EVALUATION OF PUBLIC PERCEPTION AND OUTREACH EFFORTS FOR ROUNDABOUTS IN FAIRMONT, WV

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ABSTRACT

In 2010, the Gateway Connector in Fairmont, WV was opened to the public directly connecting Fairmont, WV to the major local Interstate. A special characteristic of this stretch of roadway is that it contains the State’s first two roundabouts. As such, local and state officials were concerned regarding the public acceptance and successful operations of this new traffic control feature. A public outreach campaign was organized by the Federal Highway Administration, West Virginia Department of Highways, and City of Fairmont officials. This paper presents the public awareness campaign developed for the first two roundabouts constructed in the state of WV in Fairmont. The public perception of the roundabouts was monitored using a progressive survey. The pre-survey was administered shortly before the opening of the roundabout, while the post-survey was distributed approximately a year after the roundabout had been in operation. The reported approval rating regarding the public’s perceived comfort of navigating the roundabout and the safety of drivers, pedestrians, and cyclists increased at least 25% between the two surveys. All of the changes in opinion for the survey questions comparing public acceptance of the roundabout, before and after the Connector’s opening, were found to be statistically significant at the 1% significance level.

Keywords: Roundabout, Public Opinion, Survey, Public Awareness Campaign
INTRODUCTION

Despite the growing popularity of roundabouts among transportation agencies and others, they are often met with opposition by the public during the planning, construction, and early operational stages. Part of the opposition is due to the novelty of the intersection design, public anxiety of how to traverse the roundabout safely, and public confusion between the modern roundabout and the traffic circles of the early-to-mid 1900s (a form of intersection control that has been removed from many locations due to safety concerns). In 2010, the Gateway Connector in Fairmont, WV was opened to the public; this stretch of roadway, directly connecting Fairmont, WV to the major local Interstate, contains the state’s first two roundabouts. Heeding warning from peer states, a public outreach campaign was organized by Federal Highway Administration, West Virginia Department of Highways, and City of Fairmont officials, and the public perception of the roundabouts was monitored using a progressive survey. This paper presents the public awareness campaign developed for the first two roundabouts constructed in the state of WV in Fairmont. This paper examines the success of implementing roundabouts into a community with an older population.

LITERATURE REVIEW

Roundabouts are hailed as one of the Federal Highway Administration’s (FHWA) nine proven safety countermeasures alongside corridor access management, backplates on traffic signals, and pedestrian hybrid beacons (1). Yet, despite the backing of the FHWA, it is very difficult to gain public acceptance of roundabouts during the planning, construction, and early operational stages of a project. The importance of obtaining public acceptance cannot be understated. Despite strong engineering support, many proposed roundabouts have been abandoned during the planning stages due to the public’s strong negative feelings toward the alternative form of intersection control (2). Careful planning to ensure a successful first implementation of a roundabout, interactive public meetings, educational pamphlets, and instructional videos, have all proven successful in gaining public acceptance of roundabouts.

The most important step in gaining public support, as identified by many states, is selecting an inaugural site with a high probability of success. It’s often difficult to gain support for a roundabout based on successful implementation in other states. A state’s first roundabout tends to set a precedence for how future roundabouts will be viewed. Regardless of whether or not the first roundabout performs well, it offers a more concrete example for future proposed roundabouts to be compared against. If the first roundabout is well received, it becomes more easy for future roundabouts to gain acceptance; for example, in Washington State more than 200 roundabouts have been constructed thanks in part to the positive experience of the State’s first roundabout in 1997 (3). Therefore, it is imperative that careful planning is completed to ensure conditions are adequate for a successful first implementation of roundabout (4,5).

Public meetings with a presentation and open dialogue with the public have also proven successful (6). Florida, Kansas, Georgia, Nevada, Wisconsin, Colorado, Minnesota, and many other states have had much success using these public meetings to explain why a roundabout has been selected over alternative forms of intersection control and to directly answer the public’s questions. Many states also use these public meetings as an opportunity to distribute brochures highlighting the benefits of roundabouts and instructions on how to drive in a roundabout; other states have had success using brochures as an opportunity to educate the public about the difference between modern roundabouts and traffic circles of the past. Delaware, Kansas, Missouri, Nebraska, North Carolina, and many other states all have examples of brochures they have developed and distributed to the public available online (6). Some states, such as Oregon,
are developing outreach tools for younger generations, such as coloring books, to help develop more public support for roundabouts (7).

A third common form of public outreach is through the media (6). Many states have created videos covering topics similar to those addressed in print media, but in a more interactive manner. Arizona, California, Delaware, Georgia, Kansas, New York, and many other states have all created videos to help with their public outreach campaigns. Many of these videos are on YouTube or the State Department of Transportation’s websites. These videos have been found to be an extremely successful way to instruct drivers on how to use a roundabout. Surprisingly, the use of traditional forms of media (print, video, radio commercials, etc.) currently outpace the use of social media (6). The next section describes the public awareness campaign deployed in West Virginia prior to the opening of the roundabout.

PUBLIC AWARENESS CAMPAIGN

The public awareness campaign was conducted over a period of one year prior to the opening of the roundabouts in Fairmont, West Virginia (WV). A committee was formed comprising of engineers from the Federal Highway Administration (FHWA), West Virginia Department of Highways (WVDOH), communication professionals from the West Virginia Department of Transportation (WVDOT), and Fairmont city officials. A PowerPoint presentation which explained roundabouts from a practical and engineering perspective and a 12 minute video which described roundabouts and provided information on how to properly use a roundabout was developed. This group oversaw delivery of the presentation during meetings with the Fairmont community. This video was shown at the meetings, aired on the public broadcast channel, and was available on the Department of Highways Website.

Nine months before the roundabout opened, the committee met to develop and finalize the tactics that would be used to reach out to the public. It was determined that meetings would be held for various groups within the Fairmont community in the following months. These meetings were structured in four parts. During the first 5-10 minutes, an update of the construction status was provided, including any progress or openings. The next 10-12 minutes were used to present the PowerPoint developed by the WVDOH committee members. That was followed by the 12 minute video generated by the communications office. The last 5-20 minutes of the meeting were set aside for questions from the audience. Tri-fold pamphlets on roundabouts developed by the FHWA were provided for all audience members. Separate meetings were held for City of Fairmont emergency personnel, police, fire department, city bus drivers, school bus drivers, and the general public. In addition, the video was posted on the DOH Website and incorporated into the regular schedule of Fairmont’s public broadcast channel. The committee members from the local WVDOH office and the City of Fairmont officials distributed the FHWA’s tri-fold pamphlets around the City of Fairmont over the following months. These pamphlets were made available in the District 4 headquarters in Clarksburg, the Marion County WVDOH headquarters in Fairmont, two construction project field offices, and the city building in Fairmont.

Six months before the roundabout opening, the committee held meetings for the City of Fairmont emergency personnel, police, and fire department. Five months prior to opening, the committee held meetings for the Marion County Transit Authority and Marion County school bus operators. Four months before opening, two meetings were held that were open to the general public. One was held at the Junior High School and the other at a church. These were publicized by local television stations WBOY and WDTV and by the Fairmont Times newspaper. WBOY, WDTV, and the Fairmont Times also did a follow up story on the meetings, asserting that the presentation could be given to any interested group of 10 or more people and providing details on
how to contact the committee to set up such a presentation. This resulted in 6 to 8 additional meetings for various church groups, the Lion’s Club, Fairmont State adult education classes, and other groups.

PUBLIC OPINION SURVEY

In order to assess the public’s reaction to the new intersection design, a survey was distributed to the community in a progressive manner. The surveys were designed to understand the trends in public perception of the roundabouts over time. The survey results were analyzed and summarized, and significant trends in public perception were noted.

The preliminary survey was conducted prior to the opening of the Gateway Connector in Fairmont, WV. Its purpose was to determine the initial public opinion before the roundabout’s construction had completed and drivers had the opportunity to maneuver them. The survey became available to the public August 8th, 2010 and remained available until December 31st, 2010. A total of 414 surveys were submitted. Surveys were available both electronically and in paper format. A complete list of pre-survey questions is shown below.

1. Are you familiar with the Gateway Connector project in Fairmont that includes 2 new roundabouts? Yes or No?
2. Have you received any information on how to drive the roundabouts on the Gateway Connector? Yes or No?
3. Do you think that type of information was/would be beneficial? Yes or No?
4. How often do you plan on driving the roundabouts on the Gateway Connector? Never, Rarely, Monthly, Weekly, or Daily?
5. What is your primary purpose for driving the Gateway Connector? Work, School, Shopping/Errands, Leisure, or Other?
6. Which modes will you use to go through the roundabouts? (Please circle all that apply) Automobile, Pedestrian, Bicycle, Motorcycle, or Commercial Vehicle
7. Do you anticipate avoiding the use of the Gateway Connector because of the roundabouts? Yes or No?
8. Have you ever driven a roundabout? Yes, No, or Not sure?
9. If yes, how familiar are you with roundabouts? Not familiar, Slightly Familiar, Somewhat Familiar, Very Familiar, or Extremely Familiar?
10. What concerns do you have about use of the roundabouts? (Please check all that apply) Safety issues, Traffic backups, Confusing to Self (e.g. entering and exiting, merging), Confusing to Others, Do not function as well as a traffic signal, Lack of training, No concerns, or Other concerns?
11. How comfortable do you feel about selecting the proper lane prior to entering roundabout? Not at all Comfortable, Slightly Comfortable, Somewhat Comfortable, Very Comfortable, or Extremely Comfortable?
12. How comfortable do you feel about merging into traffic already moving in the roundabout? Not at all Comfortable, Slightly Comfortable, Somewhat Comfortable, Very Comfortable, or Extremely Comfortable?
13. How comfortable do you feel about changing lanes in the roundabout? Not at all Comfortable, Slightly Comfortable, Somewhat Comfortable, Very Comfortable, or Extremely Comfortable?
14. How comfortable do you feel about exiting a roundabout? Not at all Comfortable, Slightly Comfortable, Somewhat Comfortable, Very Comfortable, or Extremely Comfortable

15. How safe do you feel roundabouts are for drivers? Extremely Dangerous, Slightly Dangerous, Neutral, Slightly Safe, or Extremely Safe

16. How safe do you feel roundabouts are for bicyclists? Extremely Dangerous, Slightly Dangerous, Neutral, Slightly Safe, or Extremely Safe

17. How safe do you feel roundabouts are for pedestrians? Extremely Dangerous, Slightly Dangerous, Neutral, Slightly Safe, or Extremely Safe

18. When compared to stop signs and traffic signals, would you anticipate the roundabouts to be: Much More Dangerous, Slightly More Dangerous, About the same, Slightly More Safe, or Much More Safe

19. When compared to stop signs and traffic signals, would you anticipate the roundabouts to be: Much Less Efficient, Slightly Less Efficient, About the same, Slightly More Efficient, or Much More Efficient

20. How do you feel roundabouts will affect your trip? Make it much longer, Make it slightly longer, No difference, Make is slightly shorter, or Make it much shorter

21. Additional Comments:

The second survey (available only online) was conducted soon after the Gateway Connector was opened. Its purpose was to determine whether or not the opinion of the public had changed after using the roundabouts for a short period of time. The survey began on November 11th, 2011 and was available until December 19th, 2011. A total of 311 surveys were submitted. The post-survey questions are very similar to the pre-survey questions with only minor modifications (8).

Responses to both of the surveys were tabulated on separate Microsoft Excel worksheets. Afterwards, surveys which were deemed incomplete were disregarded for the data analysis portion. Once the incomplete data was eliminated there were 369 and 297 data points for the pre and post survey, respectively. This was the data set that was analyzed for trends.

Summary statistics of the surveys were generated for selected questions, for the pre and post survey for topics such as comfort, efficiency, and safety. An approval rating system was devised to “score” the responses resulting with a percentage of approval for each question. Most questions had five possible choices for the survey participants to choose from. If the subject chose the option which demonstrated the highest level of approval, that response received a 100% score. A response that corresponded to the lowest amount of approval would receive a 0% score. The low, medium, and high approval responses received scores of 25%, 50%, and 75% respectively. The approval ratings from both surveys were then compared on a scatter plot.

Table 1 shows the tabulated results for the demographic statistics of both surveys. Both surveys showed a fairly even distribution of gender and age, with slightly more female subjects than male subjects in both surveys. A significant percentage of the respondents are were above the age of 45, which is consistent with Fairmont census data. The zip code demographics showed that approximately three fourths of subjects in both surveys were from a Fairmont or nearby zip code. Very few of the subjects said they drive more than 50 miles a day on average. This would lead us to believe that most travel is local and few citizens have daily or even repeated need to travel outside the realms of Fairmont, WV.
TABLE 1 - Demographic Statistics

<table>
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<tr>
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<tr>
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<td>15.99%</td>
</tr>
<tr>
<td>151+</td>
<td>4</td>
<td>1.08%</td>
</tr>
</tbody>
</table>

PRE-SURVEY ANALYSIS

The pre-survey was conducted prior to the opening of the facility, and the survey data pool was reduced to a final set of data points consisting of 369 complete survey responses. These responses were analyzed to create a base to which the responses in the post-survey would be compared, providing understanding about the predispositions the Fairmont citizens, as well as some outside subjects, had regarding the use of roundabouts.
The distribution of responses for Question 7, “Will you avoid the roundabouts?” is 16%/84% Yes/No, Figure 1. The relatively small percentage of people who responded that they will avoid the roundabouts corresponded to the few comments received that were strongly against the roundabouts being constructed. Many of these responses mentioned the lack of educational materials published or given to citizens to educate them on the use of roundabouts. Many feared the driving habits of the elderly, who are not familiar with roundabouts, and the young high-school and college aged drivers, who would approach the roundabouts too quickly or with little or no attention to others.

As can be seen in Figure 2, almost equal proportions of the sample reported being Not Familiar and Extremely Familiar with roundabouts. After viewing the comments provided by the
survey participants, many of those who were familiar with roundabouts had had previous experiences with them outside of West Virginia. The participants who reported familiarity and those who were unfamiliar with roundabouts shared concern with the amount of information and educational materials provided to the public regarding this project. Few people had received or viewed any information describing the traffic patterns that would be put in place on the Connector or how drivers should negotiate a roundabout.

![Pie chart showing frequency of roundabout use](image.png)

**FIGURE 3 - Pre-Survey Attitudes on Frequency of Use**

The response data with respect to the frequency in which drivers plan on using the roundabout, are summarized in Figure 3. A significant majority of the sample intend on using the roundabout on a daily or weekly basis (63%) which is consistent with expectations that a majority of drivers would not go as far as to alter their routes to compensate for any discomfort or concerns regarding the roundabout.
In Figure 4, the assessment of overall comfort level with roundabouts is accompanied by an assessment of comfort levels with specific roundabout maneuvers, namely: lane selection, merging, changing lanes, and exiting. The majority of respondents expressed the highest comfort level with the first maneuver, i.e. lane selection, followed closely by exiting. This is likely due to the fact that these maneuvers occur outside of the roundabout itself. However the comfort level of comfort was significantly less for the maneuvers performed inside the roundabout. This is likely because the movements within a roundabout are both new and possibly more complex. The overall comfort level was moderate as many people fell in one of the three middle categories.
Sub-categories were also employed in assessing the subjects’ opinion with respect to the safety of roundabouts, Figure 5. Specifically, the overall safety of roundabouts includes an assessment of the safety with respect to its three primary users: drivers, bicyclists, and pedestrians. Respondants identified the “driver” as the least vulnerable user, but believed that all users are vulnerable to some degree from a safety standpoint. This is also reflected in the assessment of overall safety where only a minority of respondents rated them as either Extremely Safe or Slightly Safe (17%). These attitudes may be due to a multitude of contributing factors including the fact that few of the subjects have been in a roundabout before, have seen drawings of the traffic plans for the connector, or understood that pedestrians would be on a sidewalk interacting outside of the roundabout as it crosses one of the arterials, and that the bicyclists would have a bike path allocated for them.
FIGURE 6- Pre-Survey Attitudes on Travel Time

The last three questions concerned perceptions of roundabouts relative to traditional traffic control devices such as stop signs and traffic signals. The majority believed that roundabouts were more dangerous than a typical signalized intersection, as can be seen in Figure 6. This is likely due to the lack of information or experience of the subjects with roundabouts. Surprisingly, the subjects already believed that the roundabouts would be more efficient than the typical signalized intersection, Figure 2. The little information that the subjects did receive likely effectively conveyed traffic flow improvements often achieved by roundabouts. Almost the entire group of subjects also believed the roundabouts would either make their commutes shorter or not contribute to making a difference in their travel time or distance.
POST SURVEY ANALYSIS

The post-survey was conducted at the end of 2011 - one year following the opening of the roundabouts. The survey data was reduced to a final set of data points consisting of 297 completed survey responses. This survey allowed for a comparison of the attitudes and expectations of local drivers with respect to roundabouts before and after their implementation.

![Approval Ratings](image)

**FIGURE 7 – Change in Approval**

The chart shown in Figure 7 displays the approval ratings as captured by Questions 11 through 20 of the survey. These questions had five options which were ordered from highest to lowest levels of approval. More specifically, the chart displays the levels of approval for respondents across all comfort and safety levels for both the First Survey (before implementation) and the Second Survey (after implementation). The chart clearly shows that there is a marketable increase in approval of the roundabouts following their implantation. The overall majority of the sample was not comfortable and/or familiar with roundabouts in general and the Gateway Connector Project in particular. The Second Survey however shows that over the period of a year the majority of the population as represented by the survey sample, changed their perceptions and attitudes to view roundabouts more favorably.

Note that all of the questions pertaining to safety have the lowest approval rates for both surveys. The bicyclist and pedestrian safety in particular are the lowest two points on both graphs, indicating that drivers were skeptical of the safety provided by the roundabouts for the pedestrians and bicyclists. Additionally, many of the subjects may have never attempted to travel the connector by bike or foot. Drivers lacking this experience may not be fully aware of the bike and walking paths, crosswalks, bus stops, and shelters that were constructed as part of the Gateway Connector project and quite typical for today’s roundabout designs. These facilities separate the bike and pedestrian traffic from the vehicular traffic and minimize the interfaces for interactions. Where interactions do exist, there are typically marked crosswalks, which are placed away from the inside
of the roundabouts, on the arterials where the vehicular traffic will decrease speed in order to enter
or exit the roundabout.

![Percent Increase in Approval](image)

**FIGURE 8 – Change in Approval Ratings Across Survey Questions**

Referring to Figures 7 and 8, it can be seen that the approval rating of each question
increased greatly over the one-year study period. The safety questions showed the highest
percentage of increase, which is most likely due to the low initial approval based on uncertainty
and lack of experience.
Over the one-year evaluation period, there was a significant decrease in the rate of drivers claiming to avoid the gateway connector (from 15% to 10%), Figure 9. There are several possible explanations for this improvement, such as word of mouth and that the information provided by the West Virginia Department of Transportation had more time to circulate and inform the public.

**FIGURE 9 - Change in Avoidance**

**FIGURE 10 – Change in Familiarity**
Results from questions pertaining to familiarity with roundabouts show that, over a one-year period, drivers became significantly more familiar with the roundabouts. Specifically, there was a 19.4% increase in number of respondents that expressed familiarity, reaching a level of 62%, approaching the assimilation levels of traditional traffic control devices (Figure 10).

![Circular graph showing frequency of use for roundabouts]

- 65.79% Travel Rate
- Orange Range
- 10.30% Increase in Rate of Travel

**FIGURE 11 – Change in Frequency of Use**

Before the implantation of the roundabouts, 63% of respondents believed they would use them on a daily or weekly basis, Figure 11. This level grew to 71% one year following the implementation. The increase is modest, but significant, revealing that perhaps user’s expectations of the roundabouts’ performance were exceeded.

Chi-square tests for contingency were completed on the questions required for the survey to be deemed complete. For all questions examined (Questions 11-20 on the pre-survey and their corresponding questions on the post-survey), the results were found to be statistically significant at the 1% significance level; therefore, the results show that the public did change their opinions during the first year of the roundabouts’ implementation.

**CONCLUSIONS**

Roundabouts offer transportation planners and engineers an additional option of intersection control, and when properly implemented, can realize significant safety and flow efficiency advantages over more traditional traffic control devices. However, the geometrics and the directional flow of roundabouts, among other things, are a significant departure from existing layouts leading to anxiety and skepticism on the part of transportation officials and highway users alike. In West Virginia, the plan for addressing the issues surrounding its first roundabout implementation, was an aggressive public awareness campaign well in advance of opening. The
objective of this study has been to determine the effectiveness of this campaign and provide insights regarding the most prevalent issues to be addressed in future roundabout projects.

A public outreach campaign was organized by the Federal Highway Administration, West Virginia Department of Highways, and City of Fairmont officials, and the public perception of the roundabouts was monitored using a progressive survey. The pre-survey was administered shortly before the opening of the roundabout while the post-survey was distributed approximately a year after the roundabout had been in operation. A total of 369 and 297 completed pre and post surveys, respectively, were collected. During the pre-survey, 16% of participants reported that they would avoid using the roundabouts and 36% of participants stated that they were either not-at-all or only slightly comfortable with traversing a roundabout.

After one year of implementation, considering the public’s perceived comfort of navigating the roundabout, the safety of drivers, pedestrians, and cyclists, and other factors, public approval increased by at least 25%. All of the changes in user attitude for the ten questions comparing public acceptance of the roundabout, before and after the Connector’s opening, were found to be statistically significant at the 1% significance level. These assuring statistics of the Fairmont roundabouts’ acceptance as a form of traffic control are more impressive when the demographics of the surveys are examined, i.e. 48.5% of the pre-survey and 50.2% of the post-survey participants were over the age of 46.

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