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of Midwest Pavements

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# Public Perceptions of the Midwest's Pavements - Phase I - Focus Group Content Analysis - Iowa

University of Wisconsin - Extension, Wisconsin Survey Research Laboratory

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This Phase I report is part of a larger study. Links below connect to the following 2 phases as well as to the executive summary of this project:

[Phase II - State-Wide Survey Report](#)

[Phase III - Targeted Survey Report](#)

[Executive Summary - Iowa](#)

# Public Perceptions of Midwest Pavements

Focus Group Content Analysis - Iowa

Prepared by:

Wisconsin Survey Research Laboratory

University of Wisconsin - Extension

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## INTRODUCTION

### Purpose of the Study

This research is being conducted as part of a larger study of the public's perceptions of state-maintained rural highway pavements in Wisconsin, Minnesota, and Iowa. Later stages of this project will involve interviewing residents of the three states by telephone to gather information about people's concerns about the pavements in general and specific stretches of highways in particular. Information from this effort is expected to aid the states' Departments of Transportation refine the standards used to set pavement reconstruction priorities to better meet the needs of residents.

### Purpose of the Groups

In order to better understand the general concerns of residents and the terms people use when talking about those concerns, a series of focus groups was conducted in each of the participant states. Each group followed a standard protocol which consisted of a general discussion of pavement features participants liked or dislike, a series of questions which asked participants to choose between difficult options, and a ranking exercise in which participants decided which factors should be considered when prioritizing road repairs. In addition, participants were asked to complete a basic demographic sheet which included questions about driving habits (see Appendix B for a more detailed description of the demographic characteristics of the groups). Moderators were instructed to pay particular attention to differences in terminology used by participants and to explore these differences when they occurred. Similarly, moderators were watchful for any regional differences apparent in the groups.

## Purpose of the Analysis

This paper reports the findings of a content analysis conducted on the focus group transcripts. Content analysis is a useful tool for searching for common patterns in ways of talking about issues as well as for identifying significant differences. It is particularly helpful, as in the current situation, when researchers are interested in gathering more information to use in designing an effective survey instrument. This analysis will focus on several separate issues. First, it will look at the terminology used by participants in order to design questions that will be understandable to and elicit relevant information from respondents. Second, the analysis will examine the ways in which people talked about pavement conditions. The discussions that occurred during these focus groups can sensitize researchers to the kinds of information respondents may have available and the areas that are either difficult for respondents to articulate or that are outside of their experience. Third, this report will explore the substantive position of participants. Obviously, this analysis can not make claims of conclusive or representative findings, but can indicate whether there is reason to believe that a high degree of consensus exists in the general public and what issues are likely to have large variability.

## DESCRIPTION OF THE GROUPS

The series comprised six groups in each of the three states for a total of **18** groups. The Iowa groups were conducted in six separate communities selected by the Department of Transportation to provide a variety of perspectives from different regions of the state. Five groups in Iowa were entirely composed of people randomly selected from the community who regularly drove rural highways (see Appendix A for a more detailed description of the sampling procedure). One group included a mix of participants who were selected because they held commercial drivers' licenses as well as

randomly selected individuals'. A total of 60 people participated in the six focus groups conducted in Iowa including 34 men and 26 women. Half of the groups in each state were specifically asked to drive a stretch of rural state maintained two-lane highway. Participants in these groups were paid \$50 as compensation. The other groups were not specifically asked to drive any highway before the meeting. Participants in these groups were paid \$35 as compensation. There were 32 participants in groups that were specifically asked to drive, and 26 participants in groups that were not specifically asked.

## Decorah

The first Iowa group was conducted in **Decorah**, in northeastern Iowa close to both the Minnesota and Wisconsin borders, on October 28, 1996. There were 12 participants in the group including seven men and five women. Participants were specifically asked to drive a stretch of rural highway. The group included two motorcycle owners and three motor home owners. These participants occasionally mentioned the special concerns of drivers of motor homes or with trailers but rarely spoke as motorcyclists.

## Storm Lake

The second Iowa group was conducted in Storm Lake, in northwestern Iowa on October, **29, 1996**. There were **12** participants including six men and six woman. Participants in the Storm Lake group were randomly selected from the community and were not specifically asked to drive a stretch of rural state highway before coming to the meeting.

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<sup>1</sup> The conversations in a few groups indicated that participants were professional drivers or drove extensively for their jobs. Unfortunately, we have no specific information about the number of CDL or professional drivers in the groups.

## Atlantic

The third Iowa group was conducted in Atlantic, in southwestern Iowa, on October 30, 1996. There were ten participants including five women and five men. Participants were selected from the community at random and were specifically asked to drive a stretch of rural state highway. The group included a motor home owner, however this fact was not apparent in the conversation. Conversely, the group also included at least one professional truck driver which did affect the conversation.

## Maquoketa

The fourth Iowa group was conducted in Maquoketa, in eastern Iowa near both the Illinois and Wisconsin borders, on November 4, 1996. There were 11 participants including seven men and four women. Participants were selected from the community at random and were not specifically asked to drive a stretch of rural state highway. The group included one person who owned recreational vehicles.

## Ottumwa

The fifth Iowa group was conducted in Ottumwa, in southeastern Iowa, on November 5, 1996. There were five participants including three men and two women. Participants were selected from the community at random and were not specifically asked to drive a stretch of rural state highway. The group included one motorcycle rider.

## Marshalltown

The sixth Iowa group was conducted in Marshalltown, in central Iowa, on November 6, 1996. There were ten participants including six men and four women. The group was comprised of both people selected at random from the community and a number of participants who were invited because they held commercial drivers' li-

censes. Participants were specifically asked to drive a stretch of rural state highway before coming to the meeting. The group included no motorcycle riders or motor home owners.

## PHRASING ISSUES

The focus groups serve an important function by providing background information for researchers to use when designing an effective telephone questionnaire. Several related themes that emerged in the discussions of the focus groups directly relate to this process. First, it is important to understand how participants, and eventually respondents, think of or identify particular stretches of highway. Second, focus group discussions should be analyzed to catalog the terms used by participants for various features of the road surface. Third, the experience of the focus group can provide researchers with important insights into the specific problem of verbalizing the non-verbal expressions commonly used in the context of discussions about road conditions.

### Road Segment Identification

Because researchers are eventually interested in comparing the findings of a telephone survey with actual pavement conditions, it is imperative to find a reliable way to have respondents identify specific stretches of highway. In order to do this, we must first understand how participants define a stretch of road and then how they identify those stretches. The reliability of such identification will depend on and be limited by the answers to the first question. If people conceive of “stretches” as relatively long, poorly defined distances, any information about smaller, more specific pieces of the road will be highly unreliable.

By far, most references to a stretch of road indicated a specific highway (by number) between two towns or in relation to one town. For example, a person might talk about “highway 52 between Calmar and Decorah” or they may talk about “highway 14 south.” Occasionally, when participants defined a stretch they would re-



fer to a significant intersection with another highway. In such cases, the intersection was usually one where the roads divided or where the participant usually turned off or on the highway. For example, one participant described the roads they normally travel as “that would be D37, that’s probably a county road, and it’s blacktopped, between Agency, and then I take the road there, 178 to 149 to highway 1.” Participants also noted significant changes in the nature of the road, such as changing from two to four lanes. In some groups, it was common for people to note county lines as the demarcation of stretches, usually in connection with noted differences in the quality of the pavement that began at the county line. Similarly, some individuals noted important landmarks along the road, such as a store or restaurant. Junctions with county roads were rarely noted.

It is possible to detect a similar feature in all of the more common means of identifying beginning and end points. Drivers note changes in the road that they must respond to as drivers. All of the features included above cause the driver to respond, either by slowing to enter a village, city, or dangerous intersection, remembering to turn, or suddenly needing to pay more attention to a poor road surface. Participants’ understanding of the roads on which they travel, then, is intimately connected to the way they travel the road. These findings suggest that the degree to which a particular landmark, intersection, or other point along the highway requires drivers to respond will correspond to the pervasiveness of respondents’ identification of that specific point. Somewhat ironically, this means that the more a person travels a particular stretch of road, the less able they will be to explicitly name it. One person admitted “I travel from Ottumwa to Iowa City quite often. I don’t know what state or US highway I’m on.”

## Terms

A second issue of special interest to survey designers are the terms used and understood by participants. It is important to note that these are two distinct issues. The

first is the language participants, and eventually respondents, choose to use when discussion certain pavements features. The second is the related issue of what participants understand when someone else, a telephone interviewer for example, uses a specific word. Problems in the latter may pose a significant threat to the effective design of a survey instrument. Luckily, there is greater variation in the former than the latter.

The problem of language comprehension is notable in the context of a survey about highway pavements chiefly because there seems to be little readily accessible vocabulary for participants to call on in discussion. In general, a wide variety of terms were used by individuals, within groups, and among the different groups. This was especially true in Iowa. Frequently, the same word was used (sometime with and sometimes without modifier) to indicate separate features or characteristics. Similarly, participants often resorted to longer descriptions of features rather than use a single word. All of these things indicate that no commonly agreed upon vocabulary exists in the everyday language of participants. This situation can lead to the development of regional differences and idio-cultural responses.

In order to better understand the terms used by participants, the focus groups in Iowa began by asking participants what they would call certain road features described by the moderators. In this exercise, there was little evidence of failed communication and a great deal of agreement over terms. However, later in the discussion, this agreement proved to be elusive as participants used a variety of new terms to describe road features.

Though this lack of vocabulary caused participants to work harder in order to express themselves, it did not appear to be a major impediment to communication. Moderators noted no instances of failed communication and the transcripts do not provide any internal indication of participant frustration. It would seem that people have a common experience which they can recognize in the speech of others, despite not sharing a single common way of referring to it. Therefore, researchers should be aware that several possible problems could develop, but should not be overly con-

cerned that communication will be seriously threatened. Specifically, two possible situations may occur. First, the potential exists that there are regional variations in terms that were not detected in the focus groups. Second, researchers should not rely on a specific term to describe road features, unless that term **is** clearly described or defined in the course of the survey.

In addition to these general findings, content analysis also revealed variations surrounding several terms that may be of special interest.

### *Rutting*

By *rutting*, we mean the indentations along the tire tracks that form on the road surface as a result of compression caused by heavy trucks or traffic. This phenomena was noted in every group conducted but was frequently referred to be different names. Participants sometimes called these features *channeling*, *grooves*, or *water tracks*. Participants used several different characteristics to identify this feature including: its causes (trucks or traffic), its location (in the tire tracks), and its unintentional creation.

### *Grooves*

By grooves, we mean a pattern of narrow channels purposefully cut into a road surface, either parallel or perpendicular to the road lines, intended to increase surface friction and therefore provide safer driving conditions. Participants were fairly aware of this feature, though not as explicitly aware as they were of rutting. Most respondents indicated that they became aware of grooves as a result of the distinctive noise they causes. Most participants lacked any handy term to use for this feature and instead attempted to describe them, especially in relation to the noises they made (which was most often referred to as whining) and recognized their intentional design as an identifying characteristic. One person referred to them as *ribs*, and another called it *tinig*.

In addition to the fact that most participants lacked a specific term for grooves, there is indication that participants failed to immediately understand what moderators

were referring to when using the word “grooves”. In part, this may be due to the fact that many participants considered grooves to be what we are calling ruts. Another problem is the confusion of certain road repair practices with grooving. Specifically, in several areas in the region grinding is used to level the road surface if ruts or frost heaves have created unevenness. Sometimes, this is done to prepare the road for resurfacing while other times it is left as a final end-state. This practice leaves deep grooves which have several characteristics in common with grooves: they are intentional, create a distinctive noise, and can affect driving by “taking” or “grabbing” the car tires. Whatever the cause, discussion about grooves frequently involved an initial debate among the participants to firmly establish what feature was being discussed and it is unclear whether all participants were in fact discussing the same condition.

Another road feature that may sound somewhat similar to grooving are rumble strips. Focus group moderators specifically asked about these features and found that the most common term was **rumble strips**<sup>2</sup> (one person called them thunder bars and another referred to caution bars). The common identification of rumble strips indicates that any confusion respondents might have between grooving and rumble strips can be quickly and easily eliminated by informing them that we are not speaking of the latter.

### *Reconstruction*

A third set of terms of obvious importance to this research refer to road reconstruction. Participants made several distinctions in the level of road repair. The first level could be called *patching* and involves simply patching holes in the pavement, sealing cracks, or other similar repairs to specific pavement defects. People also referred to this as *repatching*, *reservicing*, *fixing*<sup>3</sup> and so on. The second level could be termed *resur-*

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<sup>2</sup> It may be interesting to note that this consensus occurs around a feature that is frequently marked with a warning sign that clearly identifies them as “rumble strips” - an advantage most road features do not share.

<sup>3</sup> As one participant said, “they don’t need to fix it, they need to rebuild it.”

facing, which involves applying a new running surface over the existing surface with only minor repairs to the foundation. This was also called *re-asphalting* and may include *grinding* the original surface. The third level could be called *reconstruction* and involves substantially rebuilding the underlying structure of the road or rebuilding the road in its entirety. Participants might refer to *regrading* or *grading and paving, rebuilding* the road, and so on.

The key to participants' understanding lies in the feature that is being repaired. That is repairing the defects, repairing the surface in its entirety, and repairing the foundation each represent distinct activities. Though these differences obviously connect to the cost and effort involved in repairs, participants did not generally understand these distinctions in terms of major or minor repairs. Again, it is reasonable to assume that major and minor refer to the interruption experienced by a driver, not to the project that is causing the interruption. In other words, it doesn't matter to the driver if the road is closed to be rebuilt or resurfaced. It only matters that it is closed.

It appears from the focus group discussions that this understanding of levels of road repair is generally pervasive. However, this does not mean that participants would automatically understand terms such as reconstruction without at least a brief explanation. Participants' understandings of these alternatives appear to depend on the object of repair. That is, patching (and related terms) refers to specific problems (potholes, cracks, etc.), resurfacing refers to the entire running surface, and reconstruction refers to the foundation.

### *Shoulders*

This term is only important for one reason: it demonstrates what participants think of when they think of the road surface. In every group, discussion turned at one point to the shoulder. The shoulder exists as an integral part of the road surface, even though it lies outside of the white lines. There are two reasons for this. First, people recognized the structural significance of the shoulder. Should the shoulder be damaged

or absent, the foundation of the road may be compromised. Second, the shoulder is important to people's driving strategies. They view the shoulder as a means of getting around turning cars and an escape route in case of trouble on the road. As such, drivers are constantly aware of the shoulder as intimately related to their driving and therefore to the road surface.

### ***Frost heaves***

*Frost heaves* describe a wide range of phenomena including individual dips or rises in the road, or a more general undulation of the road surface caused by freezing. Most participants had a specific term for these features, though these terms varied somewhat including *frost heaves* or *boils*; *way*, *rippy*, *rolly*, or *buckling roads*; *settling*, *dips*, *mini-hills*, *washboard*, or *washouts*, etc. Several of these terms are more vague and may describe a number of features. For example, *washboard* may also describe a stretch of road that has been frequently patched. Most important for the purpose of instrument construction, participants seem to understand most of the terms used by moderators or other participants, especially the more common *frost heaves* or *boils*.

### ***Potholes and Cracks***

A similar statement could be made for holes and cracks in the road surface. Terms for holes included potholes, holes, chuck holes, chucks, bumps, sinkholes and an amazing variety of sound effects. Terms for cracked pavements included a number of verbal descriptions such as weather checked, jigsaw puzzle, spider-web, and like shattered china. **Participants also** had a variety of terms that seemed to indicate the relative condition of the cracking and holes ranging from worn, and uneven, through broken up, crumbling, and chewed off. Again, though, participants understood any terms used by moderators or other participants.

## Sounds

Though not specifically terminology, a common pattern is apparent in the focus group discussions that may enlighten attempts to construct meaningful telephone questionnaires. Specifically, four different classes of sounds were identified by participants, each relating to a different road features. For simplicity, we can refer to these as *whine*, roar, the sound of *bad or flat tires*, and *chatter*. The first three of these classes were fairly consistently described, while the fourth is more pervasive, yet less concise. Whining is caused by tining or grooves and is similar to the sound caused by going over certain open-grate bridges'. It is identified by its high pitch. Roads roar when the aggregate surface is rough or after the roads have been ground before resurfacing or to eliminate unevenness. This sound is identified by its deep pitch and sounds similar to driving with studded tires. People believe that they have bad or flat tires when driving over a concrete surface that has ridges at the expansion joints or sometimes when traveling on a surface where cracks have been sealed with a tar compound. The fourth class is far more general and refers to the noise caused by potholes, cracks, or any number of other road defects. People use a wide variety of terms to describe this such as chatter, vibrations, or generalized noise. Understanding when and how people use these descriptions may assist telephone interviewers and survey designers in creating a more reliable instrument.

## Non-verbal indicators

Finally, the pervasive use of non-verbal indicators in all of the focus groups should be noted again. One of the most remarkable features of these groups was the constant use of pantomime and sound effects. Participants mimicked struggling to control a steering wheel, acted out being jostled by a series of bumps, recreated the sound

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<sup>4</sup> It is important to note that though references to crossing bridges and studded snow tires were common, they were also sometimes interchanged.

of going over a rhythmic series of bumps as might be caused by concrete joints, and sculpted the air to indicate the shape of the crown of the road, the undulations caused by freezing, and any number of other characteristics of either the ride or road surface. All of these indicate the difficulty many people have verbalizing their experience of driving. This is most likely the result of these experiences being largely tactile and rarely discussed in detail (or at least, rarely discussed in a context which requires one to avoid non-verbal gestures).

## **SUBSTANTIVE ISSUES**

Participants in the focus groups were initially asked to talk about the features of rural, two-lane, state-maintained highways which they liked and disliked. Participants were asked to focus solely on aspects of the pavement surface, however this proved to be a very difficult task for many people. As a result, the discussions addressed both features of the pavement and some other features of highways more broadly. The following discussion, like that of the participants, attempts to focus primarily on pavement features but also includes aspects of highways more generally to the degree that they might inform further research.

### Likes

Participants were directly asked what they like about the roads they drive. The most remarkable result of this question was the relative lack of substantive responses. As a general rule, participants gave vague responses or noted the absence of features that they disliked. For example, people would say that they liked smooth, quiet surfaces, or newly resurfaced or rebuilt roads. They also commonly noted liking the absence of bumps, cracks, dangerous intersections, steep hills, slippery surfaces, and so on. The list of specific features participants actively desired was shorter and less fre-



quently mentioned. It included adequate drainage (i.e. a gentle crown to the road), wide shoulders, clearly painted lines, and various pavement surfaces<sup>5</sup>.

The more general theme that can be extracted from these specific concerns and desires is an expectation that the road surface should not distract from the driver's experience. In other words, drivers negatively evaluate a road surface to the degree that they notice it, and vice versa. For most people, driving is a nearly automatic activity. The other activities people carry on while driving, such as conversations or listening to the radio, occupy a more central attentional position. Any road condition that disrupts this state of affairs, that is, that demands attention from the driver, is negative. Therefore, drivers' positive experiences of road surfaces are largely unavailable to the driver. The only exception occurs when drivers suddenly notice the aversive condition ending. This may happen, for example when one crosses out of one maintenance district with poorly repaired roads into another with freshly resurfaced ones. In this instance, a positive evaluation may be noted. Otherwise, such evaluations will be difficult. This leads drivers to either report vague likes or construct a negative deficit model of the positive, i.e. the positive is that state which does not include any negatives.

### Dislikes

On the converse, participants are sure and conversant about the features that they dislike. The following is a list of the features that participants most commonly mentioned as dislikes and a brief summary of their reasons.

#### *Rutting*

This was possibly the most common concern among participants. People gave several reasons for their concern. First, deep ruts could make it difficult to control the

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<sup>5</sup> A number of people expressed a preference for blacktop, some for concrete, and some for a combination. Most participants did not indicate a strong preference in any direc-

vehicle. Participants frequently pantomimed struggling with the steering wheel when confronting ruts. This was especially true for smaller cars that have a narrower wheel base than the road ruts. Second, people were concerned about the increased risk of hydroplaning when ruts filled with water, and similarly in the winter, the increased risk of ice forming in the troughs.

### ***Patching***

Dislike of excessive road patching was also common. Participants obviously did not want the Department of Transportation to ignore holes or leave them unattended. Instead, they were concerned when the percentage of patches (compared to original road surface) increased to an unacceptable level or when patches were used to repair previous patches that had deteriorated. There were three reasons for this concern. First, excessive patching was seen as a safety issue. Swerving or slowing to avoid patches could lead to accidents. Likewise, one could lose control as a result of hitting bumps associated with patches. Second, excessive patching is connected with extremely bumpy rides. Third, excessive patching is seen as an indication that the road is not properly maintained or valued. People felt that patching was frequently ineffective, that patches would deteriorate quickly leaving conditions worse than they were originally, and that resurfacing would be more cost effective in the long run.

### ***Bumps***

There was nearly universal dislike of bumps or potholes. Reasons for the dislike fell into one of three categories: ride, safety, and car damage. For most participants, the obvious discomfort caused by driving over bumps and potholes was obvious and required little conversation. However, discussion frequently went beyond the mere discomfort caused by the problem and linked it to safety concerns. Potholes could be a

safety hazard because they could “throw” the car into another lane, required more effort on the part of the driver to maintain control of the vehicle, were distracting, and could cause people to swerve or slow in order to avoid them. Many participants also discussed the car damage that they felt potholes could cause. However, it should be noted that people’s understanding of the damage bumps produce is subjective. That is, people believe that certain conditions are more likely to cause damage than others. Some were concerned that the vibrations caused by a series of little bumps was the primary cause of damage while others believed that the heavy impact of a few large holes was more of a concern.

### ***Shoulder***

As noted earlier, many participants were concerned by narrow shoulders or shoulder that were in disrepair. Their interest was twofold. First, they disliked shoulders that were not wide enough to be used by drivers in the case of emergency or to avoid cars that had slowed or stopped to turn off the road. Second, they worried that shoulders that were in disrepair could lead to other structural problems on or under the running surface of the road. Participants also noted a third shoulder condition that they disliked: height differences between road and shoulder surface. Several people noted that such differences could catch the tires of a car, causing it to suddenly swerve off the road if it ventured too near the edge.

### ***Uneven repairs***

Several participants expressed dissatisfaction with uneven road conditions on successive stretches of highway. People frequently noticed when the condition of the road would suddenly change, as might happen at a county line or when a limited stretch of road is significantly rebuild or resurfaced. Several people explained that this situation caused the driver to frequently readjust to changing conditions. As explained

earlier, because of the desire for driving to be a largely inattentive activity, this inevitably leads to a negative evaluation of the condition.

### ***Looks and noise***

Focus group participants were specifically asked about the impact of road noise and the look of a road on their general evaluations of the ride. Outside of this direct question, a small number of participants volunteered that either road noise or the look of the road bothered them in some way. As noted earlier; references to noise were frequently to the distinctive kind of noise caused by grooves and sometimes also about the general road noise caused by bumps or a deteriorating road surface. Very few participants discussed the look of the road without being specifically asked. When it occurred, it was seen as an indication of the general disrepair of the road. Overall, participants explained that road noise and unsightliness were annoyances that they prefer to do without, but were not an overriding concern.

### ***Other dislikes***

There were a number of other disliked conditions mentioned less often by participants. These include an undulating road surface which may occur as the result of freezing, excessive crowns, and the rhythmic bumping caused by concrete expansion joints.

### Indications of needed repair

After the discussion of liked and disliked highways features, participants were asked to discuss when they feel conditions have gotten so bad that repairs are indicated. As may be expected, most of the discussion centered around the dislikes identified above. Much of the discussion focused on anticipatory repairs. That is, most participants felt that the roads should be maintained so that problems such as potholes and ruts would not have an opportunity to develop. Barring that, however, participants felt

that roads should be repaired when the acceptable level of undesirable features reaches a critical limit. Unfortunately, describing these limits proved to be an extremely difficult task for most participants. For example, there was broad agreement that excessive patching indicates the need for more extensive road repair. However, it was nearly impossible for participants to define excessive patching. Comments such as “when there are more patches than road” may indicate some general sense of the criteria, but certainly do not indicate a numerical percentage, i.e. when over 50 percent of the road surface is made up of patches. Focus group participants, like most drivers, were not civil engineers and therefore did not have the expertise required to provide any definitive criteria.

Participants did, however, identify a different form of criteria that may provide useful insights into participants’ thinking about road repair. Several people indicated that they felt the road required repairs when they were forced to pay attention to the road surface rather than to driving in general or the other activities that they were engaged in while driving. To drivers, this situation signals that problems with the road surface are so severe that they represent a safety concern.

#### Other considerations

After discussing condition thresholds used by participants to decide whether a road was in need of repair, they were asked to consider other factors outside of the actual condition of the road that they felt should be considered when setting priorities.

#### *Traffic*

Traffic was the most consistently important factor people identified that should be considered when setting priorities. Participants frequently discussed at least two kinds of traffic: truck and cars. Occasionally, people would also mention a concern about pedestrian, bicycle, RV, or some other form of less common traffic. Generally, people felt that highly traveled roads should be given higher priority when scheduling

repairs. Most people gave a number of intersecting reasons for this belief. First, higher volume would cause more damage and so high volume roads would probably also be the ones in most disrepair. Second, the potential danger of disrepair would be greater on highly traveled roads. Third, repairs made on highly traveled roads would benefit the largest number of people. Some people were concerned that using traffic counts may place certain parts of the state, namely the more rural areas, at a disadvantage. In general, though, traffic counts were seen as a fair way of determining repair priorities.

The discussion surrounding truck traffic was varied. In some groups, participants talked about the need for trucks to be able to deliver important goods in and around the region. In others, people discussed the disproportionate damage caused to the roads by truck traffic. In most groups, there was at least some recognition that both of these can be true at the same time. As a result, it would be difficult or even misleading, to say that a clear consensus developed. In general, most people felt that highways used heavily by trucks should receive higher priorities.

### ***Importance***

Participants were asked if the importance of the highway, e.g. if it connected important locations, public services, or to the Interstate system, should affect how quickly repairs are made. This issue rarely arose unless directly asked. Most people felt that important roads should receive more attention, but also felt that traffic volume would probably be highly correlated with importance. Some discussions reminiscent of the truck traffic debate occurred in this context as well. That is, some people were concerned that roads servicing important businesses were receiving a disproportionate share of repairs. Again, though, these concerns were relatively isolated and uncommon.

### ***Cost***

Most participants explicitly rejected the idea that the cost of repairs should influence priority settings. For nearly all participants, road repairs were a public safety

concern and a matter of life and death. Issues of such importance should not be decided on based on cost.

However, participants also recognized that some road repair decisions may be a matter of convenience and therefore open to economic consideration. Similarly, participants felt that road repairs should be strategically planned to both account for future traffic volumes and ensure the most cost-effective use of tax dollars. They also understood that repairs would have to be paid for and were concerned that projects be realistic and efficient.

#### Trade-offs

Participants were also asked to choose between a series of difficult forced-choice options to better understand how they thought different factors should be weighed when setting construction priorities. The first question addressed convenience. The second concerned investing in longer lasting road construction and the various ways available to finance such improvements. The third and fourth questions focused on road noise and appearance.

One *summer* every 20 **or one month every five**

Participants were asked to choose between making major repairs every 20 years which would last an entire summer or making repairs that last less than one month every five years assuming the costs were the same. This question was intended to address convenience issues, however, it uncovered a different set of concerns. Most participants who accepted that these two scenarios would cost the same and believed that repairs could in fact last 20 years chose the 20 year option. Nevertheless, many participants would not accept some of the assumptions of the question. Specifically, many people in Iowa did not believe that repairs could last 20 years nor that repairs could be completed in one summer. Several people in different groups recounted stories of incomplete DOT projects or projects that had taken years to complete. Other people

also questioned the ability of the Department of Transportation to know what demands might be placed on roads so far in the future. These participants frequently opted for the five year scenario. In addition, many people also seemed to have trouble understanding the question. Some seemed to believe that repairs every five years would also require a major reconstruction every 20 and vice versa. Others were concerned that given the 20 year option, the road would be completely neglected for 20 years without minor maintenance, even if required.

When focus groups actually considered the relative convenience of the two options, a number of concerns were raised including: whether there were alternative routes available (if so, one summer was not a problem), whether the construction would disrupt important businesses or public service, and how repairs on different highways in an area might be scheduled to avoid repeated disruptions to local transportation.

### ***Initially spend more to make roads last longer***

The focus groups were also asked to discuss whether they would prefer spending more money up front to build highways that would last longer. Again, the issue for most participants was not whether to build longer lasting roads, but whether the basic assumptions of the question could be accepted. For participants who accepted the assumptions (a majority of participants), the answer was clear: build roads to last longer. In fact, many participants had suggested similar approaches earlier in the meeting. However, many people could not believe that roads could actually be designed to last that much longer or were skeptical that the improvements would actually be made. People were concerned both that designers could not accurately predict the traffic demands so far into the future. In fact, some participants suggested that we may actually be flying from place to place at that point in the future. Others worried that the additional money supposedly paying for improved road design would actually be wasted through governmental inefficiency or worse.



If people agreed to build longer lasting roads, they were asked to choose between raising revenues or delaying repairs on other roads. Most participants preferred raising revenues. Many people felt that adequate roads were a high priority and deserved the additional money. Understandably, though, people who were skeptical about the governments efficiency were most likely to opt for delaying road repairs. There was also a great deal of discussion about the ways in which revenues could be raised. Many participants felt that revenues should be raised primarily by increasing fees to non-residents. For example, one person suggested tolls at the state borders. There was also discussion of the relative cost and quality of services provided by the Iowa DOT.

### ***Road noise and looks***

People were asked to discuss whether they would prefer a road that had a rougher texture (grooves) and was safer or one that was smoother, quieter, and potentially more slippery. There was nearly universal and immediate agreement that safety would be selected over road noise. The only exceptions were comments made by people who were concerned about excessive noise. This would include road noise that made conversation or listening to the radio difficult.

People were also asked whether they would choose to repave a road that had been patched but rides well or wait until the ride was noticeably rough and uncomfortable. In the discussions surrounding this question, it was clear that many participants found it impossible to imagine a road that was patched but still rode well. However, most people felt that resurfacing should only occur when the ride is noticeably uncomfortable.

Prioritizing exercise: Safety

During the course of the discussion, a list of important considerations identified in the discussion was constructed. As a final exercise, people in the focus groups were

asked to prioritize the factors. They were given a number of stickers and an opportunity to “vote” for the factors that they thought should be most heavily weighted in setting priorities. (See Appendix C for a more detailed description of the list in each group and the number of Votes” it received.) Through the experiences of focus groups in Wisconsin and Minnesota, researchers were confident that safety would be the overwhelming concern of participants. As a result, the list of features was often constructed to purposely exclude safety as a choice thereby forcing participants to address other concerns relative to safety.

Even when safety as an explicit category was removed from factor lists, its pre-eminence was evident in the discussions that followed the prioritizing exercise. Participants were asked why they had voted the way they did. In every group and for nearly every participant, the major criteria for voting for any factor was safety. That is, even if a participant voted for “potholes”, their vote was motivated by a belief that potholes were a safety concern. As a result, it would be safe to interpret the number of votes for many of the listed factors as an indication of the general importance each has to creating or preventing a safe situation. It is true that a few participants indicated that their choice for some factors was motivated by non-safety concerns (such as convenience), but even these concerns were eventually related to safety and represent an extremely rare occurrence anyway.

## **DIFFERENCES**

In general, these groups were remarkable in their similarity rather than their differences. It is true that certain groups tended to focus on different issues to different degrees, but none of the issues brought up in any group contradicted issues brought up in the others. For example, one group spoke extensively about the dangers of narrow or deteriorating shoulders. Though this concern was not as central in other groups, it was usually noted as a concern. Even conscious manipulations to increase differences were unsuccessful. There was no appreciable difference in the discussion of groups that

were specifically asked to drive compared with those that were not. Similarly, several groups included professional drivers or people who drove extensively for work, nullifying any significant difference between the group of invited CDL drivers and the rest.

### Internal tensions

There were, however, several areas of discussion that indicate unresolved or ambiguous issues for participants. These included the impact of truck traffic on roads, the cost of repairs, and convenience issues.

#### ***Truck traffic***

Participants in the groups recognized simultaneously that trucks were important to the local economy and that they caused a great deal of damage to the roads. This tension was evident in most of the discussions and leads to mixed feelings regarding setting priorities and making repairs.

#### *Costs*

Similarly, participants wanted the highest quality roads but didn't want increased costs. Discussions around raising revenues focused on several concerns: 1) efficiency, 2) equity, and 3) trade-offs. Discussions of efficiency focused both on whether money was being wasted through mismanagement and on how money could be strategically spent to save "in the long run". In Iowa, in particular, many participants felt that the DOT was especially inefficient, both in planning and actual operations. Equity discussions focused on whether state funds were being fairly distributed in different regions (see western and rural conditions) and how expenses in Iowa compared to other states both in the region and in other parts of the country. Trade-off discussions considered the relative impact of increased road costs (taxes, registration fees, etc.), and potential benefits (decreased car repairs, etc.). Many people felt that increased spending on roads was matched in fewer repairs to cars and new businesses. In general, people

felt that good roads should be a high priority and were willing to pay for their repair and improvement provided that funds were efficiently and equitably used.

### ***Convenience***

Participants were similarly concerned about convenience. In general, detours per se did not appear to be a major concern to participants. However, many felt that the length of construction projects was unreasonable and made otherwise bearable detours problematic. During focus group discussions, participants recognized that many factors needed to be weighed when setting repair priorities, including their convenience. However, these same participants may not take such a broad view when actually confronted with a bumpy stretch of road. The conflict between wanting any road one drives to be freshly resurfaced and considering the realities of road maintenance appeared occasionally in the discussion of the participants, and might appear more often in a different setting.

### Western conditions

Of the three states studied, Iowa is the most uniformly rural and has less significant regional differences. Whereas most groups in Wisconsin and Minnesota saw themselves as unique from and somewhat less attended to than other regions in the state, there appeared to be little discussion in most of the groups in Iowa about equitable treatment of their region vis a vis other regions in the state. One notable exception was in one of the western Iowa groups who felt that they did not receive the same attention that eastern parts received.

### Individual differences

Even though the groups were remarkable in their similarity, there were important differences on an individual level. Specifically, a number of participants seemed to pay particular attention to road conditions. Often, this was linked to professional con-

cerns, either as a professional driver or a person associated with road maintenance”. These individuals showed greater knowledge of roads in the area, could identify stretches more specifically, and had a more precise and larger (though still not standardized) vocabulary of road terms. Participants who rode motorcycles or drove motor homes also expressed different concerns. In general, their concerns were not qualitatively different, but expressed an intensified dislike of unpopular road defects.

## CONCLUSIONS

The information from these focus groups provides several important pieces of information relevant to constructing effective survey instruments for further research. These include a better understanding of how participants identify road segments and the terms they have available to describe and identify road features. In general, people’s understanding of the road on which they drive is based on the amount of attention it demands. Problems exist to the extent that features require the attention of the driver. Similarly, road segments are defined practically by drivers as the distance between points that require attention, such as major intersections or turn-offs. People’s vocabulary for road-features is limited, relative, and makes use of a great deal of non-verbal language. People’s overwhelming concern is safety and features that contribute to or subtract from safety. Interest in strategic planning and convenience is secondary. In general, people in Iowa seemed dissatisfied with the condition of roads in the state and with the quality of service provided by the Iowa DOT.

These findings translate into several guidelines for questionnaire construction.

- 1) Designers should assume that people’s ability to identify specific stretches of road will be limited by their driving patterns. If specificity is desired, a special protocol should be developed.
- 2) Questions should be descriptive and not rely on any specific

<sup>6</sup> Although households were screened to eliminate those involved in road construction and repair, several participants were retired from the industry or closely associated with those in the industry.

terminology unless those terms are clearly defined in the course of the interview. 3) Questions should focus on when features become apparent or distracting. Attempt to describe the quantity or degree of a problem will place an extreme burden on respondents and produce unreliable data. 4) The importance of safety may be assumed. Researchers should focus on establishing the relative importance of the features that contribute to safety and possibly weigh the relative importance of other factors controlling for safety. That is, people are willing to weigh the cost of improvements if they feel safety has been assured.

## Appendix A - Sampling

Participants for the focus groups were selected using two separate sampling frames. Participants in all six focus groups were selected using random digit dialing and adjusted to have relatively equal numbers of male and female participants. This selection process worked to create focus groups composed of a mix of individuals from the local communities'. Households in the area surrounding the meeting location were contacted and screened to remove people living in household with anyone who is employed by any local, state or federal highway department or involved in any business or trade that either builds or repairs highways. Participants were also screened to ensure that they held a current driver's license and that they regularly (defined as at least once or twice a week) drove rural two-lane state or US highways. Participants in half the groups were also requested to take some time before the meeting to drive a stretch of rural highway paying particular attention to the pavement and the impact it had on their driving.

In one group, additional participants were selected from a list of people in the area of the meeting who held commercial driver's licenses. This group was designed to include relatively equal numbers of commercial drivers and randomly selected participants. In all six groups, recruitment continued until 12 participants confirmed that they would be able to attend the meeting.

<sup>7</sup> Because of the small number of participants, focus groups can not be considered completely representative samples. The recruitment process is solely intended to create as diverse a mix of participants as possible.

## Appendix B - Demographics

In addition, all focus group participants were asked to complete a personal information sheet which gathered general demographic information and information about their driving habits.

### AGE

Group	Average Age
Decorah	42
Storm Lake	53
Atlantic	70
Maquoketa	56
Ottumwa	62
Marshalltown	51

### SEX

Group	Male	Female
Decorah	7	5
Storm Lake	6	6
Atlantic	5	5
Maquoketa	6	5
Ottumwa	3	2
Marshalltown	6	3**

### INCOME

Group	< \$20,000	\$20,000 - \$39,999	\$40,000 - \$59,999	> \$60,000	DK/Ref
Decorah	2	4	4	1	1



Storm Lake	3	3	4	0	2
Atlantic	7	2	1	0	0
Maquoketa	5	3	1	2	0
Ottumwa	1	2	2	0	0
Marshalltown	1	1	5	3	0

**CHILDREN UNDER 17**

Group	0	1	2	3 or more	Refused
Decorah	5	2	3	1	1
Storm Lake	8	2	1	1	0
Atlantic	10	0	0	0	0
Maquoketa	5	1	1	4	0
Ottumwa	2	0	3	0	0
Marshalltown	6	0	4	0	0

## RACE

Group	Native American	White	Hispanic	Other
Decorah	0	12	0	0
Storm Lake	0	12	0	0
Atlantic*	1	6	0	2
Maquoketa	0	11	0	0
Ottumwa	0	4	1	0
Marshalltown	1	9	0	0

\* One participant did not provide information

## EMPLOYMENT STATUS

Group	Full-time	Part-time	Not Employed	Retired
Decorah	7	3	1	1
Storm Lake	6	2	3	1
Atlantic	1	2	2	4
Maquoketa	4	1	4	2
Ottumwa	3	2	0	0
Marshalltown	7	0	2	1

\* One participant did not provide information

**EDUCATION**

Groups	Less than High school	High School Diploma or GED	Some College or Technical School	College Graduate or Above
Decorah	4	1	5	2
Storm Lake	1	0	2	9
Atlantic	8	0	1	1
Maquoketa	4	2	3	2
Ottumwa	1	0	4	0
Marshalltown	2	1	1	6

**NUMBER AND TYPE OF VEHICLES**

Groups	Cars, Trucks, Vans, Pick-ups, etc.	Motorcycles	Motor Homes Recreational Vehicles	Other
Decorah	24	2	4	0
Storm Lake	20*	0	0	0
Atlantic	17*	0	4	2
Maquoketa	29	0	2	0
Ottumwa	8	1	0	0
Marshalltown	27	0	0	0

\* One participant did not provide information.

**AVERAGE MILES PER WEEK DRIVEN**

Group	Average Miles Per Week
Decorah	252
Storm Lake	215
Atlantic	224
Maquoketa	241
Ottumwa	226*
Marshalltown	245

\* One participant did not provide information

## Appendix C - Ranking Exercise

During the discussions, a list of concerns and disliked road features was developed. At the end of the meeting, participants were asked to rank how important each of these features or concerns should be when setting road repair priorities. The following are the results from each group.

<b>DECORAH</b>		<b>STORM LAKE</b>	
Potholes	22	Patched holes	16
Ruts	24	Cracking	14
Car damage	9	Ruts	7
Bumps by railroad tracks	4	Car damage	9
Cracks	6	Crumbling shoulder	8
Broken shoulders	2	Traffic volume	13
Ripples	8	Traffic type	16
Poor drainage	8	Destination	8
Traffic type	15	Future traffic/population	9
Traffic volume	12	Cost	9
Importance	3	Narrowness	23
Cost	18		

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**ATLANTIC**

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Car damage	12
Ruts (retaining water)	12
Narrow roads/broken shoulders	32
Cost	15
Traffic type	4
Traffic volume	11
Cracks	15
Unevenness of pavement and shoulder	5

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**MAQUOKETA**

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Potholes	17
Cracks	6
Car damage	11
Safety	36
Ripples caused by frost heaves	7
Traffic volume	19
How road is used (importance)	23

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**OTTUMWA**

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Dips/frost boils	11
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Ruts	4
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Potholes	8
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Cracks	4
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Traffic type	5
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Importance	6
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Traffic volume	7
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Cost	7
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**MARSHALLTOWN**

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Road affects driving	21
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Uneven pavement/bumps	3
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Accident risk/safety	40
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Deteriorating shoulders	11
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Excessive patches	2
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Uneven crown	1
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Shoulder not even with pavement	0
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Frost heaves	7
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Traffic volume	18
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Economics	3
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Destination/connections with towns	0
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The results of these individual ranking exercises were combined in several broad categories to indicate the general concerns of participants. It is important to remember that lists were spontaneously generated in each group and so are not completely comparable. Many categories were combined into related areas.

<b>IOWA - COMBINED</b>	
Safety/Accidents	76
Defect Features (potholes; cracks, deteriorating shoulders, frost heaves, ruts, etc.)	239
cracks and potholes	99
<b>ruts</b>	47
deteriorating shoulders	42
frost heaves	33
extensive patching	18
Traffic (both volume and type)	120
Volume	80
Type	40
Cost/Economic concerns	52
Design features (drainage, narrowness, etc.)	48
Car damage	41
Destinations served/Importance	40
Attention (watching the road, slowing down, etc.)	21
Strategic Planning/Quality Construction	9