35	140(2.3L)/4	M	2	HTBK-74/9	

MINICOMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System (0 = Number of barrels in the carburator)	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)	
LINCOLN-MERCURY									
BOBCAT	24	$438	21	29	140(2.3L)/4	A	2		
	20	$525	18	22	171(2.8L)/6	A	2		
MAZDA									
RX-3	23	$457	19	28	70/2 (ROTARY)	M	4	2DR-68/10	
	20	$525	18	23	70/2 (ROTARY)	A	4		
PLYMOUTH									
ARROW	33	$318	29	39	98/4	M	2	HTBK-73/11	
	32	$328	29	38	98/4	A	2		
	31	$339	27	36	122/4	M	2		
	27	$388	24	31	122/4	A	2		
LANCER *	38	$276	34	45	98/4	M	2	2DR-73/8	
	32	$328	29	38	98/4	A	2	4DR-73/8	
SAPPORO	33	$318	29	40	98/4	M	2	2DR-77/8	
	30	$350	27	35	98/4	A	2		
	28	$375	24	35	156/4	M	2		
	24	$438	22	28	156/4	A	2		
PORSCHE									
928	14	$750	12	19	273/8	M	FI	HTBK-74/8	
	13	$807	11	16	273/8	A	FI		
RENAULT									
LE CAR	31	$339	26	41	79/4†	M	2	HTBK-74/10	
17 GORDINI	25	$420	20	36	101/4†	M	FI	2DR-72/8	
SUBARU									
SUBARU	37	$284	31	46	97/4†	M	2	2DR-71/11	
	29	$362	26	33	97/4†	A	2	4DR-74/11	
VOLKSWAGEN									
BEETLE CONVERTIBLE	24	$438	21	30	97/4†	M	FI	2DR-67/7	

† *Certified for use on leaded gasoline.*

● *Available in Puerto Rico only.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

SUBCOMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	1 Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)	
ALFA ROMEO									
ALFETTA	23	$457	19	29	120(1972CC)/4	M	FI	2DR-74/7	
								4DR-89/9	
AMC									
GREMLIN	26	$404	22	34	121/4	M	2	HTBK-79/9	
	24	$438	20	29	121/4	A	2		
	23	$457	20	28	232/6	M	1		
	21	$500	18	25	232/6	A	1		
	19	$552	16	25	258/6	M	2		
	18	$584	16	21	258/6	A	2		
AUDI									
FOX	28	$375	23	37	97/4†	M	FI	2DR-84/11	
	23	$457	20	29	97/4†	A	FI	4DR-84/11	
BMW									
320 I	22	$478	19	28	121/4†	M	FI	2DR-82/12	
	21	$500	18	26	121/4†	A	FI		
530 I	17	$617	14	24	182/6†	M	FI	4DR-86/13	
	17	$617	14	21	182/6†	A	FI		
BUICK									
OPEL	27	$388	24	34	111/4	M	2	2DR-76/10	
	27	$388	24	31	111/4	A	2	4DR-79/10	
SKYHAWK	19	$552	16	28	231/6	M	2	HTBK-78/10	
	22	$478	19	27	231/6	A	2		
CHEVROLET									
CAMARO	21	$500	18	27	250/6	M	1	2DR-85/6	
	19	$552	17	24	250/6	A	1		
	17	$617	15	21	305/8	M	2		
	19	$552	16	22	305/8	A	2		
	16	$656	14	19	350/8 (GM-CHEV)	M	4		
	17	$617	15	21	350/8 (GM-CHEV)	A	4		
CHEVETTE	34	$309	30	40	98(1.6L)/4	M	1	HTBK-79/9	
	28	$375	25	33	98(1.6L)/4	A	1		
MONZA	28	$375	24	34	151/4	M	2	2DR-78/7	
	26	$404	23	31	151/4	A	2	HTBK-78/10	
	23	$457	19	33	196(3.2L)/6	M	2		
	21	$500	18	26	196(3.2L)/6	A	2		
	19	$552	15	23	231/6	M	2		
	21	$500	18	26	231/6	A	2		
	18	$584	16	22	305/8	M	2		
	20	$525	17	25	305/8	A	2		
DATSUN									
F-10	33	$318	28	40	85(1397CC)/4†	M	2	HTBK-71/14	

SUBCOMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
DATSUN									
510	29	$382	25	35	119/4†		M	2	2DR-79/8
	27	$388	25	29	119/4†		A	2	4DR-79/8
									HTBK-73/13
810	18	$584	16	23	146/6†		M	FI	4DR-80/8
	19	$552	17	21	146/6†		A	FI	
FIAT									
LANCIA BETA	20	$525	17	25	107/4†		M	2	2DR-71/9
	18	$584	17	20	107/4		A	2	4DR-85/12
									HTBK-78/16
131 MIRAFIORI	21	$500	17	27	107/4†		M	2	2DR-85/11
	20	$525	18	23	107/4†		A	2	4DR-85/11
FORD									
FIESTA	38	$276	34	46	98(1.6L)/4		M	2	HTBK-79/9
HONDA									
ACCORD	37	$284	33	44	98/4†	(CVCC)	M	3	HTBK-82/14
	30	$350	28	33	98/4†	(CVCC)	S	3	
MAZDA									
COSMO	22	$478	19	27	80/2	(ROTARY)	M	4	2DR-75/10
	19	$552	17	23	80/2	(ROTARY)	A	4	
GLC	38	$276	35	44	78/4		M	2	HTBK-75/11
	33	$318	30	38	78/4		A	2	
RX-4	22	$478	19	27	80/2	(ROTARY)	M	4	4DR-80/11
	19	$552	17	23	80/2	(ROTARY)	A	4	
OLDSMOBILE									
STARFIRE	28	$375	24	34	151/4		M	2	HTBK-78/10
	26	$404	23	31	151/4		A	2	
	19	$552	16	28	231/6		M	2	
	22	$478	19	27	231/6		A	2	
	18	$584	16	22	305/8		M	2	
	20	$525	17	25	305/8		A	2	
PONTIAC									
FIREBIRD	19	$552	16	25	231/6		M	2	2DR-85/7
	20	$525	17	25	231/6		A	2	
	17	$617	15	21	305/8		M	2	
	19	$552	16	22	305/8		A	2	
	16	$656	14	19	350/8	(GM-CHEV)	M	4	
	17	$617	15	21	350/8	(GM-CHEV)	A	4	
	14	$750	12	16	400/8		M	4	
	16	$656	14	19	400/8		A	4	
SUNBIRD	28	$375	24	34	151/4		M	2	2DR-78/7
	26	$404	23	31	151/4		A	2	HTBK-78/10

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

SUBCOMPACT CARS

Manufacturers / Manufacturer Car Line	Fuel Economy: Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Vehicle Description: Engine Description CID/Cyl Type	Transmission	Fuel System O	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
PONTIAC								
SUNBIRD	19	$552	16	28	231/6	M	2	
	22	$478	19	27	231/6	A	2	
	18	$584	16	22	305/8	M	2	
	20	$525	17	25	305/8	A	2	
ROLLS-ROYCE/ BENTLEY								
ROLLS-ROYCE/ BENTLEY	11	$954	10	13	412/8	A	2	2DR-79/11 4DR-93/13
TOYOTA								
CELICA	25	$420	20	34	134/4	M	2	2DR-80/9
	24	$438	22	27	134/4	A	2	HTBK-80/ 14
COROLLA	39	$269	34	46	71/4	M	2	2DR-75/9
	32	$328	28	38	97/4	M	2	4DR-78/9
	28	$375	26	32	97/4	A	2	HTBK-75/ 12
CORONA	23	$457	20	29	134/4	M	2	2DR-77/10
	21	$500	19	23	134/4	A	2	4DR-78/10
CRESSIDA	22	$478	20	27	156/6	A	2	4DR-83/11
VOLKSWAGEN								
DASHER	28	$375	23	37	97/4†	M	FI	4DR-84/12
	23	$457	20	29	97/4†	A	FI	HTBK-83/ 18
RABBIT	31	$339	26	40	89/4	M	1	HTBK-80/ 15
	29	$362	25	38	89/4†	M	FI	
	26	$404	22	32	89/4†	A	FI	
	45	$200	40	53	90/4 (DIESEL)	M	FI	
SCIROCCO	29	$362	25	38	89/4†	M	FI	HTBK-74/ 16
	26	$404	22	32	89/4†	A	FI	

COMPACT CARS

Manufacturers / Manufacturer Car Line	Fuel Economy: Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Vehicle Description: Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
AMC								
CONCORD	25	$420	21	33	121/4	M	2	2DR-90/11
	24	$438	20	29	121/4	A	2	4DR-90/11
	22	$478	19	26	232/6	M	1	HTBK-83/ 16
	20	$525	18	23	232/6	A	1	
	19	$552	16	25	258/6	M	2	
	18	$584	16	21	258/6	A	2	
	16	$656	14	19	304/8	A	2	
PACER	22	$478	19	26	232/6	M	1	HTBK-89/ 11
	20	$525	18	23	232/6	A	1	
	19	$552	16	25	258/6	M	2	
	18	$584	16	21	258/6	A	2	
	16	$656	14	19	304/8	A	2	
AUDI								
5000	17	$617	15	22	131/5†	M	FI	4DR-90/15
	19	$552	17	24	131/5†	A	FI	
BUICK								
SKYLARK	19	$552	16	26	231/6	M	2	2DR-90/14
	21	$500	18	26	231/6	A	2	4DR-96/13
	19	$552	16	22	305/8	A	2	HTBK-90/ 16
CADILLAC								
SEVILLE	16	$656	14	20	350/8 (GM-CAD)	A	FI	4DR-95/13
	24	$375	21	30	350(5.7L)/8 (DIESEL)	A	FI	
CHEVROLET								
NOVA	21	$500	19	26	250/6	M	1	2DR-90/13
	20	$525	18	24	250/6	A	1	4DR-96/13
	17	$617	15	21	305/8	M	2	HTBK-90/ 16
	19	$552	16	22	305/8	A	2	
	17	$617	15	21	350/8 (GM-CHEV)	A	4	
DODGE								
ASPEN	23	$457	20	28	225/6	M	1	2DR-87/15
	23	$457	20	27	225/6	A	1	4DR-98/15
	21	$500	18	28	225/6	M	2	
	21	$500	18	25	225/6	A	2	
	18	$584	15	25	318/8	M	2	
	18	$584	15	22	318/8	A	2	
	17	$617	15	22	360/8	A	2	
	13	$807	10	17	360/8	A	4	
OMNI	29	$362	25	38	105/4	M	2	HTBK-8.. 15
	26	$404	23	31	105/4	A	2	

† *Certified for use on leaded gasoline.*

O *Number of barrels in the carburator.*

COMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System	Body Type Interior Space Passengar/ Trunk or Cargo(Cu. Ft.)
FORD									
GRANADA	24	$438	21	28	250(4.1L)/6		M	1	2DR-89/15
	21	$500	18	26	250(4.1L)/6		A	1	4DR-93/15
	19	$552	16	25	302(5.0L)/8		M	2	
	19	$552	16	23	302(5.0L)/8		A	2	
LINCOLN-MERCURY									
MONARCH	24	$438	21	28	250(4.1L)/6		M	1	2DR-89/16
	21	$500	18	26	250(4.1L)/6		A	1	4DR-93/16
	19	$552	16	25	302(5.0L)/8		M	2	
	19	$552	16	23	302(5.0L)/8		A	2	
VERSAILLES	18	$584	16	23	302(5.0L)/8		A	2	4DR-92/15
MERCEDES-BENZ									
MB 116(280)	16	$656	14	19	168(2.8L)/6		A	FI	4DR-92/15
	26	$346	24	29	183(3.0L)/5	(TURBO-DIESEL)	A	FI	
MB 123(230)	19	$552	17	22	141(2.3L)/4		A	1	2DR-84/13
	29	$310	26	34	147(2.4L)/4	(DIESEL)	M	FI	4DR-92/13
	27	$333	26	30	147(2.4L)/4	(DIESEL)	A	FI	
	16	$656	14	19	168(2.8L)/6		A	FI	
	25	$360	22	28	183(3.0L)/5	(DIESEL)	A	FI	
OLDSMOBILE									
OMEGA	19	$552	16	28	231/6		M	2	2DR-90/14
	21	$500	18	26	231/6		A	2	4DR-96/14
	17	$617	15	21	305/8		M	2	HTBK-90/16
	19	$552	16	22	305/8		A	2	
PEUGEOT									
504	20	$525	17	25	120/4		M	2	4DR-90/10
	19	$552	17	22	120/4		A	2	
	30	$300	28	34	141/4	(DIESEL)	M	FI	
	28	$321	25	31	141/4	(DIESEL)	A	FI	
604	18	$584	15	22	163/6		M	3	4DR-91/14
	17	$617	15	19	163/6		A	3	
PLYMOUTH									
HORIZON	29	$362	25	38	105/4		M	2	HTBK-85/15
	26	$404	23	31	105/4		A	2	
VOLARE	23	$457	20	28	225/6		M	1	2DR-87/15
	23	$457	20	27	225/6		A	1	4DR-98/15
	21	$500	18	28	225/6		M	2	
	21	$500	18	25	225/6		A	2	
	18	$584	15	25	318/8		M	2	
	18	$584	15	22	318/8		A	2	

COMPACT CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System	Body Type Interior Space Passengar/ Trunk or Cargo(Cu. Ft.)
PLYMOUTH									
VOLARE	17	$617	15	22	360/8		A	2	
	13	$807	10	17	360/8		A	4	
PONTIAC									
PHOENIX	23	$457	21	27	151/4		A	2	2DR-90/14
	19	$552	16	28	231/6		M	2	4DR-96/13
	20	$525	18	26	231/6		A	2	HTBK-90/16
	17	$617	15	21	305/8		M	2	
	19	$552	16	22	305/8		A	2	
ROLLS-ROYCE/ BENTLEY									
CAMARGUE	11	$954	10	13	412/8		A	2	2DR-94/14
SAAB									
99	25	$420	22	30	122(2.0L)/4	(3WAYCAT)	M	FI	2DR-91/13
	22	$478	20	27	122(2.0L)/4	(3WAYCAT-TURBO)	M	FI	HTBK-89/21
	23	$457	19	29	122(2.0L)/4†	(NOCAT)	M	FI	
	23	$457	20	26	122(2.0L)/4	(3WAYCAT)	A	FI	
	21	$500	18	24	122(2.0L)/4†	(NOCAT)	A	FI	
VOLVO									
VOLVO SEDAN	24	$438	20	31	130/4	(3WAYCAT)	M	FI	2DR-89/14
	23	$457	19	29	130/4	(CAT)	M	FI	4DR-89/14
	21	$500	19	24	130/4	(CAT)	A	FI	
	22	$478	20	25	130/4	(3WAYCAT)	A	FI	
	19	$552	15	27	163/6	(CAT)	M	FI	
	19	$552	16	27	163/6	(3WAYCAT)	M	FI	
	18	$584	16	22	163/6	(CAT)	A	FI	
	19	$552	17	23	163/6	(3WAYCAT)	A	FI	

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

MID-SIZE CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)	
AMC									
MATADOR COUPE	14	$750	12	17	360/8	A	2	2DR-97/14	
BUICK									
CENTURY	23	$457	19	33	196(3.2L)/6	M	2	2DR-94/16	
	21	$500	18	26	196(3.2L)/6	A	2	4DR-101/16	
	19	$552	16	28	231/6	M	2		
	22	$478	19	27	231/6	A	2		
	20	$525	17	25	305/8	A	2		
	21	$500	18	26	305/8	A	4		
REGAL	23	$457	19	33	196(3.2L)/6	M	2	2DR-96/16	
	21	$500	18	26	196(3.2L)/6	A	2		
	19	$552	16	28	231/6	M	2		
	21	$500	19	26	231(3.8L)/6 (TURBO)	A	2		
	22	$478	19	27	231/6	A	2		
	20	$525	17	25	231(3.8L)/6 (TURBO)	A	4		
	20	$525	17	25	305/8	A	2		
	21	$500	18	26	305/8	A	4		
CADILLAC									
ELDORADO	11	$954	10	15	425/8	A	4	2DR-102/17	
CHECKER									
CHECKER	18	$584	16	22	250/6	A	1	4DR-100/14	
	13	$807	12	14	350/8	A	4		
CHEVROLET									
MALIBU	24	$438	21	29	200(3.3L)/6	M	2	2DR-96/17	
	21	$500	19	25	200(3.3L)/6	A	2	4DR-102/17	
	18	$584	16	22	305/8	M	2		
	20	$525	17	25	305/8	A	2		
MONTE CARLO	19	$552	16	28	231/6	M	2	2DR-96/16	
	22	$478	19	27	231/6	A	2		
	18	$584	16	22	305/8	M	2		
	20	$525	17	25	305/8	A	2		
CHRYSLER									
CORDOBA	16	$656	14	21	318/8	A	2	2DR-95/16	
	17	$617	14	22	360/8	A	2		
	15	$700	13	20	400/8	A	4		
LEBARON	20	$525	17	25	225/6	M	2	2DR-91/16	
	19	$552	17	22	225/6	A	2	4DR-97/16	
	18	$584	15	25	318/8	M	2		
	18	$584	15	22	318/8	A	2		
	17	$617	14	22	360/8	A	2		

MID-SIZE CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)	
DODGE									
CHARGER SE/ MAGNUM XE	16	$656	14	21	318/8	A	2	2DR-97/16	
	17	$617	14	22	360/8	A	2		
	15	$700	13	20	400/8	A	4		
DIPLOMAT	20	$525	17	25	225/6	M	2	2DR-91/16	
	19	$552	17	22	225/6	A	2	4DR-97/16	
	18	$584	15	25	318/8	M	2		
	18	$584	15	22	318/8	A	2		
	17	$617	14	22	360/8	A	2		
MONACO	20	$525	18	25	225/6	M	1	2DR-95/15	
	20	$525	17	24	225/6	A	1	4DR-101/20	
	19	$552	17	22	225/6	A	2		
	16	$656	14	21	318/8	A	2		
	17	$617	14	22	360/8	A	2		
	13	$807	10	17	360/8	A	4		
	15	$700	13	20	400/8	A	4		
	11	$954	10	14	440/8	A	4		
FORD									
FAIRMONT	26	$404	23	33	140(2.3L)/4	M	2	2DR-95/17	
	26	$404	22	33	140(2.3L)/4	A	2	4DR-96/17	
	24	$438	21	29	200(3.3L)/6	M	1		
	22	$478	19	26	200(3.3L)/6	A	1		
	19	$552	16	23	302(5.0L)/8	A	2		
LTD II	17	$617	15	22	302/8	A	2	2DR-94/16	
	16	$656	14	20	351(5.8L)/8 (MENG)	A	2	4DR-102/16	
	18	$584	15	22	351(5.8L)/8 (WENG)	A	2		
	15	$700	13	17	400(6.6L)/8	A	2		
THUNDERBIRD	17	$617	15	22	302(5.0L)/8	A	2	2DR-95/16	
	16	$656	14	20	351(5.8L)/8 (MENG)	A	2		
	18	$584	15	22	351(5.8L)/8 (WENG)	A	2		
	15	$700	13	17	400(6.6L)/8	A	2		
LINCOLN-MERCURY									
CONTINENTAL MARK V	15	$700	13	20	400(6.6L)/8	A	2	2DR-99/18	
	14	$750	12	17	460(7.5L)/8	A	4		
COUGAR/ COUGAR XR-7	17	$617	15	22	302(5.0L)/8	A	2	2DR-93/16	
	16	$656	14	20	351(5.8L)/8 (MENG)	A	2	4DR-101/16	
	18	$584	15	22	351(5.8L)/8 (WENG)	A	2		
	15	$700	13	17	400(6.6L)/8	A	2		
ZEPHYR	26	$404	23	33	140(2.3L)/4	M	2	2DR-95/17	
	26	$404	22	33	140(2.3L)/4	A	2	4DR-96/17	

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

MID-SIZE CARS

Manufacturer's Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System 0	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
LINCOLN-MERCURY								
ZEPHYR	24	$438	21	29	200(3.3L)/6	M	1	
	22	$478	19	26	200(3.3L)/6	A	1	
	19	$552	16	23	302(5.0L)/8	A	2	
MERCEDES-BENZ								
MB116V(450)	14	$750	12	18	276(4.5L)/8	A	FI	4DR-96/15
	12	$875	10	15	417(6.9L)/8	A	FI	
OLDSMOBILE								
CUTLASS	19	$552	16	28	231/6	M	2	2DR-97/16
	22	$478	19	27	231/6	A	2	4DR-101/16
	23	$457	20	29	260/8	M	2	
	22	$478	19	27	260/8	A	2	
	18	$584	16	22	305/8	M	2	
	21	$500	18	26	305/8	A	4	
CUTLASS SUPREME	19	$552	16	28	231/6	M	2	2DR-98/16
	22	$478	19	27	231/6	A	2	
	23	$457	20	29	260/8	M	2	
	22	$478	19	27	260/8	A	2	
	18	$584	16	22	305/8	M	2	
	21	$500	18	26	305/8	A	4	
PLYMOUTH								
FURY	20	$525	18	25	225/6	M	1	2DR-95/15
	20	$525	17	24	225/6	A	1	4DR-101/20
	19	$552	17	22	225/6	A	2	
	16	$656	14	21	318/8	A	2	
	17	$617	14	22	360/8	A	2	
	13	$807	10	17	360/8	A	4	
	15	$700	13	20	400/8	A	4	
	11	$954	10	14	440/8	A	4	
PONTIAC								
GRAND PRIX	19	$552	16	28	231/6	M	2	2DR-94/16
	22	$478	19	27	231/6	A	2	
	20	$525	18	25	301/8	A	2	
	20	$525	17	24	301/8	A	4	
LEMANS	19	$552	16	28	231/6	M	2	2DR-96/17
	22	$478	19	27	231/6	A	2	4DR-102/17
	22	$478	19	27	260/8	A	2	
	20	$525	18	25	301/8	A	2	
	20	$525	17	24	301/8	A	4	
	20	$525	17	25	305/8	A	2	

LARGE CARS

Manufacturer's Car Line	Combined MPG	Average Annual Fuel Costs	City MPC	Highway MPG	Engine Description CID/Cyl Type		Transmission	Fuel System 0	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
AMC									
MATADOR SEDAN	14	$750	12	17	360/8		A	2	4DR-110/20
BUICK									
ELECTRA	18	$584	15	22	350/8	(GM-BUICK)	A	4	2DR-108/20
	16	$656	14	20	403/8		A	4	4DR-111/20
LESABRE	20	$525	17	25	231/6		A	2	2DR-107/21
	19	$552	16	22	231(3.8L)/6	(TURBO)	A	4	4DR-111/21
	20	$525	17	24	301/8		A	2	
	18	$584	15	22	350/8	(GM-BUICK)	A	4	
	17	$617	14	20	403/8		A	4	
RIVIERA	18	$584	15	22	350/8	(GM-BUICK)	A	4	2DR-108/20
	16	$656	14	20	403/8		A	4	
CADILLAC									
CADILLAC	15	$700	13	19	425/8		A	4	2DR-107/20
	14	$750	12	18	425/8		A	FI	4DR-109/20
LIMOUSINE	11	$954	10	15	425/8		A	4	4DR-116/18
CHEVROLET									
CHEVROLET	19	$552	17	24	250/6		A	1	2DR-106/20
	19	$552	16	22	305/8		A	2	4DR-111/20
	17	$617	15	21	350/8	(GM-CHEV)	A	4	
CHRYSLER									
CHRYSLER	15	$700	13	20	360/8		A	2	2DR-106/22
	14	$750	11	18	400/8		A	4	4DR-107/22
	12	$875	10	16	440/8		A	4	
FORD									
FORD	17	$617	15	22	302(5.0L)/8		A	2	2DR-100/23
	16	$656	13	21	351(5.8L)/8	(MENG)	A	2	4DR-106/23
	18	$584	15	22	351(5.8L)/8	(WENG)	A	2	
	15	$700	13	20	400(6.6L)/8		A	2	
	14	$750	12	17	460(7.5L)/8		A	4	

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

LARGE CARS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
LINCOLN-MERCURY									
LINCOLN CONTINENTAL	15	$700	13	20	400(6.6L)/8		A	2	2DR-111/22
	13	$807	11	17	460(7.5L)/8		A	4	4DR-114/22
MERCURY	16	$656	13	21	351(5.8L)/8	(MFNG)	A	2	2DR-100/23
	15	$700	13	20	400(6.6L)/8		A	2	4DR-108/23
	14	$750	12	17	460(7.5L)/8		A	4	
OLDSMOBILE									
DELTA 88	20	$525	17	25	231/6		A	2	2DR-107/20
	21	$500	18	25	260/8		A	2	4DR-111/20
	19	$552	16	23	350/8	(GM-OLDS)	A	4	
	24	$375	21	30	350(5.7L)/8	(DIESEL)	A	FI	
	16	$656	14	20	403/8		A	4	
OLDSMOBILE 98	17	$617	15	22	350/8	(GM-OLDS)	A	4	2DR-108/20
	24	$375	21	30	350(5.7L)/8	(DIESEL)	A	FI	4DR-111/20
	16	$656	14	20	403/8		A	4	
TORONADO	15	$700	13	19	403/8		A	4	2DR-105/17
PONTIAC									
PONTIAC	20	$525	17	25	231/6		A	2	2DR-107/20
	20	$525	17	24	301/8		A	2	4DR-111/20
	18	$584	15	22	350/8	(GM-BUICK)	A	4	
	16	$656	14	19	400/8		A	4	

TWO SEATERS

Manufacturers	Fuel Economy				Vehicle Description			
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System
ALFA ROMEO								
SPIDER 2000	21	$500	18	26	120(1972CC)/4		M	FI
CHEVROLET								
CORVETTE	18	$656	14	19	350/8	(GM-CHEV)	M	4
	17	$617	15	21	350/8	(GM-CHEV)	A	4
DATSUN								
280Z	21	$500	18	27	168/6†		M	FI
	19	$552	17	23	168/6†		A	FI
FIAT								
LANCIA BETA SCORPION	20	$525	18	23	107/4		M	2
X1/9	23	$457	20	31	79/4†		M	2
124 SPORT	22	$478	19	28	107/4†		M	2
MERCEDES-BENZ								
MB107(450SL/SLC)	14	$750	12	19	276(4.5L)/8		A	FI
MG								
MGB	20	$525	16	29	110/4		M	1
MIDGET	26	$404	22	33	91/4		M	1
PORSCHE								
911	19	$552	15	27	183/6		M	FI
	14	$750	11	22	201/6†	(TURBO)	M	FI
924	23	$457	20	30	121/4		M	FI
	21	$500	19	26	121/4		A	FI
TRIUMPH								
SPITFIRE	26	$404	22	33	91/4		M	1
TR	23	$457	20	28	122/4		M	2
	22	$478	20	26	122/4		A	2
	19	$552	16	26	215/8		M	2
	17	$617	15	22	215/8		A	2

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

SMALL STATION WAGONS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
AMC								
CONCORD WAGON	22	$478	19	26	232/6	M	1	4DR-91/30
	20	$525	18	23	232/6	A	1	
	18	$584	16	21	258/6	A	2	
	16	$656	14	19	304/8	A	2	
PACER WAGON	22	$478	19	26	232/6	M	1	2DR-91/26
	20	$525	18	23	232/6	A	1	
	19	$552	16	25	258/6	M	2	
	18	$584	16	21	258/6	A	2	
	16	$656	14	19	304/8	A	2	
AUDI								
FOX WAGON	28	$375	23	37	97/4†	M	FI	4DR-83/40
	23	$457	20	29	97/4†	A	FI	
CHEVROLET								
MONZA WAGON	28	$375	24	34	151/4	M	2	2DR-83/25
	26	$404	23	31	151/4	A	2	
	19	$552	15	28	231/6	M	2	
	21	$500	18	26	231/6	A	2	
DATSUN								
F-10 WAGON	33	$318	28	40	85(1397CC)/4† (NOCAT)	M	2	2DR-73/29
510 WAGON	27	$388	24	32	119/4†	M	2	4DR-79/29
	25	$420	23	28	119/4†	A	2	
810 WAGON	18	$584	16	23	146/6†	M	FI	4DR-81/30
	19	$552	17	21	146/6†	A	FI	
DODGE								
COLT WAGON	32	$328	28	38	98/4	M	2	4DR-82/34
	30	$350	27	35	98/4	A	2	
	28	$375	24	35	156/4	M	2	
	24	$438	22	28	156/4	A	2	
FIAT								
128 WAGON	23	$457	20	31	79/4†	M	2	2DR-76/26
131 ESTATE WAGON	21	$500	17	27	107/4†	M	2	4DR-85/33
	20	$525	18	23	107/4†	A	2	
FORD								
PINTO WAGON	26	$404	23	33	140(2.3L)/4	M	2	2DR-78/31
	25	$420	22	31	140(2.3L)/4	A	2	
	20	$525	18	22	171(2.8L)/6	A	2	
HONDA								
CIVIC WAGON	33	$318	31	36	91/4† (CVCC)	M	3	4DR-65/22
	29	$362	27	31	91/4† (CVCC)	S	3	

SMALL STATION WAGONS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
LINCOLN-MERCURY								
BOBCAT WAGON	26	$404	23	33	140(2.3L)/4	M	2	2DR-78/31
	25	$420	22	31	140(2.3L)/4	A	2	
	20	$525	18	22	171(2.8L)/6	A	2	
MAZDA								
RX-4 WAGON	22	$478	19	27	80/2 (ROTARY)	M	4	4DR-82/32
	19	$552	17	23	80/2 (ROTARY)	A	4	
PLYMOUTH								
LANCER WAGON •	32	$328	28	38	98/4	M	2	4DR-82/34
	30	$350	27	35	98/4	A	2	
	28	$375	24	35	156/4	M	2	
	24	$438	22	28	156/4	A	2	
PONTIAC								
SUNBIRD SAFARI WAGON	28	$375	24	34	151/4	M	2	2DR-83/25
	26	$404	23	31	151/4	A	2	
	21	$500	17	29	231/6	M	2	
	21	$500	18	26	231/6	A	2	
SUBARU								
SUBARU WAGON	31	$339	27	37	97/4†	M	2	4DR-74/24
	28	$375	25	33	97/4†	A	2	
TOYOTA								
COROLLA WAGON	32	$328	28	38	97/4	M	2	4DR-74/31
	28	$375	26	32	97/4	A	2	
CORONA WAGON	23	$457	20	29	134/4	M	2	4DR-77/35
	21	$500	19	23	134/4	A	2	
CRESSIDA WAGON	22	$478	20	27	156/6	A	2	4DR-84/38
VOLKSWAGEN								
DASHER WAGON	28	$375	23	37	97/4†	M	FI	4DR-83/40
	23	$457	20	29	97/4†	A	FI	

† *Certified for use on leaded gasoline.*

● *Available in Puerto Rico only.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

MID-SIZE STATION WAGONS

Manufacturers	Fuel Economy				Vehicle Description			
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
BUICK								
CENTURY WAGON	22	$478	19	27	231/6	A	2	4DR-100/40
	19	$552	16	22	305/8	A	2	
	18	$584	16	23	305/8	A	4	
CHEVROLET								
MALIBU WAGON	24	$438	21	29	200(3.3L)/6	M	2	4DR-101/40
	21	$500	19	25	200(3.3L)/6	A	2	
	17	$617	15	21	305/8	M	2	
	19	$552	16	22	305/8	A	2	
CHRYSLER								
LEBARON WAGON	20	$525	17	25	225/6	M	2	4DR-98/39
	19	$552	17	22	225/6	A	2	
	16	$656	14	21	318/8	A	2	
	17	$617	14	22	360/8	A	2	
DODGE								
ASPEN WAGON	20	$525	18	25	225/6	M	1	4DR-99/39
	20	$525	17	25	225/6	M	2	
	19	$552	17	22	225/6	A	2	
	18	$584	15	25	318/8	M	2	
	18	$584	15	22	318/8	A	2	
	17	$617	14	22	360/8	A	2	
DIPLOMAT WAGON	20	$525	17	25	225/6	M	2	4DR-98/39
	19	$552	17	22	225/6	A	2	
	16	$656	14	21	318/8	A	2	
	17	$617	14	22	360/8	A	2	
MONACO WAGON	15	$700	13	20	360/8	A	2	4DR-104/50
	14	$750	11	18	400/8	A	4	
FORD								
FAIRMONT WAGON	26	$404	23	33	140(2.3L)/4	M	2	4DR-98/43
	23	$457	19	29	200(3.3L)/6	M	1	
	20	$525	18	24	200(3.3L)/6	A	1	
	19	$552	16	23	302(5.0L)/8	A	2	
LINCOLN-MERCURY								
ZEPHYR WAGON	26	$404	23	33	140(2.3L)/4	M	2	4DR-98/43
	23	$457	19	29	200(3.3L)/6	M	1	

MID-SIZE STATION WAGONS

Manufacturers	Fuel Economy				Vehicle Description			
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	0 Fuel System	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
LINCOLN-MERCURY								
ZEPHYR WAGON	20	$525	18	24	200(3.3L)/6	A	1	
	19	$552	16	23	302(5.0L)/8	A	2	
OLDSMOBILE								
CUTLASS CRUISER WAGON	22	$478	19	27	231/6	A	2	4DR-100/40
	21	$500	18	25	260/8	A	2	
	18	$584	16	23	305/8	A	4	
PEUGEOT								
504 WAGON	20	$525	17	25	120/4	M	2	4DR-89/44
	19	$552	17	22	120/4	A	2	
	30	$300	28	34	141/4 (DIESEL)	M	FI	
	28	$321	25	31	141/4 (DIESEL)	A	FI	
PLYMOUTH								
FURY WAGON	15	$700	13	20	360/8	A	2	4DR-104/50
	14	$750	11	18	400/8	A	4	
VOLARE WAGON	20	$525	18	25	225/6	M	1	4DR-99/39
	20	$525	17	25	225/6	M	2	
	19	$552	17	22	225/6	A	2	
	18	$584	15	25	318/8	M	2	
	18	$584	15	22	318/8	A	2	
	17	$617	14	22	360/8	A	2	
PONTIAC								
LEMANS SAFARI WAGON	22	$478	19	27	231/8	A	2	4DR-101/40
	19	$552	16	22	305/8	A	2	
VOLVO								
VOLVO STATION WAGON	23	$457	19	31	130/4 (3WAYCAT)	M	FI	4DR-89/42
	22	$478	18	29	130/4 (CAT)	M	FI	
	21	$500	19	24	130/4 (3WAYCAT)	A	FI	
	20	$525	18	24	130/4 (CAT)	A	FI	
	19	$552	15	27	163/6 (CAT)	M	FI	
	19	$552	16	27	163/6 (3WAYCAT)	M	FI	
	19	$552	17	23	163/6 (3WAYCAT)	A	FI	
	18	$584	16	22	163/6 (CAT)	A	FI	

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

LARGE STATION WAGONS

Manufacturers	Fuel Economy				Vehicle Description				
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System 0	Body Type Interior Space Passenger/ Trunk or Cargo(Cu. Ft.)
AMC								
MATADOR WAGON	14	$750	12	17	360/8	A	2	4DR-112/ 50
BUICK								
ESTATE WAGON	18	$584	15	22	350/8 (GM-BUICK)	A	4	4DR-111/ 51
	16	$656	14	20	403/8	A	4	
CHEVROLET								
CHEVROLET WAGON	16	$656	14	20	305/8	A	2	4DR-111/ 51
	16	$656	14	19	350/8 (GM-CHEV)	A	4	
FORD								
FORD WAGON	16	$656	13	21	351(5.8L)/8 (MENG)	A	2	4DR-108/ 56
	15	$700	13	20	400(6.6L)/8	A	2	
	13	$807	11	17	460(7.5L)/8	A	4	
LINCOLN-MERCURY								
MERCURY WAGON	16	$656	13	21	351(5.8L)/8 (MENG)	A	2	4DR-108/ 56
	15	$700	13	20	400(6.6L)/8	A	2	
	13	$807	11	17	460(7.5L)/8	A	4	
OLDSMOBILE								
CUSTOM CRUISER WAGON	17	$617	15	22	350/8 (GM-OLDS)	A	4	4DR-110/ 51
	22	$410	19	27	350(5.7L)/8 (DIESEL)	A	FI	
	16	$656	14	20	403/8	A	4	
PONTIAC								
PONTIAC SAFARI WAGON	17	$617	15	21	301/8	A	2	4DR-111/ 51
	18	$584	15	22	350/8 (GM-BUICK)	A	4	
	16	$656	14	19	400/8	A	4	

SMALL PICKUP TRUCKS

Manufacturers	Fuel Economy				Vehicle Description		
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System 0
CHEVROLET							
LUV PICKUP	27	$388	24	34	111/4	M	2
	26	$404	23	29	111/4	A	2
DATSUN							
PICKUP	27	$388	24	31	119/4†	M	2
	24	$438	23	26	119/4†	A	2
FORD							
COURIER PICKUP	33	$318	29	38	110(1.8L)/4	M	2
	29	$362	25	35	140(2.3L)/4	M	2
	25	$420	22	29	140(2.3L)/4	A	2
MAZDA							
B1800 PICKUP	33	$318	29	38	110/4	M	2
TOYOTA							
HILUX	26	$404	23	31	134/4	M	2
	24	$438	22	27	134/4	A	2

STANDARD PICKUP TRUCKS

Manufacturers	Fuel Economy				Vehicle Description		
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System
CHEVROLET							
EL CAMINO	24	$438	21	29	200(3.3L)/6	M	2
	21	$500	19	25	200(3.3L)/6	A	2
	18	$584	16	22	305/8	M	2
	19	$552	16	23	305/8	A	2
	16	$656	14	19	350/8 (GM-CHEV)	M	4
	17	$617	15	21	350/8 (GM-CHEV)	A	4
PICKUP	19	$552	17	24	250/6	M	1
	18	$584	16	22	250/6	A	1
	17	$617	15	21	305/8	M	2
	16	$656	15	19	305/8	A	2
	15	$700	14	18	350/8 (GM-CHEV)	M	4
	15	$700	13	17	350/8 (GM-CHEV)	A	4
	23	$392	20	27	350(5.7L)/8 (DIESEL)	A	FI
	13	$807	12	16	454/8	A	4

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

STANDARD PICKUP TRUCKS

Manufacturers	Fuel Economy				Vehicle Description			
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System
DODGE								
PICKUP	19	$552	17	23	225/6		M	2
	19	$552	17	22	225/6		A	2
	19	$552	16	24	318/8		M	2
	16	$656	15	18	318/8		A	2
	14	$750	12	19	360/8		A	2
FORD								
PICKUP	22	$478	19	28	300(4.9L)/6		M	1
	20	$525	17	23	300(4.9L)/6		A	1
	20	$525	17	26	302(5.0L)/8		M	2
	19	$552	16	23	302(5.0L)/8		A	2
	16	$656	14	20	351(5.8L)/8	(MENG)	M	2
	16	$656	14	22	351(5.8L)/8	(MENG)	A	2
	15	$700	13	19	400(6.6L)/8		A	2
RANCHERO	17	$617	15	22	302(5.0L)/8		A	2
	18	$584	15	22	351(5.8L)/8	(WENG)	A	2
	16	$656	14	20	351(5.8L)/8	(MENG)	A	2
	15	$700	13	17	400(6.6L)/8		A	2
GMC								
CABALLERO	24	$438	21	29	200(3.3L)/6		M	2
	21	$500	19	25	200(3.3L)/6		A	2
	18	$584	16	22	305/8		M	2
	19	$552	16	23	305/8		A	2
	16	$656	14	19	350/8	(GM-CHEV)	M	4
	17	$617	15	21	350/8	(GM-CHEV)	A	4
PICKUP	19	$552	17	24	250/6		M	1
	18	$584	16	22	250/6		A	1
	17	$617	15	21	305/8		M	2
	16	$656	15	19	305/8		A	2
	15	$700	14	18	350/8	(GM-CHEV)	M	4
	15	$700	13	17	350/8	(GM-CHEV)	A	4
	23	$392	20	27	350(5.7L)/8	(DIESEL)	A	FI
	13	$807	12	16	454/8		A	4

VANS

Manufacturers	Fuel Economy				Vehicle Description			
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type		Transmission	0 Fuel System
CHEVROLET								
VAN	20	$525	17	24	250/6		M	1
	19	$552	16	22	250/6		A	1
	17	$617	15	21	305/8		M	2
	16	$656	15	19	305/8		A	2
	15	$700	14	18	350/8	(GM-CHEV)	M	4
	15	$700	13	17	350/8	(GM-CHEV)	A	4
DODGE								
VAN	19	$552	17	23	225/6		M	2
	19	$552	17	22	225/6		A	2
	19	$552	16	25	318/8		M	2
	16	$656	15	19	318/8		A	2
	14	$750	12	19	360/8		A	2
FORD								
VAN (ECONOLINE/ CLUB WAGON)	20	$525	18	25	300(4 9L)/6		M	1
	18	$584	16	22	300(4.9L)/6		A	1
	17	$617	14	22	351(5.8L)/8	(WENG)	M	2
	16	$656	13	19	351(5.8L)/8	(WENG)	A	2
GMC								
VAN	20	$525	17	24	250/6		M	1
	19	$552	16	22	250/6		A	1
	17	$617	15	21	305/8		M	2
	16	$656	15	19	305/8		A	2
	15	$700	14	18	350/8	(GM-CHEV)	M	4
	15	$700	13	17	350/8	(GM-CHEV)	A	4
PLYMOUTH								
VAN	19	$552	17	23	225/6		M	2
	19	$552	17	22	225/6		A	2
	18	$584	15	22	318/8		M	2
	16	$656	14	18	318/8		A	2
	14	$750	12	19	360/8		A	2
VOLKSWAGEN								
BUS (WAGON, KOMBI, CAMPMOBILE)	20	$525	17	25	120/4†		M	FI
	19	$552	17	23	120/4†		A	FI

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

Table 3.--Fuel cost estimates for all 1978 automobiles (continued)

SPECIAL PURPOSE TRUCKS

Manufacturers	Fuel Economy				Vehicle Description		
Manufacturer Car Line	Combined MPG	Average Annual Fuel Costs	City MPG	Highway MPG	Engine Description CID/Cyl Type	Transmission	Fuel System 0
AM GENERAL							
POST OFFICE VEHICLE	20	$525	19	22	232/6	A	1
CADILLAC							
COMMERCIAL CHASSIS	11	$954	10	15	425/8	A	4
CHEVROLET							
LUV CAB CHASSIS	26	$404	23	32	111/4	M	2
	25	$420	23	28	111/4	A	2
DATSUN							
DATSUN CAB CHASSIS	22	$478	19	27	119/4†	M	2
FORD							
COURIER CAB CHASSIS	29	$362	25	35	140(2.3L)/4	M	2
JEEP							
JEEP (CJ-5/CJ-7)	18	$584	16	21	232/6	M	1
	18	$584	16	20	258/6	M	1
	17	$617	16	20	258/6	A	1
	16	$656	15	19	304/8	M	2
	14	$750	13	17	304/8	A	2
TOYOTA							
HILUX CAB CHASSIS	21	$500	18	25	134/4	M	2
LAND CRUISER	14	$750	12	18	258/6	M	2
LAND CRUISER WAGON	13	$807	11	16	258/6	M	2

† *Certified for use on leaded gasoline.*

0 *Number of barrels in the carburator.*

NOMOGRAPH FOR LOAD RATING LOG STRINGER BRIDGES

E.W. Larsen
Structural Engineer

B. Rankenburg
Structural Engineer

Region 5

The nomograph presented herein (figure 1) is intended to enable the engineer in the field to load rate log stringer bridges quickly and accurately.

CRITERIA

The rating loads conform to Types 3, 3S2, and 3-3 as defined in "Manual for Maintenance Inspection of Bridges," 1974, American Association of State Highway Transportation Officals (AASHTO).

Distribution of wheel loads to stringers conforms to "Standard Specifications for Highway Bridges," 1973, AASHTO.

FEATURES

This nomograph may be used for load rating single lane log stringer bridges that are constructed similar to R-5 Standard Log Stringer, Timber Deck Bridge (dwg. #R5-SD-B1-1), using an allowable bending stress of F_b = 1,200 psi (8,273.6 kilopascals). Other configurations may also be rated, as provisions are included for adjusting:

--Decking dead load;

--Girder distribution factors; and

--Allowable fiber stresses.

With the flexibility of having different allowable fiber stress comes the added responsibility of engineering judgment in selecting an economical but safe stress. In selecting a stress value for logs, consideration must be given to the wood species, age, and state of deterioration. Suggested values are:

Species	Basic Stress psi	Age factor (Years)			Condition factor			
		1-5	6-10	10-Over	Little weathering	Weathered and		
						Checked	Split	Decayed
Douglas Fir	1,500 (10,342.1 kilopascals)							
Fir-Hemlock	1,300 (8,963.1 kilopascals)	1.15	1.10	.9	1.15	1.0	.9	.8
Pine	1,200 (8,273.6 kilopascals)							

The rating stress is obtained by combining the basic stress with the age and condition factor as shown in the following equation:

[Rating Stress = (Basic Stress) x (Age Factor) x (Condition Factor)]

The simple conversion that permits the use of any other allowable bending stress is shown in the example on the nomograph.

$$\text{New Moment (Live Load Available)} = \frac{F_{b(new)}}{1{,}200 \text{ psi } (8{,}273.6 \text{ kilopascals})} \times \text{Graph Moment}_{\text{(total Cap.)}} - \text{Moment}_{\text{(Dead Load)}}$$

This new available live load bending moment is the new pivot point for computing ratings for the three types of loads in the usual manner.

Horizontal shear and bearing stresses are not usually limiting factors in log stringer designs, and will not normally require checking in load rating of log stringer bridges 16 feet (4.88 meters) or longer. However, when substantial decay and loss of section occurs at the bearing area of the log, first mode failure can occur in a form of vertical shear at this location. If this needs checking, a rating stress of 75 psi (517.1 kilopascals) applied to the net area will provide conservative results.

The nomograph is flexible enough to allow the user to enter at various points, as required, to adjust to field conditions. If a four-stringer bridge were to be rated, for example, or a ten-stringer bridge with a rock deck, the engineer could simply compute the dead load bending moment, assume a distribution factor, and quickly arrive at a rating. The nomograph readily indicates if a bridge needs to be posted.

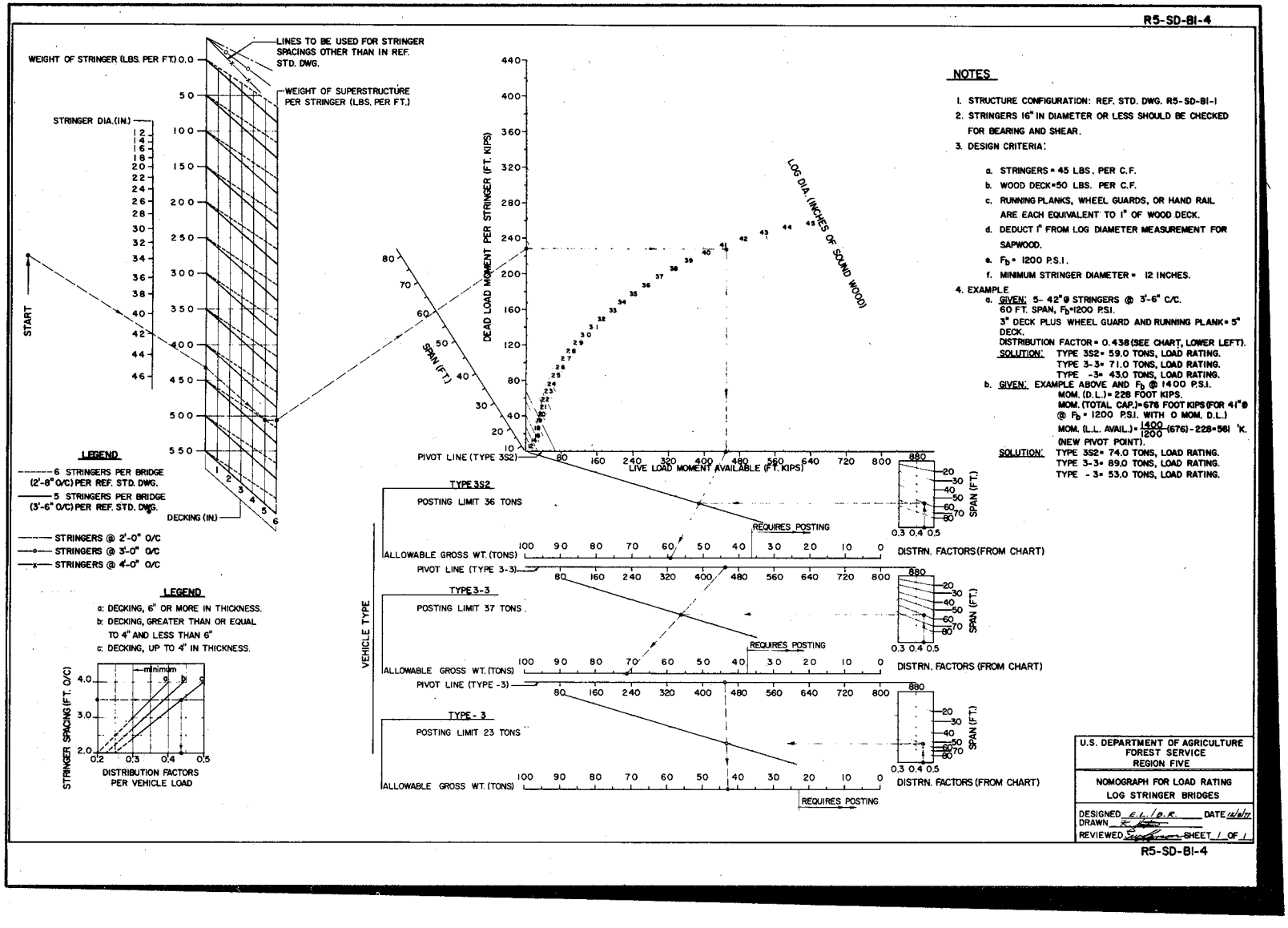

Figure 1. Nomograph for load rating log stringer bridges.

APPLICABILITY

This nomograph is only a tool which, if used with understanding, can eliminate many tedious calculations. It cannot compensate for lack of judgment or experience in dealing with complex and variable problems.

Major defects, splits, or rot in the stringers, for example, may require some investigation as to the extent of remaining sound wood. This can be allowed for by using different diameters for computing the available live load moment. Some error probably results from assuming the remaining sound wood is circular. The effect of this can best be judged by the person in the field. Defects in the deck or worn decks may have some influence on distribution factors for the wheel loads. Engineers may be required to make educated guesses about the actual distribution mechanism operating in the field.

ACCURACY

The ratings are accurate to approximately 2 percent on the average. This is less than the error inherent in the assumptions made about a structure. Estimates of sapwood, distribution factors, and the changes normally found in organic materials all contribute to rating variance.

WASHINGTON OFFICE NEWS

OPERATIONS

Harold L. Strickland
Assistant Director

TECHNOLOGY TRANSFER

Since 1968, formal recognition has been given to the need for improving our engineering technology transfer efforts. This was and continues to be based on our need to use the "latest state-of-the-art" in carrying out our missions and the need to eliminate costly duplications of effort and trial and error procedures.

Most of us have overlooked the fact that our internally held technology is one of our most valuable resources. Without question, our collective knowledge concerning low volume road issues exceeds that of any other engineering group in the world, and this is probably true for most resource management engineering activities. The problem is how to make this internally held resource available to all engineers and paraprofessionals on a Service-wide basis.

Up until this year our efforts have focused on internally generated engineering publications and especially *Engineering Field Notes*. These are designed to give specialists a vehicle for sharing their knowledge with their counterparts. Although much valuable knowledge has been transferred through this effort, most specialists, engineering managers, and line officers have not recognized that technology transfer is an inherent part of their jobs.

On January 16, 1978, the Chief, Forest Service, sent a 1250 letter to the Regional Foresters on the subject of technology transfer and requested implementation of eight specific actions which were designed to improve the process. Some of the key issues were:

1. The Deputy Chief for State and Private Forestry (S&PF) will provide Service-wide leadership for technology transfer.

2. Subject matter specialists are to communicate with and provide feedback to their counterparts and use available information systems.

3. Line officers are to identify within their staffs and program areas key persons whose jobs should include the responsibility for keeping up-to-date and transferring knowledge and technology. This will permit management to assign specific responsibility and include it in job descriptions.

State and Private Forestry is in the process of establishing a technology transfer staff unit for the Washington Office. As soon as this unit is fully staffed and has an opportunity to develop detailed Service-wide direction, we can expect some significant advancements and major emphasis on your responsibilities for technology transfer.

FSM 7113 establishes your initial responsibilities in support of our Engineering Technical Information Systems, and you are encouraged to review this section as soon as possible.

In support of the Chief's direction on use of available information systems and the development and implementation of new ones, we are conducting an evaluation of the Fort Collins Computer Conferencing System. Each Regional Technical Information Coordinator (see listing of coordinators on last page) has been asked to collect brief, informal information statements and questions to feed into the system and to access the system for information. The objective is to demonstrate the effectiveness of using a computer for communication purposes, and to determine if something of this nature should be established for use by all engineering units.

If you have a message you think would be of Regional or Service-wide value or if you have a problem and would like some help on it, please call your respective coordinator, and arrange for the message to be entered into the system.

In summary, there are several developments in the area of technology transfer, and we can expect a lot more. The key to the success of our existing and future engineering information systems is you. If you recognize, accept, and act on the fact that technology transfer is an important part of your function, we can all be assured of having answers when we need them.

TECHNOLOGICAL IMPROVEMENTS

Heyward T. Taylor
Assistant Director

ED&T BOARD MEETS IN MISSOULA

The Equipment Development and Test Board's National meeting was held at the Missoula Equipment Development Center (MEDC) on April 11-13. The Board meets annually to discuss the ED&T Program. More than 50 people from the various Washington Office staffs, the Regions, the Stations, the Equipment Development Centers, the Bureau of Land Management, and the Montana State Forester's office participated in the 3-day session.

The meeting also gives Board members and others involved in equipment development the opportunity to review the latest activities and accomplishments of the Missoula and San Dimas Equipment Development Centers.

One day of the session was devoted to field demonstrations. In the morning, the attendees visited the University of Montana Human Performance Laboratory and listened to a discussion of the methods developed to evaluate the human factors in work and equipment design.

At the MEDC shops, the group saw revegetation equipment demonstrated and the roles of the gouger, tree spade, and hay spreader in reclaiming strip-mined land. This revegetation equipment was built for the Bureau of Land Management (see figure 1).

The rest of the day was spent on the Ninemile Ranger District, located 30 miles west of Missoula. The group saw the following variety of equipment related to ED&T project work under way at Missoula and San Dimas:

--Ford Ditch Master--a commercial machine designed to clean silt, rocks, and other debris from ditches along secondary and logging roads;

--New plastic toilet vault riser that is stronger and cheaper than stainless steel models;

--Crosscut saw filing techniques;

--Smokejumper aircraft evaluation and smokejumping.

--Lightweight camp gear that lessens impact on wilderness.

--New solid-state instrument to measure degree of seedling dormancy and determine the best time to lift seedlings for planting.

--Ignition systems for igniting brush and other fuels from the air.

--Lightweight yarder designed to remove slash from steep slopes.

--Yarder Guyline Anchor failure detection device.

--Self-powered yarding carriage that bunches logs along a skyline corridor (see figure 2).

--Water gel explosives for building a fireline around prescribed burns.

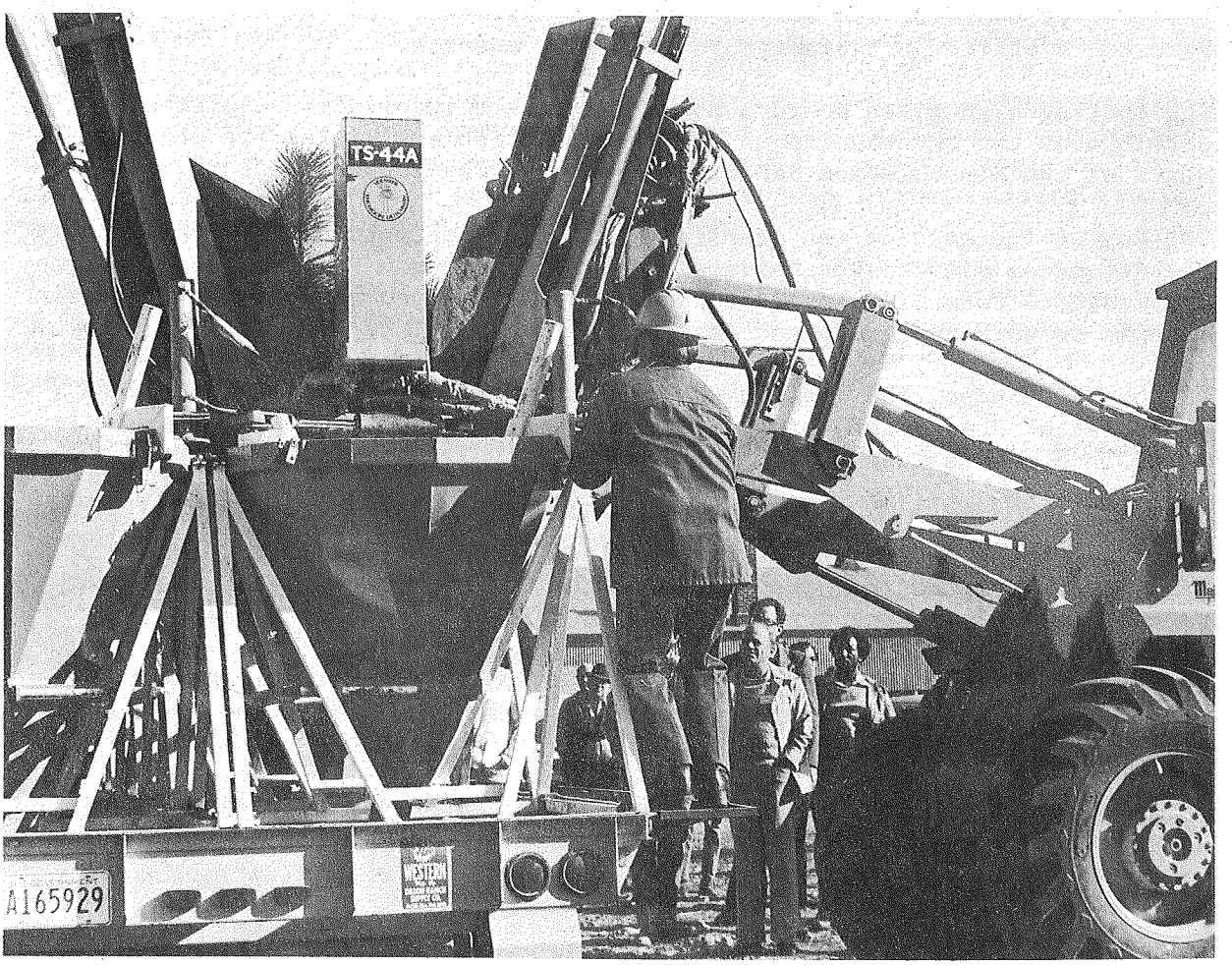

Figure 1. A Vermeer Tree Spade, for revegetating disturbed land, demonstrated to ED&T Board attendees.

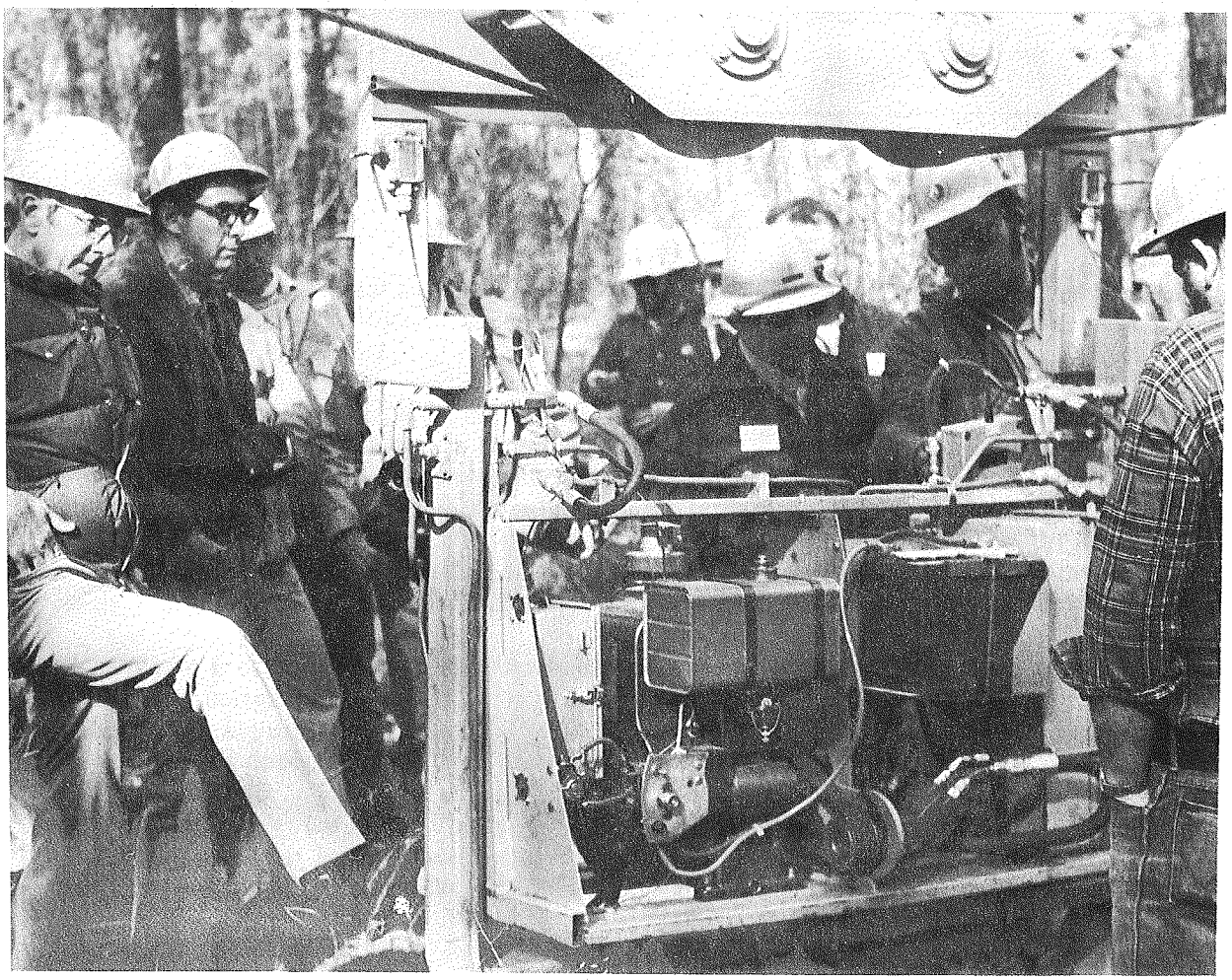

Figure 2. Prototype self-powered yarding carriage was demonstrated to those attending the ED&T Board meeting. The machine "bunches" logs or slash along a skyline corridor.

INVITATION TO READERS OF *FIELD NOTES*

Every reader is a potential author of an article for *Field Notes.* If you have a news item or short article you would like to share with Service engineers, we invite you to send it for publication in *Field Notes.*

Material submitted to the Washington Office for publication should be reviewed by the respective Regional Office to see that the information is current, timely, technically accurate, informative, and of interest to engineers Service-wide (FSM 7113). The length of material submitted may vary from several short sentences to several typewritten pages; however, short articles or news items are preferred. All material submitted to the Washington Office should be typed double-spaced; all illustrations should be original drawings or glossy black and white photos.

Field Notes is distributed from the Washington Office directly to all Regional, Station, and Area Headquarters, Forests, and Forest Service retirees. If you are not currently on the mailing list ask your Office Manager or the Regional Information Coordinator to increase the number of copies sent to your office. Copies of back issues are also available from the Washington Office.

Each Region has an Information Coordinator to whom field personnel should submit both questions and material for publication. The Coordinators are:

R-1	Melvin Dittmer	R-4	Ted Wood	R-9	Fred Hintsala
R-2	Royal M. Ryser	R-5	Jim McCoy	R-10	F. W. Baxandall
R-3	Juan Gomez	R-6	Kjell Bakke	WO	Al Colley
		R-8	Bob Bowers		

Coordinators should direct questions concerning format, editing, publishing dates, and other problems to:

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