Transit-Sensitive Suburban Land Use Design: Results of a Competition

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The International City Design Competition (ICDC) is analyzed to determine the extent to which public transit was included by planners, architects, and engineers in their visions of the future for suburban areas. The ICDC provided an opportunity for experts in urban design to present concepts for the form of cities in the year 2020. The ICDC generated over 250 entries from over 40 countries. An analysis of the suburban portion of the ICDC is described to determine how (or if) public transit was considered and to partially identify that state of the practice of land use design as it relates to transit. Results of the analysis indicated that, in general, entrants favored a town center, with neighborhood or crossroads approach in their designs of the suburban area with limited use of corridor development patterns. Increased open space and a mixture of housing types were also frequently used. However, the analysis showed a limited use of public transit as a factor in suburban planning. Only 43 percent of the proposals evaluated explicitly used public transit and only 12 percent of the proposals evaluated were judged to have used it appropriately. Bus transit, park and ride services, or commuter rail were seldom considered as an option for suburban areas. Further analysis of planning handbooks or guides and accreditation criteria for educational programs related to land use planning showed little explicit consideration for public transit. These results imply that the state of the art for using public transit as a land use design consideration is poor and that, if this view holds, little change is expected in the automobile-dominated suburbs in the future.

There has been a rapid growth in the level and complexity of suburban activity during the past decades. Suburban areas that used to be thought of as bedroom communities for commuters into a central city have now become multifunctional areas with a full range of employment, business, and institutional activity, some of which rival downtown areas. A diverse set of activities covering all aspects of modern life have become available in suburban areas along with all of their associated problems. No longer are suburban streets quiet avenues. They have become crowded arterials with severe traffic congestion and safety problems. There is a critical need to develop means of public transport that can be used to relieve these problems as well as to provide better mobility for residents and workers in suburban areas.

Efforts to incorporate public transport into suburban activity centers have had limited success. Travel patterns are highly diverse, with trips from many origins to many destinations and few concentrated corridors of demand. Activity centers and trip generators are poorly tied to each other and scattered in many locations. Buildings are difficult to access by transit or by foot in an automobile-dominated world. Transit is not typically considered in land development, planning, and implementation decisions and it is difficult to retrofit transit into a suburban environment.

Most work on the problem of transit in suburban areas to date has concentrated on the development of new methods of operation or administration of public transit services in suburban areas. Demonstration projects have been attempted and new services have been offered with the hope of finding effective transit solutions to suburban travel problems. Although these efforts certainly have merit, they often ignore the underlying land use design issues that are the root of transportation problems. Land use decisions are made, site designs are approved, and projects are implemented with little or no regard for public transportation, on the assumption that the automobile is the only mode of transportation available. Little systematic work has been done to develop land use patterns that can be designed in response to transit needs. Work done in the United States [Seattle Metro, Snohomish County (*1,2*)] and in Canada [BC Transit (*3*)] provide limited guidance, but the real estate developer or local planner who wishes to design projects to facilitate transit use has little information available. The purpose will be to examine how urban designers and planners view the role of transit and transit-responsive land use and to point out future trends and directions in these areas.

The objective will be to investigate the state of the art of suburban land use planning to determine the extent to which public transportation is considered. This will be done by examination of the entries submitted in the International City Design Competition (ICDC) as well as a partial look at the basic literature in the form of planning textbooks and standards. The ICDC was an international urban design contest that provided an opportunity for design professionals to present their visions of how future cities should be designed. These entries provide a glimpse into the current thinking of professionals involved with land use design and decision making and can help to indicate how future land use planning will occur. Approaches used in the suburban design component of this competition, in nearly 200 entries from over 40 countries, are summarized. In addition, criteria were developed that can be used to assess whether a design is transit sensitive.

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CRITERIA FOR TRANSIT-SENSITIVE DESIGN

Transit can be successful in attracting usage away from the automobile if it provides a user-oriented service. User-oriented transit operates directly between passengers' origins and destinations without transfer, at a convenient schedule, and at a price that is competitive with the automobile. Transit stops should be easily accessible to building entrances to minimize walking and there should be clear pathways that connect activity points and transit services. Transit-sensitive land use, then, recognizes these factors and provides convenient connections between land uses and transit services. Furthermore, trip ends are concentrated in convenient locations to provide a sufficient market for transit services. In order to determine the extent to which the ICDC entries were sensitive to factors that lead to successful transit, a set of criteria were developed. These criteria related to concentrations of trip ends, pedestrian movement, and ease of operation of the transit service. They are as follows:

1. Density of Land Use. Are densities feasible for transit utilization?
2. Number of People. Is the total number of people who live or work sufficient within the market area of a transit stop or route (¼-mi radius)?
3. Concentrated Locations. Are the locations of housing, employment, commercial activity, etc., concentrated in relationship to potential transit lines?
4. Pedestrian Orientation. To what extent does the design consider pedestrian movement?
5. Minimize Walking. Does the design provide logical pathways that connect land uses with the location of potential transit services so that overall walking is minimized?
6. Through Routing. Does the location of streets permit easy movement of transit vehicles into and out of the area without backtracking or circuitous routing?
7. Turns Required. How many turns are required for transit vehicles to serve the area? Fewer turns are better.
8. Right-of-Way Available. Are rights-of-way (either streets or guideways) that can be used for transit services provided?
9. Overall Feasibility. An aggregate indicator, combining the other criteria into a single value.
10. Evidence of Transit. Is transit mentioned in the text or graphics accompanying the design or is transit service apparent from the presentation of information

Each design was systematically reviewed according to these criteria to assess the degree to which people considered transit in land use design. Over 200 projects in the competition were evaluated for a variety of transit and land use attributes of the suburban portion of the competition. Because of the wide range of the proposals, three pretest stages were required to develop an appropriate evaluation form. Two research assistants examined the suburban aspects of the proposals, noting project attributes on standard survey forms; the survey forms included multiple criteria to measure the characteristics of each proposal; interobserver reliability and sampling throughout the project were assessed by the principal investigators. Some 82 (31 percent) of the projects were eliminated from the survey because they did not address the suburban element of the competition, they presented highly abstract or incomplete solutions, or the submissions were unavailable for examination.

THE ICDC

Description

The ICDC was conducted by the School of Architecture and Urban Planning at the University of Wisconsin—Milwaukee to develop innovative ideas for cities of the future (*4*). This international competition, held in 1988–1989, provided $125,000 in prize money to winning proposals chosen by a renowned jury of planners and scholars. The competitors were "challenged to create innovative and credible visions for Milwaukee in the year 2020." In addition, these solutions were to be usable in similar settings throughout the world. Planners, architects, and designers put forth their concepts and visions of the city of the future addressing the urban center, an older neighborhood, and a relatively undeveloped suburban fringe area.

Milwaukee was chosen as the site of the competition because it is representative of many cities that experienced rapid economic development and growth tied to manufacturing during the past century. Such cities are currently going through profound changes in their economic structure as they move from a manufacturing to a service base. The competition's program directed entrants to develop "innovative proposals that responded to the social and economic forces of today."

The suburban element of the competition involved the design of a portion of the City of Oak Creek, south of the City of Milwaukee. An area of land approximately ¾ mi square, with an existing mixed land use of residential development, with large agricultural areas and open space, was used as the competition site. Approximately 70 percent of the land was in nonurban use. The area was chosen to represent suburban areas with potential for development. It is located near a major freeway corridor, has a freight rail line, as well as several arterial roadways passing through it, and is near Milwaukee's airport.

Competitors were asked to outline their vision of the area in terms of expected changes in land use, rate of development, relationship to the metropolitan area, size of projects, degree of replacement of existing development and preservation of the natural environment. This program for the future would then provide a basis for the physical layout of land uses and infrastructure for the area. Entries were submitted on standard-sized boards that contained a written and graphical presentation of the designs. The use of public transit was up to each of the competitors.

ICDC Evaluation Results

Characteristics of Entries

Over 250 entries were received from architects, planners, and engineers from 45 different countries. The United States contributed 81 participants; other North American countries had

22; Eastern Europe, 44; South America, 13; Asia/Pacific, 39; and other (Africa/Middle East) had 10 entrants. A number of submittals had several countries represented on the same team. The competitors represented a diverse group composed of professionals and students, academics, and practitioners, first-time competitors as well as winners of 30 other competitions. Typical team size was two to four members with 75 percent of the participants practicing professionals and 20 percent students. Architects were represented on 83 percent of the teams, urban planners on 42 percent, engineers on 8 percent, and landscape architects on 11 percent. Private firms contributed 38 percent of the entries, public agencies 11 percent, university faculty 27 percent, and students 39 percent. Competitors were urged to form interdisciplinary teams, and many of the higher-ranked solutions came from international teams composed of architects, engineers, planners, and artists. Overall, 3 teams won gold medals and shared a prize of $75,000, 4 silver medal teams shared $50,000, and 15 teams won honorable mentions. Collectively, the winning entries represented Argentina, Australia, Austria, Brazil, Canada, China, India, Japan, Poland, and the United States.

Suburban Design Approach

A total of 182 entries were analyzed to determine their approach to suburban land use design. These entries were those that planned for growth in the area and excluded ones that proposed removal of existing development or did not address the suburban portion of the competition. The general characteristics of the designs are shown in Figures 1–4.

Design Approach The overall approach used by entrants is shown in Figure 1. The most frequently used concept, seen

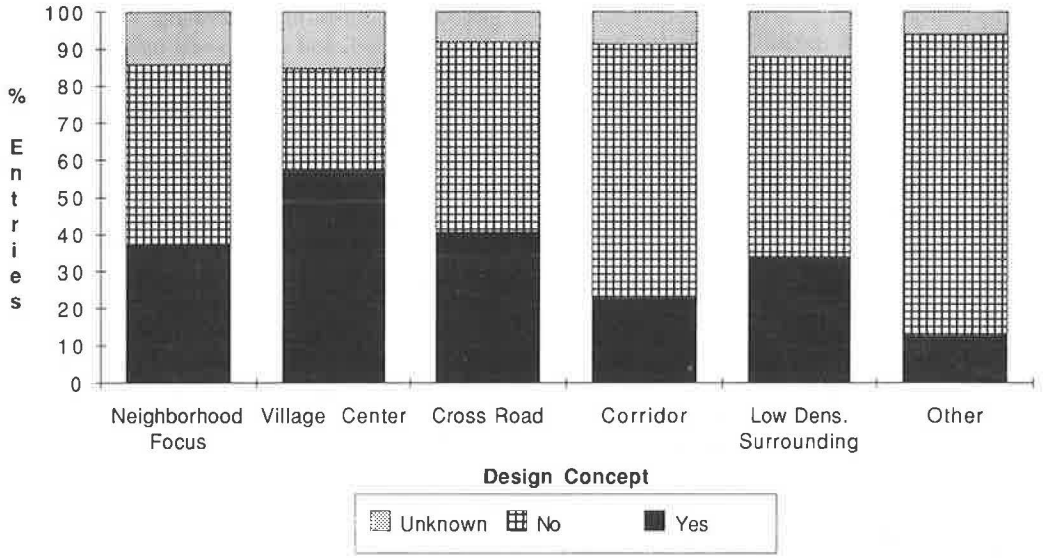

FIGURE 1 ICDC suburban entries—design approach.

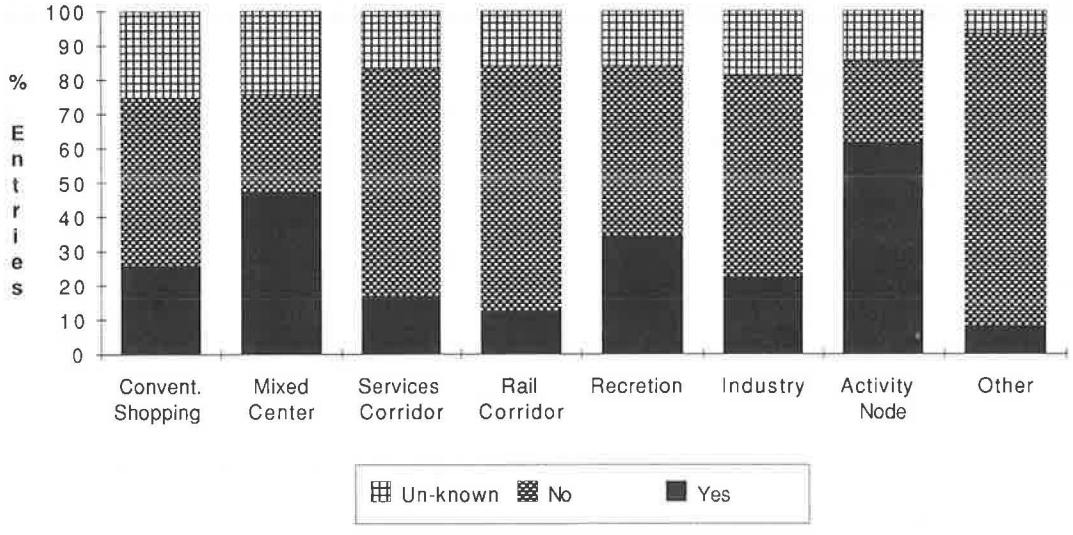

FIGURE 2 ICDC suburban entries—commercial development patterns.

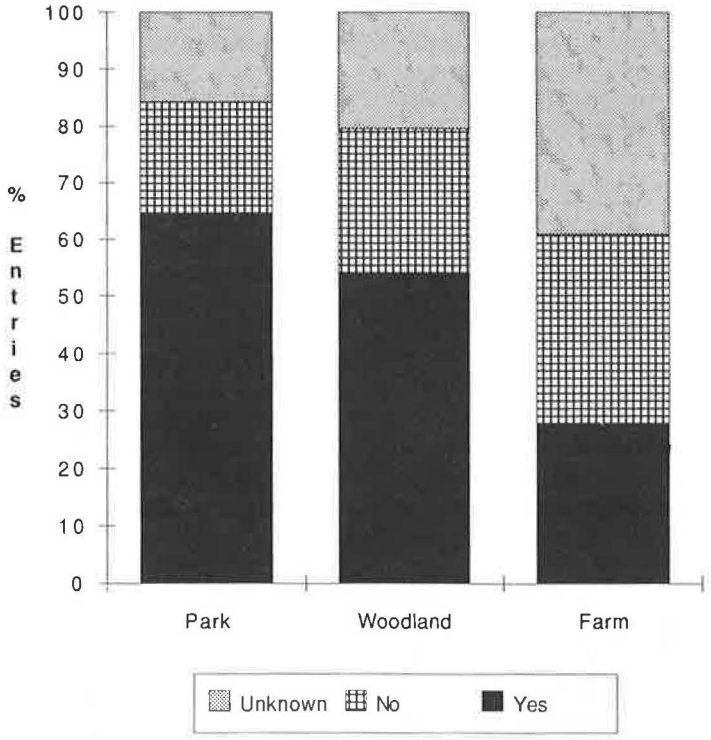

FIGURE 3 ICDC suburban entries—use of open space.

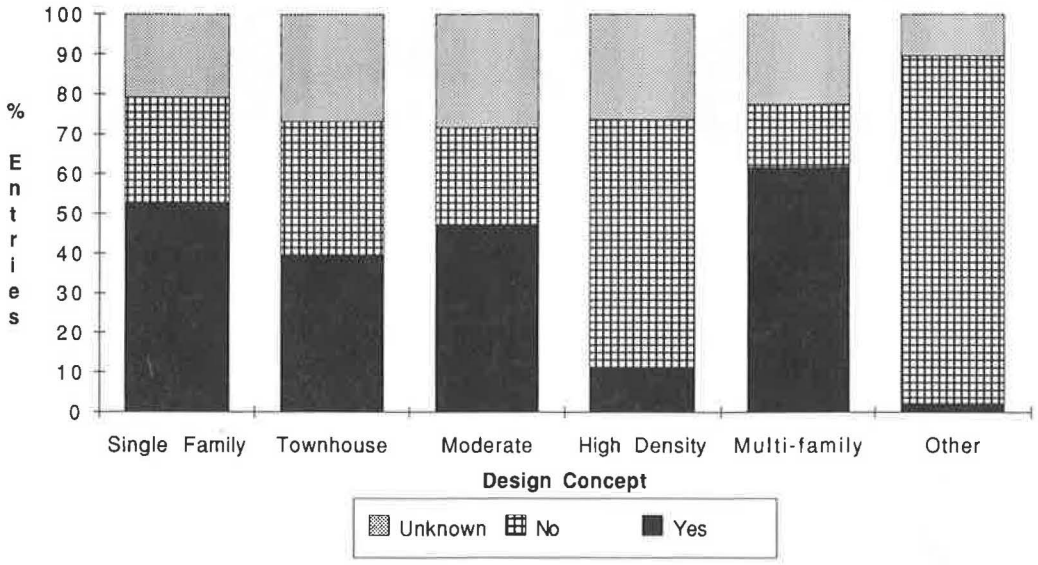

FIGURE 4 ICDC suburban entries—housing types.

in over half the submissions, was a village center approach. These designs attempted to create a town center with multiple activities. Similar concepts, to create several neighborhood focal points or to use a crossroads development pattern, was used by about 40 percent of the entries (some used multiple concepts). Development along transportation corridors was used by about 20 percent of the entries. Typically the designs would include mixed land uses with a central area for shopping and employment. Many proposals concentrated development on a portion of the site and left substantial open space.

Commercial Land Use Entrants also favored a centralized approach for commercial development (Figure 2), with 62 percent of the entries using a high-activity node and 49 percent using a nonconventional activity center, both mixed-use concepts at different levels of intensity. Entertainment and recreational concepts were used by 34 percent of the entrants, and conventional shopping center concepts were used by 26 percent. Development along corridors either as a strip commercial area or along the rail corridor was rare, with less than one-sixth of the entries using such an approach.

Open Space Entrants proposed extensive use of open space (Figure 3) with nearly two-thirds of the entrants proposing to increase the area of parks and greenbelts and half including increased woodland areas. Permanent agricultural use was proposed by about one-fourth of the entries.

Housing Types A mixture of housing types was used by the entrants (Figure 4). Generally, entrants favored higher densities that are typical in American suburbs. Multifamily housing was included in 62 percent of the designs, single family housing in 53 percent, moderate density housing in 47 percent, and townhouses in 40 percent. Housing in the form of high-rise buildings was, however, relatively rare, appearing in about 11 percent of the designs.

Transportation Component Expansion of the street system was the most frequently used transportation-related change (Figure 5), with 77 percent of the entrants proposing it. Increased pedestrian circulation was proposed by 45 percent of the entrants, while an increase of parking was proposed by 40 percent. Increases in transit or new transit links were proposed by about one-third of the entrants.

Mass Transit The major portion of the analysis was concerned with whether transit was used and the quality of its use in the proposals. These results were disappointing for those who hope that the credible visions of design professionals in the future will include public transportation. The majority of entrants (57 percent) did not mention public transit either in the text or the graphics of their presentation. Of those that did include transit in their submissions, by far the most popular mode of transportation was light rail (Figure 6), which was included in 31 percent of the entries. Bus, perhaps the most likely mode for suburban areas, was mentioned by only 8 percent of the entrants, whereas park and

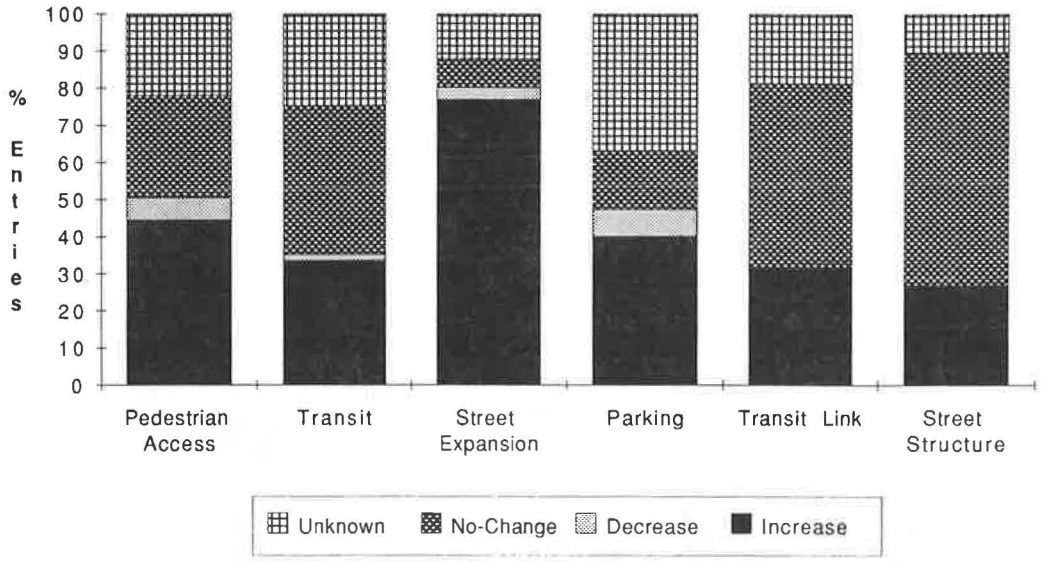

FIGURE 5 ICDC suburban entries—transportation-related changes.

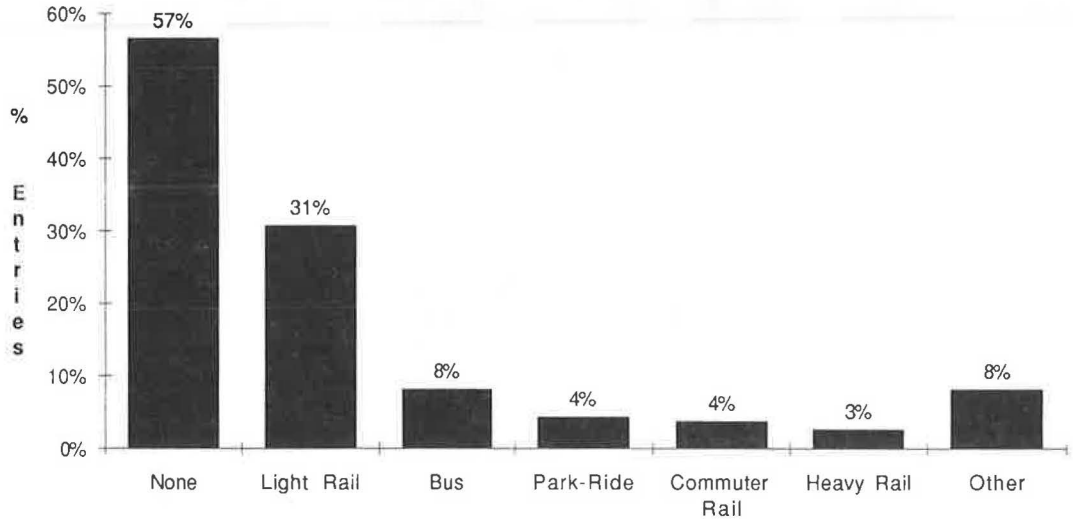

FIGURE 6 ICDC—transit modes used by entries.

ride was mentioned by only 4 percent. Other modes of transit were used by less than 10 percent of the entrants. In summary, few proposals included transit as an element of their design, and those who did include transit used light rail as the preferred mode. Use of bus, park and ride, and commuter rail—the most commonly used modes of travel in the suburbs—seldom entered the vision of the future in the minds of the design teams.

Land Use/Transit Sensitivity The planning criteria discussed earlier were developed to determine if the entries were sensitive to factors that could lead to successful transit services. These criteria were related to the categories of population concentrations at trip ends, pedestrian movement, and ease of transit operation. Each entrant was assessed on these criteria on a 0 to 5 scale and an overall rating was developed as shown in Figure 7. Approximately 25 percent of the entrants proposed designs that had land use patterns that were judged as having a "good" sensitivity to transit, with a rating of 4 or 5; about 50 percent were judged "fair," with a rating of 3; and about 25 percent were judged as "poor," with a rating of 1 or 2. Those entries that explicitly mentioned transit were rated only marginally better in providing design attributes conducive to transit success than those that did not include transit. Only 12 percent of all entrants both used transit and submitted designs that were evaluated as satisfactory in their sensitivity to transit as a land use design factor.

With respect to the various criteria for transit (Figure 8), entrants who mentioned transit did best at providing sufficient rights-of-way (73 percent judged as good) and poorest at minimizing walking distance (28 percent judged as good). Results were similar for those who did not mention transit; 63 percent did a satisfactory job of providing rights-of-way and only 18 percent provided short walking distances to potential transit routes. In general, those who did not mention transit did poorer on pedestrian and transit operational criteria, but better in criteria related to concentrations of trip ends than those who did mention transit.

A comparison of the origins of participants versus their sensitivity to transit is shown in Figure 9. Entrants from the United States and North America designed land use for transit marginally better than entrants from elsewhere in the world. Interestingly, entrants from countries that already have extensive transit systems (eastern Europe and Asia/Pacific areas) used public transit concepts less frequently than entrants from other areas such as North America.

EXISTING GUIDANCE FOR TRANSIT-SENSITIVE DESIGN

The results of this analysis led to the examination of the extent to which public transit, as a land use design consideration, is mentioned in standard textbooks and guides often used by practicing planners or developers. Accordingly, a cross section of this material as well as the accreditation criteria for planning architecture and engineering programs were examined to determine what the state of the practice is in transit sensitive land use design. The state of the practice differs from

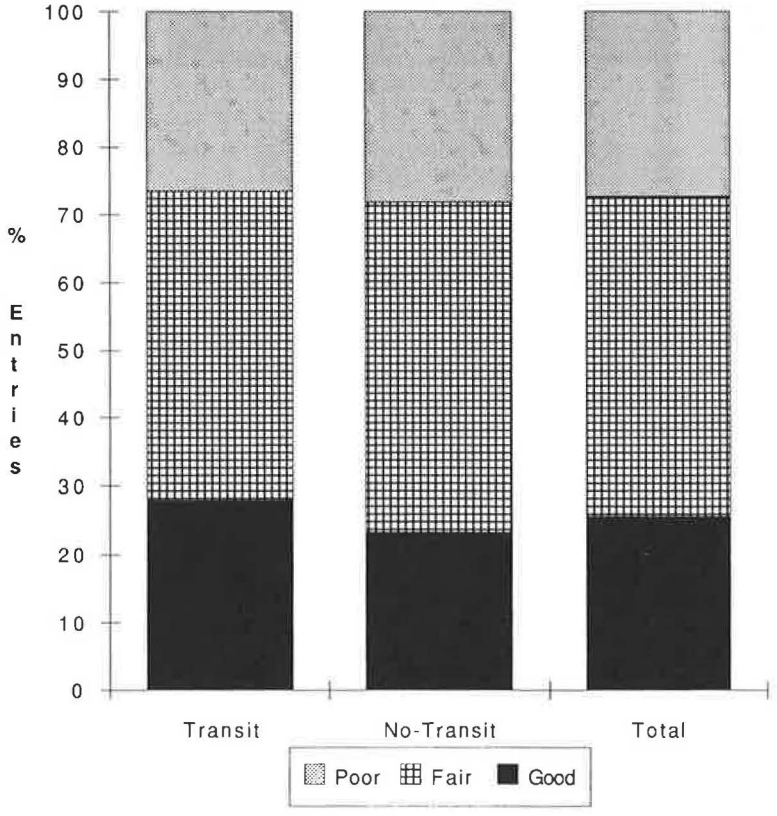

FIGURE 7 ICDC suburban entries—land use/transit sensitivity.

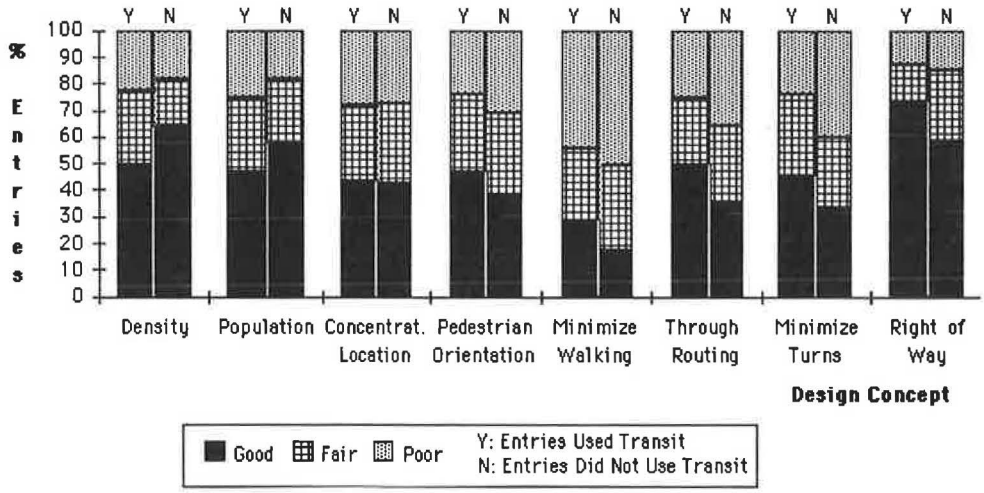

FIGURE 8 ICDC suburban entries—transit evaluation.

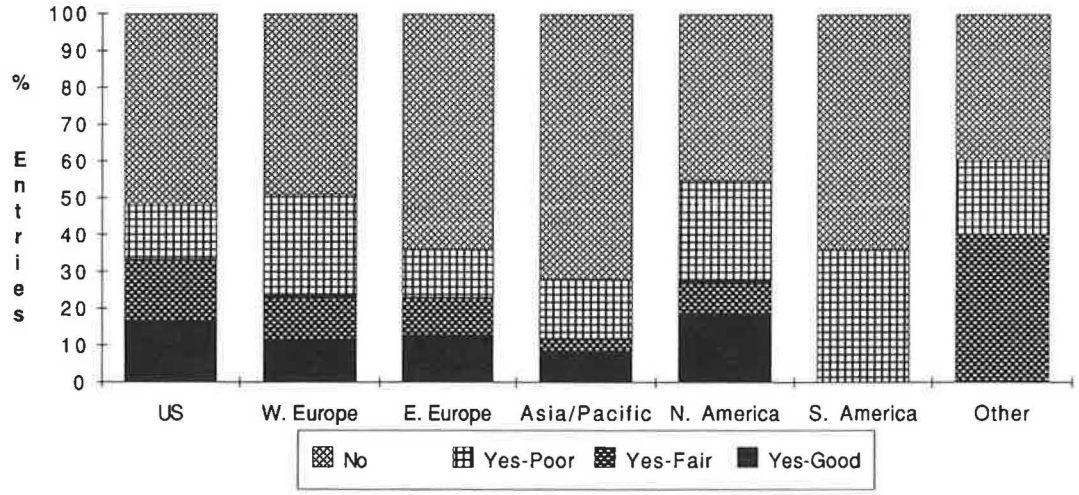

FIGURE 9 ICDC suburban entries by geographical area and transit-sensitive land use.

the state of the art in that materials examined were widely available rather than found only in limited circulation journals or technical reports.

Handbooks and Design Guides

A review was made of a number of the standard textbooks and design guides used by planners and developers to provide information on project design. This review included material available to real estate developers, architects, and planners through professionals organizations as well as in the form of textbooks or handbooks. The purpose of the review was to determine what information, if any, was available to design for transit service and to find out how prominent the issue of transit service land use design is, especially in suburban areas.

The results of this review (*5–12*) were disappointing. Public transit service in the suburbs is seldom, if ever, mentioned in planning texts and handbooks as a consideration or concern in the material reviewed. Generally, guidelines for land use design in the suburbs assume that only automobile transportation is available. Little information is provided about public transit; in many cases it is not mentioned or, if it is mentioned, it is in a historical context. These materials are strong in their coverage of land use but weak in the role of public transit.

Textbooks and handbooks in transportation and traffic engineering (*13–17*) contain substantial materials on transit. Examples of such information include turning radii, stopping zones, and special design to accommodate high-occupancy vehicles on streets and highways; however, little mention is made of land use design and considerations in planning that would affect the success of public transit. These materials are stronger in their coverage of transit, but weak in land use. There seems to be two different worlds—a world of land developers, architects, and planners who seldom think of transit, and a world of transit and traffic professionals who seldom

deal with broad land use issues. Although it is not possible to consult all standard sources, nor to know in fact what factors people consider in their design work, a review of the basic written body of work commonly available indicates that the typical practitioners involved in this field have few resources available that would guide them to a strong consideration of land use planning sensitive to public transit concerns.

Accreditation Criteria

A review was also made of the criteria used to accredit educational programs in architecture, planning, and engineering. Here again, little if any mention is made of public transit. For instance, the latest criteria for the accreditation of architectural schools containing some 77 specific areas of study, including detail within each area, does not mention transportation nor are any transportation-related subjects present. The criteria for schools and departments of planning in the United States is similar. No mention is made of the need to cover transportation topics. The results of this competition are consistent with the curricula. Public transit is not an issue when it comes to defining the basic body of knowledge needed to perform in these fields.

CONCLUSIONS AND IMPLICATIONS

In terms of the use of transit in future suburban planning, the results were disappointing. About two-fifths (43 percent) of the proposals evaluated explicitly used mass transit as an element of suburban land use design; only 12 percent of the competitors included mass transportation and had a land use design that used transit appropriately. In the credible visions of most of the entrants, it appears that the automobile will continue to be the dominant form of future transportation in suburban areas. Entries from U.S. professionals were comparable to foreign entries in their ability to use transit. An additional review of commonly used handbooks and guidelines and accreditation criteria for academic programs in architecture, planning, and engineering showed little, if any, concern for public transit as a land use design consideration.

The entries to the ICDC are a selected sample of planners and architects, and the sample does not represent a careful sample of these professions. However, the goal of the competition in encouraging visions of the future and the makeup of the competitors would suggest a progressive outlook. Furthermore, the design competition was free of many constraints that could limit creativity in design. In view of this, the analysis of the projects was particularly frustrating in terms of the competitor's perception of the role of transit. Not only did relatively few competitors use mass transit in their designs, but a good portion of those that included transit did not use it appropriately.

The consequences of this analysis are disturbing. Public transit does not seem to be a strong part of the vision of the future by those who will make many of the design decisions for the suburbs. Furthermore, it is not strongly considered in the basic resources, written or educational, that provide the fundamental body of information that these professionals use. In a future with finite resources, an automobile-dominated world is assumed. Planning decisions are made with little thought of the potential role for other modes, especially transit or walking. Unless such trends are changed, serious problems will arise in the future in attempting to adapt and retrofit our suburban communities to changes in future resource availability. In order to provide a future in which transit plays a role, those involved in transit must make the others, who are largely responsible for land use design, aware of the benefits of transit and create a vision of the future that includes a broad set of transportation alternatives.

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