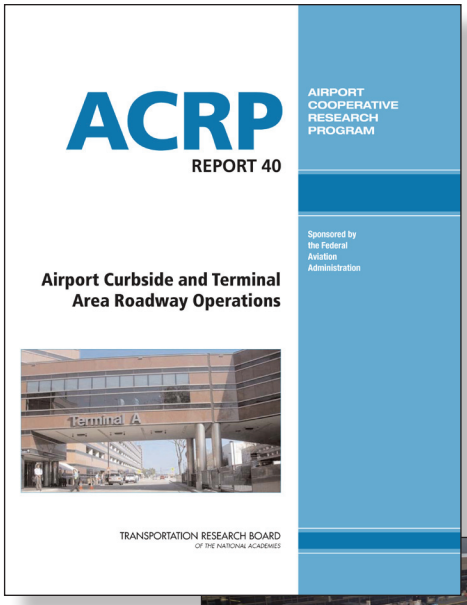
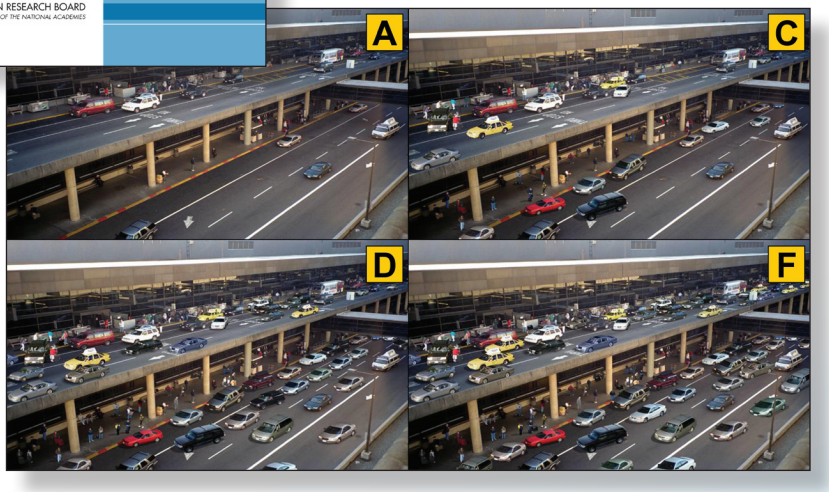
ACRP AIRPORT COOPERATIVE RESEARCH PROGRAM
IMPACTS on PRACTICE
August 2014
www.TRB.org/ACRP

Improving Airport Curbside and Roadway Operations

An airport's roadway infrastructure is an important operational component that significantly impacts travelers' arrival and departure experiences. These roadway areas are often constrained by terminal buildings or other infrastructure which creates difficulty in adding capacity, improving safety, and reducing delays.

At the Ottawa Macdonald-Cartier International Airport (YOW), traffic volume demand was exceeding curbside and roadway capacity. To help improve airport operations and travelers' experiences, the planning staff at YOW turned to analytical tools presented in *ACRP Report 40: Airport Curbside and Terminal Area Roadway Operations* (2010).





Right: Conceptual airport curbside levels of service ranging from an excellent LOS (image A) to a failing LOS (image F).

Image courtesy of LeighFisher Management Consultants.

Analytical tools help airports to make informed decisions when considering improvements or new infrastructure. *ACRP Report 40* describes a comprehensive approach to analyzing traffic operations on airport curbside and terminal area roadways, and introduces an estimation tool known as the 'Quick Analysis Tool for Airport Roadways' (QATAR). The report also provides airport operators, planners unfamiliar with airport roadway operations, and airport consultants with a basic framework and vocabulary for curbside operations typically found inside an airport. The guidance includes data requirements, operational performance measures, and estimation procedures necessary to capture existing and future uses of airport roadway.

Alexander Stecky-Efantis, airport planner with the Ottawa Macdonald-Cartier International Airport Authority, found *ACRP Report 40* and the QATAR tool to be helpful resources in evaluating a variety of roadway improvement measures discussed in the report. "QATAR has been useful in providing comparable and simple to understand illustrations of different scenarios," said Mr. Stecky-Efantis.

Airport planners at YOW selected two strategies for final review from a toolbox of improvements that included the five solutions listed below. Strategy I combined only improvements 1, 2, and 4, while strategy II included all five solutions:

1. Modifying the public transit parking policy;
2. Modifying the curbside dwell time policy;
3. Reducing the pedestrian crosswalk width;
4. Extending the curb area;
5. Adding a fourth curbside lane.

Using QATAR, planning staff at YOW identified the optimal combination of improvements to increase the airport's ability to process the vehicular traffic demand. The analysis resulted in a finding of significant capacity constraints in the current year (validated by observations by airport personnel) and with a ten-year projection of traffic volumes. Strategies I and II were further analyzed using the software to evaluate the impact of the improvements on the roadway level of service (LOS). The level of service is a traffic performance rating from 'A' (excellent) to 'F' (failing).

The quantification of curbside and roadway operations was essential for determining the optimal set of improvement solutions. The analysis found that each strategy would improve the curbside operations from a failing LOS 'F' to an LOS 'D' and

continued on page 2

Improving Curbside and Roadway Operations—*continued*

also improve the through-traffic movements from a current operating condition of LOS 'F.' "By showing the level of service achievable with the scenarios that were modelled using QATAR," said Mr. Stecky-Efantis, "the airport is able to identify and select the best possible solutions." To date at YOW, the airport has implemented one of the improvements—modifying the curbside dwell time policy—and is planning to employ other recommendations in coordination with additional terminal area improvement strategies.

The QATAR tool, based on methodologies presented in *ACRP Report 40*, is available for download on the TRB website (*www.trb.org/Main/Blurbs/164469.aspx*). The tool was developed by incorporating landside analyses of large U.S. and Canadian airports with the 2010 *Highway Capacity Manual*'s (HCM) methodology. QATAR updates the HCM methodology to apply when free-flow operations speeds are less than 35 mph, as is often the case in large airports.

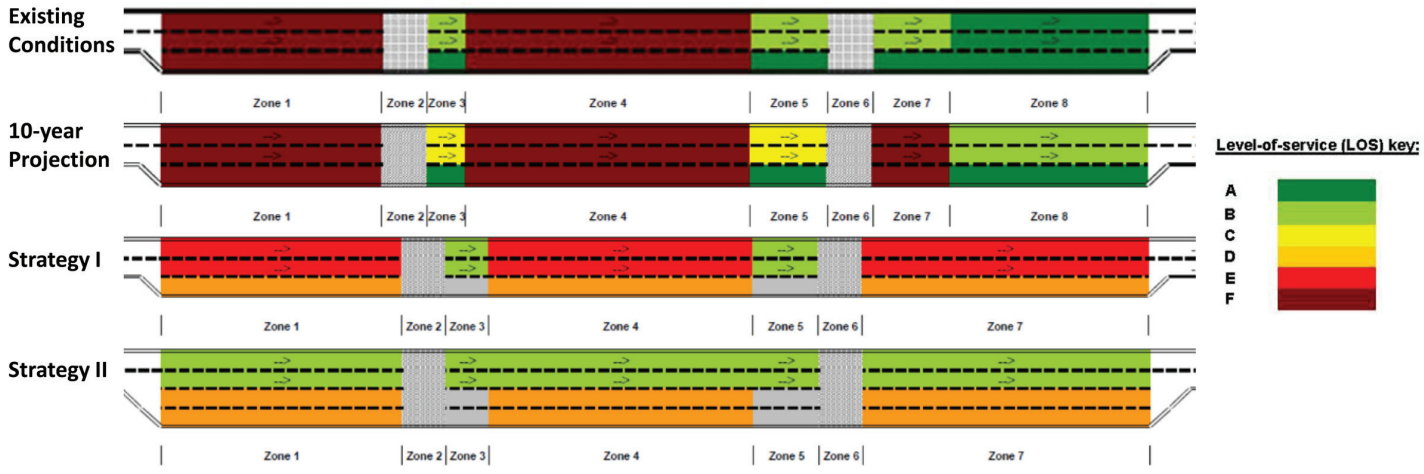
By summarizing airport curbside and terminal area roadway operations according to key performance measures, QATAR allows professionals to evaluate vehicular traffic's level of service and to estimate the impact of mitigation strategies. For curbside analysis, the performance measures include: curbside utilization ratio, number of vehicles parked in the second and third lanes, queue length and duration, and average vehicle delay. For terminal area roadways, the performance measures include: average speed, traffic density, maximum volume-to-capacity ratio, and queue length and duration. Practitioners may target varying LOS depending on the size of the airport and the age of the roadway.

As planning staff at the Ottawa Macdonald-Cartier International Airport Authority discovered, QATAR is a useful tool for practitioners because (1) it does not require a large amount of data; (2) it allows for rapid testing and screening of a range of physical, operational, and demand management strategies; and (3) it displays results in an intuitive format. "I would recommend the use of the QATAR tool for the analysis of future curbside improvement projects," said Mr. Stecky-Efantis.

The methodologies detailed in *ACRP Report 40* have been deployed at several airports, including international airports in Austin (AUS), Bengalore (BLR), Boston (BOS), Cincinnati (CVG), Fort Lauderdale (FLL), Houston (IAH), Memphis (MEM), Seattle (SEA), San Francisco (SFO), Salt Lake City (SLC), Tampa (TPA), and Ottawa (YOW). The applications at these airports included condition assessments, capacity enhancement project evaluation, and demand management strategies assessment.

"QATAR [Quick Analysis Tool for Airport Roadways] allows airport planners and operators to determine the ability of a curbside roadway to accommodate changes in traffic volumes, airline passenger activity, vehicle mix, curbside allocation plans, and curbside enforcement levels. QATAR also allows the user to observe how airport curbside roadway levels of service are expected to vary as these input factors change."

ACRP Report 40: Airport Curbside and Terminal Area Roadway Operations



Above: Roadway assessment scenarios at Ottawa Macdonald-Cartier International Airport from QATAR outputs. Image courtesy of LeighFisher Management Consultants..

ACKNOWLEDGMENT OF SPONSORSHIP: This work was sponsored by the Federal Aviation Administration and was conducted in the Airport Cooperative Research Program, which is administered by the Transportation Research Board of the National Academies.