

I'M NOT TO BLAME — ITS THE ROADS

Speeding tickets underline problem

My last two speeding tickets were not my fault. They weren't due to a lead foot on the gas pedal, but to the inconsistency between the design of the roads and the posted speed limit.

Basically, it was a failure of the design of the roads to tell me what the appropriate speed was — a lack of legibility.

The police officer didn't see it quite the same way.

Legibility is a word that urban designers like to use to describe the ease with which the city or its parts can be recognized and organized into a coherent pattern — the mental picture of the city or neighbourhood held by users on the street.

The city and its constituent parts should have a natural legibility. Basically, things should look like what they are.

Legibility makes people feel competent through their ability to understand their environments, and it gives integrity to the function or object.

When the built environment is legible, it is easy to understand what is going on — and it is easy to know how to behave.

For example, if the design of a building is legible, it is easy to find the front door or the service entrance, and there is little confusion.

When a building looks like what it is supposed to be (for example, when a church looks like a church and not like a big box store, or when a library looks like an important public building and not like a shopping mall), it is more legible.

In a legible neighbourhood, it is easy to find your way to the store, the school or the park without getting lost in the curvilinear maze of drives, crescents, closes, and ways (with the same name).

For me driving my car, when a street is legible, it is easy to know from its design how fast (or slow) you should be going.

When a street is narrower, with cars parked on both sides as well as street trees and sidewalks, it is clear that there are likely to be houses and pedestrians around, so the message is "take it easy."

But where there are no street trees and no on-street parking, and where the lanes are separated by a wall, a fence or a concrete divider,



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the message is very different.

It is a road built for higher speeds. So, what happens when there is a road that is sending out the message that it is a freeway, because it is a six-lane divided runway with no street trees and no on-street parking, but it is signed for 50 km/hour?

You guessed it, a speeding ticket. Calgary landscape architect Garry Carson is fond of saying that "signage is an admission of defeat."

He means that if you have to put a sign up to tell people where the front door is, or what the speed limit is, you have basically failed as a designer to provide those clues through the built environment.

Signs are often very useful in cases where it is important to reassure people they are in the right place and going in the right direction, but it should be reinforcing what we are already doing naturally.

When signs are contradicting our natural tendencies that we have to respond to the cues of our environment, they are there as a last resort to correct the mismatch between the city form and our behaviour in it.

Legibility also applies to the big picture.

The urbanist Kevin Lynch demonstrated that people tend to create a mental map of a place, neighbourhood or city in order to make sense of an environment and to develop a picture of its structure and identity.

This is important in wayfinding, and also in developing a sense of belonging to a place.

When the urban structure is composed of a recognizable, coherent pattern of urban blocks, buildings and spaces — that is, when it is possible to construct a strong environmental image — we tend to have a good sense of emotional security.

We know where we are and we know how to get to where we want to go.

When we feel competent about



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When the elements of a city's design work together, citizens are better able to form a positive mental map.

finding their way or in understanding an environment, we feel confident and much more positive about the place.

When we have trouble constructing that mental map — when we can't quite figure out an environment — we become frustrated and more likely to form a negative opinion about the place.

Lynch believed that the city image/mental map was composed of five elements and when they worked together, citizens would have a greater likelihood of being able to form that positive mental map.

Those elements are paths, districts, nodes, edges and landmarks. (We'll talk about some of the other elements in future articles, but this time, we are concentrating on paths.)

Paths are the channels along which we move and they include streets, walkways, transit lines and railroads.

For many of us, these are the predominant elements in our image of the city.

We observe the city while moving through it. Along these paths, the other environmental elements are arranged and related.

Paths are the most potent means by which the whole city can be ordered.

Knowing this, we should be designing more streets as beautiful and memorable places, with fewer as single-purpose and unattractive freeways.

We need more Memorial Drives and fewer Crowchild Trails.

The paths are also the framework or skeleton of the city, and this should be an integrated system of public streets that connects the public spaces and important landmarks.

What kind of city are we producing, then, where the streets are a tangled maze, where sidewalks aren't always continuous, where a church looks like a big box store, where libraries and schools look like shopping malls, and where every new building is trying to be the newest landmark?

Rather than so many monumental

buildings, a legible city should be composed of a ground cover of residential and commercial fabric, punctuated by important landmarks, all connected by clear and memorable circulation routes for people and cars.

These elements of the city are also the building blocks in the process of making good urban design, and we should make sure that they inter-relate and they are special.

Streets that are designed specifically for their intended use would likely mean that more of them would be comfortable places for pedestrians, and attractive corridors to pass through.

And maybe, just maybe, people like me wouldn't get so many speeding tickets.

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ROAD DESIGNERS ARE PROFESSIONALS, BUT CLIENTS DICTATE DIRECTION

City hall's priorities tend to promote lead feet

Unfortunately, like my colleague, I have also recently received a speeding ticket. However, as an engineer, I must defend my profession!

I have to believe that a skilled transportation design engineer responsible for the road that nabbed Prof. Bev Sandalack was doing a professional job, focused on meeting the client's requirements.

So let's start this investigation by understanding the different design parameters, from an engineering standpoint, and how those parameters might overlap with legibility.

The average person may be somewhat surprised to learn the full level of detail applied to the design of roads.

There is no such thing as a flat road; in fact, all roads slope simultaneously in two directions to ensure proper drainage.

Changes in slope must be treated with careful consideration, using "vertical curves" that are calculated to the nearest millimetre to make sure that cars can maneuver changing slopes with ease.

Horizontally, roads rarely have simply curves; there is often a "spiral" calculation that introduces a curve slowly — often with simultaneous changes in road slope, or "super-elevation" to once again guide the car smoothly into the curve.

These are some of the macro design considerations, which are then layered in with a myriad of fine detail considerations, including lane widths, channelization and parking.

Lane widths can have a dramatic impact on legibility. Quite simply, wide lanes encourage faster speeds, while narrow lanes, particularly with two-way undivided traffic, encourage slower speeds.

Further, in choosing lane widths, the design engineer is aware that large trucks are significantly wider than small private automobiles.

Hence, logically, local residential roads would have much narrower lanes than freeways due to



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the higher frequency of truck traffic on freeways.

However, emergency vehicles and garbage trucks do at times need access to every road in Calgary — and while it could be argued that roads can be shared for such occurrences, generally the criteria calls for very wide lanes, even for local residential roads.

Unfortunately, this practice contradicts the principles of everyday legibility.

Channelization represents the use of control devices, such as concrete barriers, curbs and guide-rails, to control where vehicles travel.

The most common is the outside curb, which works both to contain drainage (diverting it to underground sewer systems) and to protect pedestrians by deflecting cars that veer toward the sidewalk.

There are two types of curbs — straight face and rolled face.

The rolled face has become more popular in Calgary, mostly because it allows more flexibility for locating driveway accesses.

However, a rolled face curb does not provide a clean edge to the road, and as a result encourages faster speeds.

Another important component of the curb design is the "curb returns" or radius of the curb at intersections.

A small radius favours pedestrians by shortening the road opening at the intersection, while a larger radius favours the car, making it easier to negotiate the corner without fear of jump-

ing the curb.

This is a key component of legibility. Interestingly, if you look at older city streets in the inner-city, you will notice a very small curb return radius (in the order of 1.5 metres), while new subdivisions have a curb return radius in the order of 10 metres.

The wider curb radiuses provide more space for garbage trucks and emergency vehicles.

However, with my car, I can actually turn a new subdivision corner at 50 km/h, but must almost stop to turn the corner in old neighbourhoods.

Channelization also includes centre medians and concrete traffic control islands for left turn bays and dedicated right turn lanes.

Here's something interesting that you may not have noticed before — the edge of these islands is rarely parallel to the travel lanes.

They are instead tapered to start further from the travel lanes and angle back to the normal setback, thereby channeling traffic while not needing to slow it down.

Parking is also a key factor in road design. Parallel parking lanes slow down traffic.

The driver must be alert to the possibility that people and cars are moving in and out, which causes traffic to slow.

So, in summary, wider travel lanes, rolled face curbs, a wide curb radius, tapered channelization, and no parking creates a road where drivers are encouraged to travel faster.

These are exactly the parameters that are used in much of the residential road design in Calgary — which explains why residential roads in newer communities encourage more speeding, while in older neighbourhoods, traffic is slower and drivers are more alert, creating safer conditions for pedestrians.

Of particular note, in virtually all new commu-



Grant Black, Calgary Herald

Things like the shape and design of curbs can affect traffic safety.

nities, the retail districts are separated from the residential district by large, divided and very pedestrian-hostile roads.

To the transportation design engineer, the fundamental role of road legibility was learned in the first year of university.

So why do they design residential roads that end up weak on the legibility scale and dangerous to pedestrians?

The only plausible answer is that the design engineer is doing what is requested by the client.

Indeed, the general direction from city council is to serve traffic flow as a top priority supported by countless citizen surveys — the most recent by the Canada West Foundation — that list better roads (from a car driver's perspective, not a pedestrian's) as the top priority for Calgarians.

I suspect that neither the average citizen nor city council appreciates the consequences of this direction, but it is very real and potentially

harmful. The design engineer is simply doing their job by adhering to the demands of the client. Or are they?

As I rethink my position, maybe the design engineer is at fault.

The fault lies not in applying tried and tested design tools, but in allowing the client to dictate inappropriate design needs without fully appreciating the consequences.

Professionals have a much larger responsibility than simply following the direction of their clients, and the lack of effective legibility in our road designs does create unsafe environments.

For that reason alone, engineers should refuse to provide their professional seal on the design standards applied in new suburbs. That's what being a professional is about.

Sorry, Bev, I think our profession has let you down on this one.

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