

NCHRP *Research Problem Statement*

I. PROBLEM NUMBER:

2010-C-14

II. PROBLEM TITLE:

Accommodating Oversize/Overweight Vehicles at Roundabouts

III. RESEARCH BACKGROUND

AASHTO Subcommittee on Design # 10 Priority

The safety and traffic operational benefits of roundabouts for the typical vehicle fleet have been well documented. Although roundabouts have been in widespread use in other countries for many years, their general use in the United States began only in the recent past, but their use is growing. Roundabouts can offer several advantages over signalized and stop controlled alternatives, including better overall safety performance, lower delays, shorter queues, better management of speeds and opportunities for community enhancement features. In some cases, roundabouts can avoid or delay the need for expensive widening of an intersection approach that would be necessary for signalization.

However, the potential use of roundabouts with all their benefits is greatly diminished because they may not accommodate the superloads. This is the central issue in the need for this research.

IV. RESEARCH PROBLEM STATEMENT

The design vehicle for a roundabout, as in any design, should be the largest vehicle that can reasonably be anticipated for normal use. However, superloads are vehicles that use the roadway by special permit and travel on a random basis. Further their physical characteristics greatly exceed the dimensions given for trucks in A Policy on Geometric Design of Highways and Streets AASHTO, 2004.

Superloads impact pavement structure, roadway geometrics, and traffic operations. Superloads are a reality for American industry and often critical for certain industries. In Kansas these vehicles average 122' long, 12'-9" wide and almost 15' high and have an average weight of 218,000 pounds. In addition, many of the trailers have low clearance above the roadway surface. Kansas has experienced a significant increase in the number of these loads moving thru the state. In 1999 there were 433 total loads and that grew to 6,402 total loads in 2007. A better understanding and sharing of current practices is essential for states that permit such movements, and the industry which must rely on state highways and a permit to deliver large loads.

Because roundabouts are intentionally designed to operate at slower speeds, narrow curb-to-curb widths and tight turning radii are used. However, if the design geometrics are too restrictive, roundabout use by the superloads may be difficult or even impossible. Therefore, the central issue is how to accommodate superloads without sacrificing the integrity of the roundabout. Typically superloads are routed around roadway restrictions such as certain bridges, narrow roadways, etc. However with the popularity of roundabouts and the benefits they provide, such routing is becoming more difficult and could lead to reduced or prohibited roundabout use.

V. RESEARCH OBJECTIVE

This research project is necessary to compile current practice and research by various states and countries related to the effects that oversize/overweight vehicles (also called Superloads) have on roundabout location, design, and accommodation. Second, the research needs to fill in information gaps with respect roundabout design and operations for these classes of vehicles. Currently there is little information available for accommodating the oversize/overweight vehicle classes in roundabout design.

VI. LITERATURE SEARCH SUMMARY

Kansas DOT, Other State Department of Transportations, Other countries such as Australia, Germany, England, Netherlands, France etc., Federal Highway Administration, U.S. Military

NCHRP 3-65, Applying Roundabouts in the United States.

TRR No. 1776, Paper entitled, Derivation of Capacity for Roundabout Entry with Mixed Circulating and Exiting Flows.

3rd International Symposium on Highway Geometric Design, 2005, Paper Session, Kennedy, et al, International Comparison of Roundabout Design Guidelines.

VII. RESEARCH FUNDING AND DURATION

The estimated funding for this project is \$200,000. The estimated time to conduct the research including review time is 18 months.

VIII. AASHTO MONITOR

To be determined by AASHTO/NCHRP

IX. PERSON SUBMITTING PROBLEM STATEMENT

James O. Brewer, Kansas Department of Transportation and TRB Task Force on Roundabouts (ANB75T)
AASHTO Technical Committee on Geometric Design
Submitter: AASHTO Highway Subcommittee on Design

NCHRP Review of C-14

Reviewed By:
B. Ray Derr
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Comments:

The proposed research is appropriate for the NCHRP but the expected benefit is difficult to assess.

Superloads, by their nature, are difficult to categorize. There is no standard design vehicle and assuming the very worst case for all dimensions and characteristics would result in a very costly design.

After a design vehicle is determined, there will need to be some process for determining which roundabouts need to be designed for superloads. The same issues must arise for other intersections and bridges and a coordinated approach is needed since the weakest link determines whether a route can be used by a superload.

Review Date:

11/10/2008

FHWA Evaluation of C-14

Reviewed By: Wei Zhang

Comments: Problem was described by a practitioner who has personally involved in the permitting issue of routing oversize/overweight vehicles through roundabouts. Lane assignment violation by large trucks through roundabouts is common. This issue needs to be investigated.

Review Date:

11/4/2008

Submitter Response for 2010-C-14

Accommodating Oversize/Overweight Vehicles at Roundabouts

Comments: While it is true that a single design vehicle is not known, it is a fact that as more roundabouts are built, available routes for superload travel are reduced or eliminated thereby affecting the economy. This could lead to reduction/elimination of roundabouts which offer many major benefits to vehicles of normal size including mobility, safety, and environmental. I think both reviewers recognize the importance of the requested research and I believe successful research yielding design concepts to accommodate a range of superloads will yield nationwide benefits of enormous proportions, both in terms of the economy, but for the general traveling public.

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