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Abridgment

Evaluation of Vending Machine Operations in Rest Areas and Welcome Centers in Georgia

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ABSTRACT

Section 153 of the Surface Transportation Assistance Act of 1978 authorized a demonstration program permitting the installation of vending machines in safety rest areas on the Interstate highway system. Georgia was one of the states selected by FHWA to participate in this demonstration program to evaluate the provision of vending machines in rest areas and welcome centers. Vending machines were installed in 13 rest areas and 5 welcome centers in Georgia for a 1-year evaluation period. About 92 percent of the 4,641 rest area and welcome center users interviewed indicated that providing vending machines in rest areas and welcome centers was a good idea. The provision of vending machines in the rest areas and welcome centers caused no serious security problems and only four incidents of vandalism occurred. All four of these break-ins occurred at welcome centers. The rest areas had no break-ins. Revenues from vending machines covered approximately 17 percent of the cost of operating a rest area. Revenues received during the 1-year evaluation period totaled \$205,000 on gross sales of \$639,000. Provision of vending machines in rest areas and welcome centers had no serious adverse effects on the operations of the rest areas and welcome centers during the evaluation period and it is recommended that they be made permanent.

Section 153 of the Surface Transportation Assistance Act of 1978 authorized a demonstration program permitting the installation of vending machines in safety rest areas on the Interstate highway system. According to the provisions of the Act the vending machines may dispense such food, drink, and other articles as the Secretary of the U.S. Department of Transportation determines necessary to ascertain the need for, and desirability of, this service to the traveling public. The Act also provided that the Secretary report to Congress by October 30, 1980, on the results of this demonstration project.

FHWA was empowered to select states to participate in this vending demonstration program. The states that were chosen to participate were required to evaluate the effects of vending machines on the operation of the rest areas. Georgia was one of the states selected to evaluate the provision of vending machines in rest areas and welcome centers.

The objective of this project was to evaluate the effects of vending machines on the operations of rest areas and welcome centers on Georgia Interstate highways by studying the effects on

- Maintenance of the rest area and welcome centers,
- Security,
- Vandalism,
- Litter on the highway downstream of the facility,
- Problems associated with increased stopping and length of stay, and
- Other problems or advantages of providing vending facilities.

Other objectives were to determine the reaction of the motoring public to the provision of vending machines in rest areas and welcome centers and to determine the economic benefits. See Figure 1 for a map of the locations of the 13 rest areas and 5 welcome centers where the evaluation was accomplished.

TYPICAL VENDING MACHINE INSTALLATIONS

The vending machines are housed in buildings that are separate from the main rest area and welcome center buildings. The buildings that house the rest area vending facilities were built by district maintenance crews and cost an average of about \$4,000 to build, accounting only for material costs. The rest area vending buildings are of concrete block and plywood siding construction. The welcome center vending building is of concrete block construction. Each vending installation in a rest area or welcome center has six vending machines: two fountain soft drink machines, one coffee and hot chocolate machine, one pastries and chips machine, one candy and chewing gum machine, and one dollar bill changer. The vending machines are attractive and are supplied and serviced by the vending contractor, Servomation Corporation. The buildings and utilities are furnished by the Georgia Department of Transportation

(GDOT) and the Georgia Department of Industry and Trade, which operate the welcome centers.

EFFECTS OF VENDING ON REST AREA USE

An important part of the evaluation of providing vending machines in rest areas and welcome centers is to determine the effects on rest area and welcome center use. Do vending operations cause more people to use the rest areas and welcome centers and do people stay longer because of the vending machines? These questions are addressed in the following sections.

Procedure Used to Determine Change in Percentage of Traffic Using Rest Area After Vending

To determine how rest area use would be affected by the presence of vending machines, before and after counts were made on the main line and off-ramps into the rest areas. For each of the before and after counts portable traffic recorders were set up on the highway immediately before the rest area off ramp and another portable traffic recorder was placed on the rest area off ramp. Data were recorded for 7 days for both the before and after traffic counts. The ratio of rest area off-ramp traffic to main line

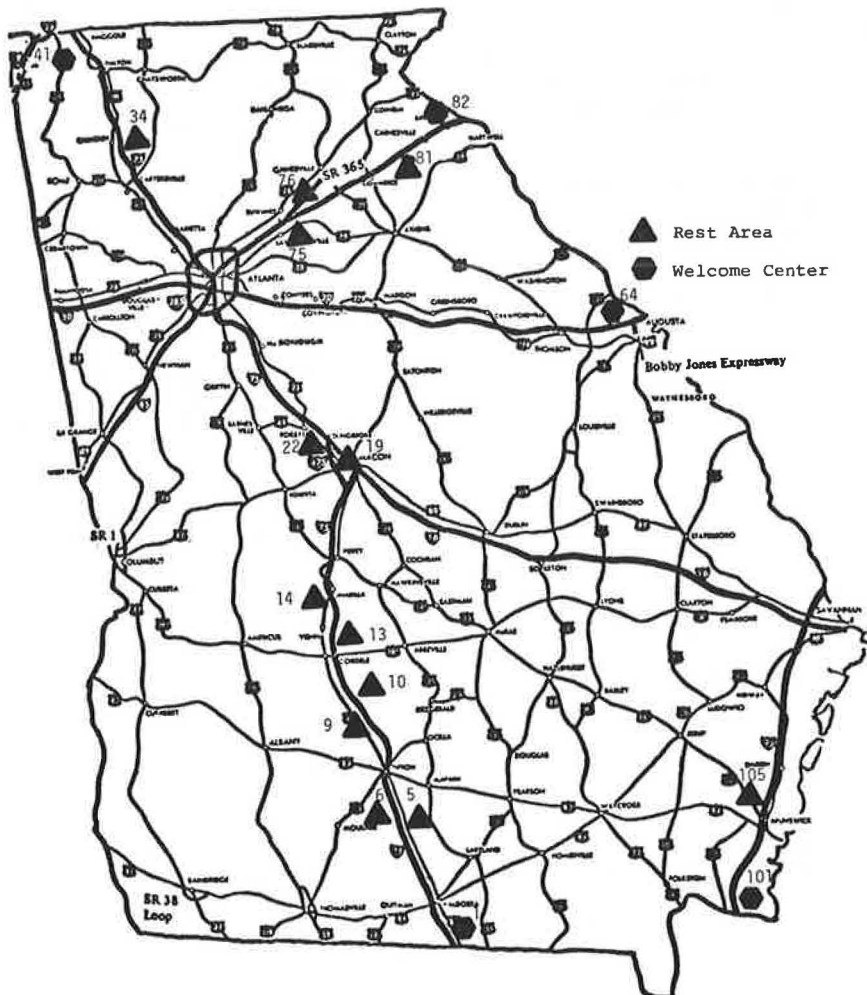


FIGURE 1 Georgia Department of Transportation rest areas and welcome center locations with vending facilities.

traffic gives the percentage of traffic using the rest area. The percentage from the before counts, which were done before the vending machines were installed, was compared with the percentage from the after counts, which were done after the vending machines were installed, to see how rest area use changed as a result of vending.

Analysis of Data from Before and After Rest Area Percent Use Counts

Table 1 gives the results from the before and after percentage of traffic use counts for the 13 rest areas in the test except for rest area 105, which was not counted. From this table note that the percent of change of main line traffic using the rest area increased from a low of 0 percent for rest area 5 to a high of 42.5 percent for rest area 10 when comparing the after percent use with the before percent use. Four locations, rest areas 13, 34, 76, and 81 suffered a reduction in percent use of 32.8, 9.7, 4.5, and 47.8 percent after the vending machines were installed. The difference between the before and after mean percent use figures at 10.05, and 10.54 percent was only 5 percent.

Although there were sizable increases in percent use after the vending machines were installed at seven test locations and sizable decreases at four others, using the t-test at the 95 percent confidence level, it could not be determined whether there was a statistically significant difference in the mean percent use figures for the before and after situations. If signs had been used to advise motorists that the rest areas have vending machines the results would possibly have been different with more people using the rest areas to get refreshments.

TABLE 1 Change in Percentage of Traffic Using Rest Areas After Vending Operations

| Rest Area | Before Percent Use | After Percent Use | Change in Percent Use |
|----------------|--------------------|-------------------|-----------------------|
| 5 | 11.8 | 11.8 | 0 |
| 6 | 10.0 | 10.8 | +8.0 |
| 9 | 9.2 | 12.1 | +31.5 |
| 10 | 8.0 | 11.4 | +42.5 |
| 13 | 6.4 | 4.3 | -32.8 |
| 14 | 10.0 | 12.8 | +28.0 |
| 19 | 10.9 | 13.3 | +22.0 |
| 22 | 8.4 | 11.1 | +32.1 |
| 34 | 10.3 | 9.3 | -9.7 |
| 75 | 6.6 | 7.8 | +18.2 |
| 76 | 15.4 | 14.7 | -4.5 |
| 81 | 13.6 | 7.1 | -47.8 |
| X | 10.05 | 10.54 | |
| S ² | 7.086 | 8.635 | |

TABLE 2 Before and After Litter Survey Tabulation

| Litter Items | Before Litter Survey | | After Litter Survey | | Percent Change in Litter | t-Statistic | Significant at 95 Percent Confidence |
|--|----------------------|--------------------|---------------------|--------------------|--------------------------|-------------|--------------------------------------|
| | Mean | Standard Deviation | Mean | Standard Deviation | | | |
| Cigarette packs | 145.00 | 140.50 | 151.50 | 91.89 | 4.5 | 0.102 | No |
| Paper cups | 64.38 | 43.28 | 117.50 | 68.09 | 82.5 | 1.742 | No |
| Candy and chewing gum wrappers | 87.50 | 59.67 | 76.13 | 67.33 | -13.0 | 0.334 | No |
| Potato chip and cracker wrappers | 44.38 | 34.78 | 23.88 | 19.36 | -46.2 | 1.363 | No |
| Pastry wrappers | 24.75 | 23.21 | 15.75 | 20.82 | -36.4 | 0.764 | No |
| Pain reliever containers | 3.88 | 5.79 | 3.88 | 3.91 | 0 | 0 | No |
| Soft drink bottles and cans | 134.75 | 94.85 | 87.38 | 26.55 | -35.2 | 1.272 | No |
| Beer bottles and cans | 173.50 | 134.59 | 110.25 | 53.51 | -36.5 | 1.149 | No |
| Food bottles and cans | 13.63 | 9.77 | 14.00 | 19.32 | 2.7 | 0.045 | No |
| Other food containers | 47.13 | 47.62 | 18.50 | 15.78 | -60.7 | 1.510 | No |
| Other nonfood and miscellaneous | 223.13 | 243.70 | 221.13 | 178.53 | -0.9 | 0.018 | No |
| Total litter volume (ft ³) | 28.3 | 20.59 | 29.3 | 28.23 | 3.5 | 0.076 | No |

Permanent Traffic Recorders

In addition to the traffic counts mentioned earlier, permanent traffic recorders were installed in the rest area off ramps and will be operated as continuous counting stations. Also, quarterly occupancy counts were conducted at each rest area. Using the occupancy rates from the quarterly occupancy counts and the traffic from the rest area continuous-count stations, the number of persons using the rest areas can be determined.

HOW LITTER IS AFFECTED BY VENDING OPERATIONS

Two areas might be affected by the accumulation of litter from vending machines in rest areas and welcome centers: the grounds surrounding the rest area and welcome center and the main line downstream of the rest area or welcome center.

Before and After Litter Surveys on Main Line

To determine the effect of vending machines in rest areas on litter downstream of the rest area, before and after litter surveys were conducted on the main line for 1 mile downstream of the rest area. In this 1-mile segment litter was collected on the side of the road where the rest area is located beginning at the end of the entrance ramp from the rest area onto the main line and for 1 mile downstream of the rest area. The litter was classified into one of 11 types of litter, and the loose volume of the litter was measured.

Similar before and after litter surveys were used. The days of accumulation of litter for the before and after surveys in the study varied between 8 and 95 days with a mean value of 62 for the days of accumulation.

Analysis of the Before and After Litter Survey Data

From the analysis of the data it could be determined that there was a statistically significant difference in the litter downstream of the rest area as a result of the vending operations. The data in Table 2 indicate that the total volume of litter increased only 3.5 percent after the vending machines were installed. As expected, the number of paper cups increased and the number of soft drink bottles and cans and beer bottles and cans decreased because the vending machines at the rest areas dispense soft drinks in paper cups whereas bottles and cans are usually dispensed at other off-road vending areas such as service stations.

All 11 classes of litter showed a decrease in the number of items collected in the after litter survey except for paper cups, as mentioned earlier, and small increases in the number of cigarette packs and food bottles and cans. The litter categories for those items vended in the rest areas--paper cups, candy and chewing gum wrappers, potato chip and cracker wrappers, and pastry wrappers--all showed a decrease in number of litter items in the after survey except for paper cups. This could perhaps be explained by the fact that convenient trash receptacles are provided near the vending machines and that the food items purchased in the vending machines are consumed at the rest area rather than on the highway.

Table 2 includes data from rest areas 5, 6, 9, 10, 13, 14, 81, and 105 but does not include data from litter surveys at rest areas 19, 22, 34, 75, and 76. Data from rest area 19 were not included because of scheduling problems and data from rest area 34 were not included because data from the after survey were not available before the project was completed. The data for rest areas 22, 75, and 76 were rejected because of apparent discrepancies; these data indicated unusually large reductions in litter in the after survey as compared with the before litter survey.

A t-test was run on the data items in Table 2. Although some items showed large percent changes in litter in the after survey as compared with the before litter survey at the 95-percent confidence level, there was no statistically significant difference for any of the 11 categories of litter or the volume of litter because of the large standard deviations for all the items.

The Effects of Vending on Litter on the Grounds of the Rest Areas and Welcome Centers

To determine the effects of vending operations on the litter on the grounds of the rest areas and welcome centers, questionnaires were sent to the district engineers requesting that the maintenance area managers conduct interviews with the rest area caretakers. Questionnaires were also sent to the welcome center managers to ascertain their observations of the effects of vending on rest area and welcome center litter and other effects of the vending machines on the operation of the rest areas and welcome centers. The results of this questionnaire are discussed later.

REST AREA AND WELCOME CENTER USERS SURVEYS

To determine the reaction of the public to the provision of vending machines in rest areas and welcome centers, interviews were conducted in the rest areas and welcome centers using an appropriate questionnaire. These interviews were conducted for 8 hours at each location from 10 a.m. to 6 p.m. The interviewers were instructed to select interviewees from among all rest area users and not just those people using the vending machines.

Two interviews were conducted at rest areas 9, 10, 22, 34, 75, and 76 and at the five welcome centers; only one interview (during February 1980) was conducted at rest areas 5, 6, 13, 14, 19, 81, and 105. The first interviews were completed during the peak travel season in August 1979 and the second interviews, which were conducted at all 13 rest areas and 5 welcome centers, were completed during the off-peak travel period during February 1980. During the first set of interviews (August 1979) 2,346 people were interviewed and an additional

2,295 were interviewed during February 1980. A total of 2,403 rest area users and 2,238 welcome center users were interviewed.

Peak-Travel Season Interview Results (August 1979)

The August 1979 interviews were conducted at rest areas 9, 10, 22, 34, 75, and 76 and the five welcome centers. From this survey about 73 percent of the people interviewed were males and about 86 percent were white, 11 percent black, and 3 other races. The respondents were fairly uniformly distributed across the four age ranges that were used with a low of 20 percent for 16 to 29 year olds to a high of 29 percent for 30 to 39 years olds. Almost 40 percent of the people interviewed were either professionals or students.

Almost one-half of those stopping at the rest areas stopped to use the rest rooms followed by almost 18 percent who stopped to stretch. Almost 12 percent stopped to use the vending facilities, although there are no signs on the Interstates announcing that the rest areas have vending machines. About 89 percent of the people interviewed believed that having vending machines in rest areas was a good idea whereas only about 6 percent believed that it was not a good idea and 6 percent had no opinion.

The 68 percent interviewed who said that they had used the vending machines were asked additional questions about the vending operations. The personal characteristics of the group that used the vending machines are about the same as those for the rest area user group as a whole, except truck drivers were overrepresented in this group.

About one-half of the vending users interviewed indicated that their stay at the rest area was prolonged by less than 4 minutes and another one-third stated that their stay was prolonged by between 5 and 9 minutes because of their use of the vending machines. The average stay was prolonged by less than 6 minutes because of use of the vending machines.

Off-Peak Travel Season Interview Results (February 1980)

In February 1980 interviews were conducted at 13 rest areas and 5 welcome centers. Almost 78 percent of those interviewed were males, about 91 percent were white, about 8 percent were black, and about 1 percent were other races. The 16 to 29 age group had the smallest representation at about 16 percent whereas the 30 to 39 age group had the largest representation at more than 31 percent. The age 40 to 49 and over 50 age groups had representations of about 28 and 25 percent.

About 77 percent of those interviewed stated that they stopped to use the rest rooms whereas another 10 percent stopped to stretch, and only about 3 percent stopped to use the vending machines. About 95 percent of the respondents agreed that having vending machines in the rest areas and welcome centers was a good idea whereas only about 1 percent disagreed and about 4 percent had no opinion.

As in the August 1979 interviews, the 68 percent of those interviewed who stated that they had used the vending machines were asked additional questions about their opinion of the vending operations. The personal characteristics of this group are similar to the characteristics of the group of all persons interviewed except, as in the peak-period surveys, again, truck drivers were overrepresented in the vending machine users group.

Almost one-third of the vending machine users prolonged their stay less than 4 minutes and almost one-half prolonged their stay at the rest area from 5 to 9 minutes by using the vending machines. On the average the length of stay at the rest area or welcome center for a vending machine user was prolonged by less than 7 minutes.

Comparison of August 1979 and February 1980 Interview Results

After combining the results from the August 1979 and February 1980 interviews, almost 92 percent of all people interviewed agreed that vending machines in the rest areas and welcome centers was a good idea whereas only about 4 percent disagreed and 4 percent had no opinion. The average stay for a vending machine user was prolonged by between 6 and 7 minutes because of the use of vending machines.

The results from the August 1979 and February 1980 surveys are comparable except in the February 1980 interviews a much larger percentage of people (77 percent) listed using the rest rooms as their purpose for stopping as compared with 48 percent for the August 1979 surveys. No explanation can be found as to why, in the February 1980 interviews, only 3 percent indicated that they stopped to use the vending machines as compared with almost 12 percent in the August 1979 interviews who stopped to use the machines. It would be expected that the February 1980 percentages for stopping to use the vending machines would be larger than those for August 1979 because more people would be expected to know the machines are installed as time passes and hence more people would stop to use them. However, the warmer weather during the August interviews may have contributed to the larger numbers of people stopping to use the vending machines during that survey.

RESULTS OF SURVEY OF REST AREA CARETAKERS AND WELCOME CENTER ATTENDANTS

The rest areas are attended from 7 a.m. to 12 a.m., 7 days a week and on holidays; the welcome centers are attended from 8:30 a.m. to 5:30 p.m. A typical rest area has four caretakers to share the two 8-hour shifts. To determine the type of experiences the people most affected by having vending machines in rest areas and welcome centers have had with vending, interviews were conducted with rest area caretakers and questionnaires were sent to welcome center attendants.

The interviews with the rest area caretakers were conducted by the maintenance area managers. The

questionnaires returned from the welcome center attendants were completed by the welcome center managers. Forty-seven responses were received--42 from rest area caretakers and 5 from welcome center attendants. The responses from Rest Area 105 were received too late to be included in the survey results. The results of the survey of rest area caretakers and welcome center attendants are given in Table 3.

Effects on Litter on the Grounds

The data in Table 3 indicate that 57 percent of the respondents noticed an increase in litter on the grounds of the rest areas and welcome centers after the vending machines were installed. None of the respondents indicated a decrease in litter after vending machines were installed and 43 percent noticed no change in litter as a result of the vending machines.

Vandalism and Security Problems

Only 13 percent of the respondents believed that there were vandalism or security problems at the rest areas and welcome centers because of vending machines, and about one-half of this 13 percent considered minor vandalism problems such as acts as banging on the machines when they kept a user's money. There were only four serious incidents of vandalism--all occurred at welcome centers. The machines at the welcome center in Lavonia and Augusta were broken into once and the machines at the welcome center in Valdosta were broken into twice. No serious incidents of vandalism occurred at the rest areas. This could perhaps be explained by the use of heavy metal doors to close the vending buildings at 12 a.m. when the rest areas are unattended whereas only metal mesh gates are used to close the vending buildings at the welcome centers. The heavy metal doors hide the vending machines and appear less prone to vandalism than the metal mesh gates.

Change in Welcome Center and Rest Area Use

Only 47 percent of the respondents noticed a change in welcome center and rest area use after vending machines were installed and 53 percent noticed no change. The changes in rest area use most often mentioned were that more trucks and buses were using the rest areas. Also it was noticed that a number of people were stopping at the rest areas just to

TABLE 3 Rest Area Caretaker and Welcome Center Attendants Survey Results

| Question | Respondents Who Indicated | Percent Responding | Comments |
|--|---------------------------|--------------------|---|
| 1. Change in litter on the grounds | Increase | 57 | |
| | Decrease | 0 | |
| | No change | 43 | |
| 2. Vandalism or security problems | Yes | 13 | The welcome centers at Lavonia and Augusta experienced one machine break-in each; two such incidents occurred at the welcome center at Valdosta. No break-ins occurred at rest area vending machines. |
| | No | 83 | |
| | No response | 4 | |
| 3. Have you noticed any change in rest area or welcome center use? | Yes | 47 | More buses and trucks use rest areas. More people now use rest areas than before vending machines were installed. |
| | No | 53 | |
| 4. Has work load changed as a result of vending? | Yes | 68 | Small increase in work load due to clean-up work in vending area and issuance of refunds. More trash to empty from litter receptacles. |
| | No | 30 | |
| | No response | 2 | |
| 5. Additional remarks about vending | | | The caretakers like the vending machines and believe that the public does too. |

use the vending machines. A few respondents remarked that more people were using the rest areas and were staying longer because of the vending machines.

Change in Work Load Due to Vending

Even though 68 percent of the respondents found that their work loads increased because of vending, the majority believed that the increase was small. Most of the increased work load was the result of cleaning the immediate area around the vending machines. There also was more trash to empty from the litter receptacles around the vending machine buildings. Some extra work was also involved in providing refunds to customers and maintaining the petty cash fund to cover these refunds.

Additional Remarks about Vending

Of the 20 respondents who had additional remarks about vending, more than 80 percent were favorable toward having vending machines in the rest areas. Most liked having the vending machines in their rest areas or welcome centers and they believed that the public like them too.

ECONOMIC EVALUATION

The provision of vending machines in rest areas and welcome centers is a welcome service to the traveling public, which has expressed support for having vending machines in rest areas and welcome centers. The machines benefit not only the traveling public but also the Georgia Department of Transportation and Department of Industry and Trade, both of which receive commissions from the firm that contracted to operate the vending machines. The welcome centers are operated by the Department of Industry and Trade

and the rest areas are operated by GDOT. It was hoped that the income from the vending operations would make a significant contribution toward paying for the operation of the rest areas and welcome centers.

The Vending Contract and Contractor

GDOT and the Department of Industry and Trade (I&T) contracted with Servomation Corporation to operate the vending machines. GDOT and I&T provided the utilities and buildings to house the machines. The contract provided for 30 percent commission on total sales, which increases on a sliding scale as sales volume increases. The contractor has serviced the machines in a satisfactory manner and, in general, is fulfilling his contractual duties adequately. To assure that the vending contractor is reporting sales receipts and commissions fairly and accurately the contract requires that the contractor post a \$100,000 bond and provides that the state can audit the records of the contractor.

Total Sales and Commissions

GDOT expected to receive \$205,100 on total sales of \$639,200 in its 13 rest areas during the first full year of operation. Data on sales for a full year were not available when the final report was written so data for a partial year were factored up to obtain the preceding numbers. Seven of the rest areas had data available for only 7 months and six had data available for 12 months, but all were factored up to obtain 12 months of receipts for all 13 rest areas. More recent follow-up data on revenues are included later in this paper.

The data in Table 4 indicate gross sales by month and the data in Table 5 indicate net revenue by

TABLE 4 Gross Vending Sales by Month

| REST AREA | JUNE 80 | MAY 80 | APR. 80 | MAR. 80 | FEB. 80 | JAN. 80 | DEC. 79 | NOV. 79 | OCT. 79 | SEPT. 79 | AUG. 79 | JULY 79 |
|---------------------------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
| No. 19 Bibb County | 8,356 | 4,621 | 5,554 | 5,247 | 2,638 | 2,857 | 2,282 | - | - | - | - | - |
| Nos. 5 & 6 Cook County | 8,486 | 6,732 | 9,979 | 8,045 | 4,573 | 5,031 | 3,324 | - | - | - | - | - |
| Nos. 13 & 14 Dooly County | 8,409 | 5,040 | 7,908 | 7,220 | 4,292 | 7,024 | 6,109 | - | - | - | - | - |
| No. 81 Franklin County | 3,491 | 1,983 | 1,869 | 2,112 | 1,238 | 1,817 | 2,487 | - | - | - | - | - |
| No. 105 Glynn County | 3,931 | 3,017 | 4,149 | 4,264 | 3,074 | 3,976 | 2,884 | 2,085 | - | - | - | - |
| No. 34 Gordon County | 6,963 | 6,471 | 8,808 | 6,688 | 2,809 | 5,573 | 4,174 | 3,669 | 3,586 | 7,077 | 7,725 | 5,361 |
| Nos. 75 & 76 Gwinnett County | 10,898 | 7,957 | 7,820 | 7,390 | 4,417 | 5,724 | 9,413 | 6,709 | 7,094 | 10,852 | 9,955 | 2,729 |
| No. 22 Monroe County | 6,664 | 5,741 | 8,001 | 8,018 | 5,133 | 7,768 | 7,558 | 7,268 | 5,751 | 7,657 | 8,086 | 4,236 |
| Nos. 9 & 10 Turner County | 10,160 | 7,940 | 10,278 | 8,351 | 5,380 | 8,246 | 7,168 | 4,416 | 5,951 | 8,738 | 9,516 | 2,991 |

TABLE 5 Net Revenues from Vending by Month

| REST AREA | JUNE 80 | MAY 80 | APR. 80 | MAR. 80 | FEB. 80 | JAN. 80 | DEC. 79 | NOV. 79 | OCT. 79 | SEPT. 79 | AUG. 79 | JULY 79 |
|---------------------------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
| No. 19 Bibb County | 2,507 | 1,386 | 1,666 | 1,574 | 791 | 857 | 685 | - | - | - | - | - |
| Nos. 5 & 6 Cook County | 2,546 | 2,020 | 2,994 | 2,414 | 1,372 | 1,509 | 997 | - | - | - | - | - |
| Nos. 13 & 14 Dooly County | 2,523 | 1,512 | 2,372 | 2,166 | 1,288 | 2,107 | 1,833 | - | - | - | - | - |
| No. 81 Franklin County | 1,047 | 595 | 561 | 634 | 371 | 545 | 746 | - | - | - | - | - |
| No. 105 Glynn County | 1,179 | 905 | 1,245 | 1,279 | 922 | 1,193 | 865 | 834 | - | - | - | - |
| No. 34 Gordon County | 2,089 | 1,941 | 2,642 | 2,006 | 843 | 1,672 | 1,252 | 1,467 | 1,434 | 2,831 | 3,090 | 2,144 |
| Nos. 75 & 76 Gwinnett County | 3,269 | 2,387 | 2,346 | 2,217 | 1,325 | 1,717 | 2,824 | 2,684 | 2,838 | 4,341 | 3,982 | 1,092 |
| No. 22 Monroe County | 1,999 | 1,722 | 2,400 | 2,405 | 1,540 | 2,330 | 2,267 | 2,907 | 2,300 | 3,063 | 3,234 | 1,694 |
| Nos. 9 & 10 Turner County | 3,048 | 2,382 | 3,083 | 2,505 | 1,614 | 2,474 | 2,150 | 1,766 | 2,380 | 3,495 | 3,806 | 1,196 |

month from the vending operations in the 13 rest areas. From Table 4 it can be seen that gross sales during the peak-travel months of the summer are from two to three times larger than the sales during the winter months as would be expected because more traffic means more potential customers and more sales.

Comparison of Vending Income and Rest Area Operating Costs

The data in Table 6 indicate the estimated annual operating cost, annual income from vending (factored), and percent of operating cost covered by the income from vending. From this table it can be observed that the cost of operating a rest area varied from \$68,524 to \$122,039 in 1979--the average for the 13 rest locations was \$92,875. The commissions from vending operations in rest areas for the 1-year test period varied from \$8,350 to \$27,864 with an average of \$15,775. The percent of operating expense covered by the income from vending varied from a low of 10.0 percent to a high of 22.83 percent with an average of 17.0 percent. This 17.0 percent was sufficient to pay for the material and supplies used at the rest areas.

Although the income from vending will not pay the total cost of operating a rest area, it does provide a significant sum of money that the department will not have to take from its regular budget to spend on rest areas, instead the money can be spent on other maintenance items. The vending income that is generated does not place an added tax burden on the public, but it results from the provision of convenient snack foods and drink to the traveling public without requiring capital expenditure by GDOT.

Welcome Center Vending Income

The Department of Industry and Trade received \$58,792 in commissions from vending operations in the five welcome centers during the first full year of operation. The vending machines were open only from 8:30 a.m. to 5:30 p.m. whereas the vending machines at the rest areas were open from 7:00 a.m. to 12:00 a.m. This explains why the average vending income for a welcome center was \$11,758 whereas the average income for a rest area was \$15,775 during the first year of operation.

RECOMMENDATIONS AND CONCLUSIONS

The provision of vending machines in 13 rest areas and 5 welcome centers in Georgia had no observed adverse effects on their operations during the 1-year evaluation period. Litter downstream of the rest area was not affected and litter on the grounds of the rest areas and welcome centers increased only slightly. The work load of the attendants increased only slightly due to vending.

Having vending facilities in the rest areas and welcome centers did increase the length of stay of those people who stopped at the rest areas and welcome centers by between 6 and 7 minutes. Also the rest area caretakers and welcome center attendants expressed the belief that more people used the rest areas as a result of vending. They also noted that more buses and trucks were using the rest areas and welcome centers after vending machines were installed.

Vandalism is not a problem even though there were four incidents of breaking into the vending machines at the welcome centers. This could possibly have

TABLE 6 Rest Area Operating Costs and Vending Income Comparison

| REST AREA NO. | LOCATION | ANNUAL USAGE PERSONS | 1979 ESTIMATED ANNUAL OPERATING COST | ESTIMATED ANNUAL INCOME FROM VENDING | RATIO OF VENDING INCOME TO OPERATING COST (%) |
|---------------|-----------------|----------------------|--------------------------------------|--------------------------------------|---|
| 5 | Cook County | 450,100 | 68,524 | 12,854 | 18.76 |
| 6 | Cook County | 762,900 | 68,524 | 12,854 | 18.76 |
| 9 | Turner County | 640,800 | 114,011 | 14,951 | 13.11 |
| 10 | Turner County | 619,300 | 114,011 | 14,951 | 13.11 |
| 13 | Dooly County | 457,000 | 83,612 | 12,807 | 15.32 |
| 14 | Dooly County | 686,000 | 83,612 | 12,807 | 15.32 |
| 19 | Bibb County | 635,800 | 106,451 | 17,570 | 16.51 |
| 22 | Monroe County | 758,800 | 122,039 | 27,864 | 22.83 |
| 34 | Gordon County | 804,800 | 111,355 | 23,413 | 21.03 |
| 75 | Gwinnett County | 366,700 | 87,883 | 15,511 | 17.65 |
| 76 | Gwinnett County | 581,000 | 87,883 | 15,511 | 17.65 |
| 81 | Franklin County | 357,000 | 83,525 | 8,350 | 10.00 |
| 105 | Glynn County | 512,500 | 75,946 | 15,632 | 20.58 |
| | TOTALS | | \$1,207,376 | \$205,073 | |
| | | | \$ 92,875 Avg. | \$ 15,775 Avg. | 17.00% Avg. |

been prevented if the welcome center vending buildings had been set up like those at the rest areas. There were no break-ins at the rest areas.

The income from the vending operations at the 13 rest areas, which amounts to a commission of 30 percent of gross sales, was adequate to cover about 17 percent of the cost of operating a rest area on the average. Even though this income is not adequate to cover all the operating expenses of a rest area it does provide a significant amount of money that would ordinarily have come from taxes. This additional money requires no capital investment by GDOT in order to collect it but comes from the provision of a convenient snack food service to the traveling public.

From interviews with 4,641 rest area and welcome center users, it was determined that almost 92 percent of the traveling public favor having vending machines in rest areas and welcome centers. Also the majority of vending machine users were satisfied with the vending operations. In particular they agreed that the quality and selection of merchandise were good and the prices were reasonable.

It is recommended that Congress change the law to allow the permanent provision of vending machines in rest areas and welcome centers and that the law be extended to all present and future rest areas with facilities and to all welcome centers. The benefits of having vending facilities in rest areas and welcome centers outweigh the disadvantages.

It is further recommended that consideration be given to allowing signs to be erected on the highway in advance of the rest areas advising motorists that refreshments are available at the rest stop.

FOLLOW-UP EVALUATION

Four new rest areas have been constructed since this study was completed, and vending facilities were added to them. Georgia now has vending facilities in

all 17 rest areas that have bathroom facilities. Vending facilities have also been added to all 8 welcome center locations. Since the evaluation was completed in 1980, no significant problems have occurred in connection with the provision of vending facilities in rest areas or welcome centers.

The state now receives 32.5 percent commission on gross sales. The revenue received for the next year after the evaluation period, fiscal year (FY) 1981, was \$193,218 on gross sales of \$644,059. Receipts for FY 1982 were \$218,798 on gross sales of \$729,327. The four new rest areas were added during FY 1982. Data for the most recent year, FY 1983, indicate commissions of \$250,525 on gross sales of \$824,990 for the 17 rest areas.

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The opinions, findings, and conclusions expressed in this paper are those of the author and not necessarily those of the Georgia Department of Transportation or the Federal Highway Administration.

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