Access Management Considerations for High Capacity Multi-Lane Roundabout Design and Implementation

Mark T. Johnson, P.E. and Hillary N. Isebrands, P.E.

Abstract
Roundabouts are compatible with many access management principles. The operational characteristics differ from signalized intersections in many substantial ways. This allows for more flexibility that can be of significant benefit when balancing the competing objectives of roadway safety, capacity, and access needs of existing and/or proposed land uses. This paper explores examples of the different opportunities that roundabouts can provide and the effects on how the transportation infrastructure is planned and designed. It specifically addresses business access into and near roundabouts, roundabouts in series, and other access management issues compatible with roundabouts in redevelopment, new development and urban constrained environments.

Business Access
Unlike traditional signalized intersections, roundabouts provide more flexibility to accommodate business accesses into and near the intersections. Commercial entrances, ranging from big box retail centers to health care facilities, can have direct access into a roundabout via a separate approach leg. Accesses near intersections are often blocked by queues and access onto the roadway is often difficult, if not impossible during peak hours.

Wal-Mart Super Center on South Town Drive/Industrial Drive
Roundabout provided the key access solution leading to approval of this $200M commercial ‘Brown Fields’ retail/commercial redevelopment providing improved access and safety for the existing industrial park and retail shopping traffic along this corridor.

State Trunk Highway 78 and State Trunk Highway 92
Mt. Horeb, WI
The STH 78/92 intersection has a constrained urban environment where the horizontal alignment was limited by a gas station, a cemetery, and two other commercial properties. The roundabout provides an efficient flow of traffic and maintained business accesses within 50 ft of the intersection. The existing peak hour volume is ~2,500 vph and the design hour volumes were estimated at 3,200 vph with 8% heavy trucks.

Roundabouts in Series
A common concern of roundabouts in series along a corridor is the impact to traffic flow (Isebrands et al., 2008) and compatibility with traffic signals and stop controlled intersections, however, with good engineering analysis, planning and design, roundabouts, signals and stop controlled intersections can coexist adjacent to each other and along the same corridor. Issues such as platoon arrivals, lane-use needs of nearby intersections, or access points must be accounted for and designed accordingly.

Mt. Horeb, WI - Main Street/Springdale Street

Access via a fifth minor leg was required to be maintained to an established residential neighborhood that serves ~13 residences and helps maintain good neighborhood circulation. Additionally, residential access is accommodated 125 ft from the roundabout on the east leg and small commercial driveway within 100 ft on the west leg.

Summary
The significant differences and advantages roundabouts provide in some situations related to transportation planning and access management, are just beginning to be developed and applied. Roundabout applications on our roadway systems can provide significant advantages to operational and safety principles which are, as of yet, not clearly understood or documented in industry planning and access management standards. Roundabouts provide flexibility for accesses at and near intersections as well as along a corridor.