

Bridges and Public Art

Crime prevention through environmental design

by Paul Kinderman and Matt Rochon,
Washington State Department of Transportation



Graffiti removal costs are estimated at over \$8 billion per year in the United States. It's generally considered disruptive to public safety and a barrier to economic potential. But when you think of the graffiti, do you think of public art as a deterrent? You will after learning about crime prevention through environmental design (CPTED).

Strategies for the Built Environment

CPTED is a multi-disciplinary tool aimed at deterring criminal behavior through environmental design. The method provides strategies that influence offenders and was formulated 45 years ago by criminologist Clarence Ray Jeffrey. Central to the theory is the notion of defensible space where people should see and be seen continuously. Strategies may be small scale, such as trimming shrubs that obscure police sight lines, or they may include an entire neighborhood where residences are oriented to ensure occupants can monitor street activity. We'll focus on just two strategies here: natural surveillance and natural territorial reinforcement.

Bridge engineers may recognize these terms from project urban design guidelines. These are common language in the lexicon of urban design and refer to natural surveillance and territorial reinforcement, respectively.

Natural Surveillance

Natural surveillance is often expressed as *eyes on the street* and relies on the placement of physical features and activities to maximize visibility. This fosters social interaction among legitimate users of the public areas. And when offenders observe this increased scrutiny, crime is deterred because it becomes too risky. Public fear is diminished when offenders can be observed, identified, and apprehended.



Maintenance repair of graffiti on Interstate 5 on ramp in Mount Vernon, Wash., prior to public art (left). Citizens typically consider graffiti disruptive to public safety and economic potential. Public art shows natural territorial reinforcement strategies at the same Interstate 5 on-ramp (right). Photos: City of Mount Vernon.

Crime is inversely related to the level of activity on the street.

Since crime is inversely related to the level of activity on the street, more people in a public setting leads to less crime. Increased pedestrian and bicycle traffic support this effort. And in transportation facilities, vehicular traffic is considered an aide to surveillance.

Typical natural surveillance elements in transportation work include trim landscape plantings, transparent noise walls, lighting with good color rendition, and designs that encourage high volumes of citizen use at all times.

Natural Territorial Reinforcement

Natural territorial reinforcement is another CPTED strategy that promotes the social control of public spaces. Two things happen when citizens acquire a vested interest in high-quality areas.

First, an increased sense of ownership encourages local residents to challenge offenders or report them to the police. Second, inappropriate users stand out and are easily identified. People must

care about their territory before they're willing to intervene in, or report, crime.

Territorial ownership is created by well-maintained premises, which in turn communicates an active presence. And increased use, promoted by high-quality designs, attracts more people and leads to the perception of social control. Typical natural territorial reinforcement strategies in transportation projects include community-based artwork, increased maintenance, and well-defined public areas. Surprisingly, and contrary to traditional law enforcement thinking, research has shown that trees are seen by citizens as creating significantly more attractive and safer spaces.

We'll look at a few examples. The urban settings will be familiar to bridge engineers all over the United States.

Example: Mount Vernon, Washington State

The city of Mount Vernon in western Washington State had an Interstate 5 on-ramp that was being tagged. It so happened that the mayor, Jill Boudreau, had a background in law enforcement. As a community service officer, she worked on the front lines of crime prevention. So when discussions started

with strategies to repair graffiti (and the challenge to civil order that it implied) the idea of public art as a deterrent was quickly vetted.

But the mayor already knew the strategy worked in her town. Just around the corner from the freeway ramp, the city already had one of those charming American classics. It was a small retaining wall with paintings of tulips, mountains, and blue sky. The little wall was as immaculate as the town. And it was not tagged (at least in part) because of the territorial component of CPTED. It's because locals created a sense of ownership and definition of public space.

Example: Spokane, Washington State

Old railroad bridges in downtown Spokane carry an Amtrak line. And every bridge had been tagged repeatedly. So the Spokane Arts Commission mobilized its Murals program. And eventually every railroad undercrossing in downtown received a mural, light-hearted wall sculptures, or even just a fresh coat of paint.

Conventional wisdom has it that graffiti artists respect the work of the muralists. So there's a tendency for the walls to be left alone by the taggers. And on the city's Murals website, you can read about activating underutilized areas and place-making.

Other examples

Other examples abound. And newly aware readers will now recognize them in their own neighborhoods. For instance, look at the Puyallup River Bridge south of Seattle, Wash. It shows a more grassroots approach. The river's trail runs under the bridge approaches and suffers the fate of blight. It's vandalized because it's a bit secluded (no natural surveillance). But territorial reinforcement principles come into play when the taggers pretty much leave the artist's fish mural alone.

Summary

How effective is CPTED? One meta-analysis in the United States found a decrease in robbery crimes between 30% and 84%.¹ Even though effective, CPTED does have its critics. For instance, some point to the word prevention and suggest deterrence is more accurate.



Railroad bridge in Spokane, Wash., demonstrating territorial reinforcement and tendency of taggers to respect public art. Photo: Washington State Department of Transportation.



Tagging of the Puyallup River Bridge pier demonstrating a lack of territorial reinforcement in a partially activated space. Photo: Washington State Department of Transportation.



Grassroots citizen effort showing territorial reinforcement under the bridge at the trail. Photo: Washington State Department of Transportation.

Others point to the surveillance component and fear it could lead to vigilantism. Or some simply ask: why not just use surveillance cameras? All are fair questions pointing to the complexity of the issue.

Are there other strategies? Sure. You can read a recent paper by Eck and Martinelli where you'll find correlations between concrete surface finish amplitude and incidents of graffiti.²

But CPTED has endured for decades as the prevailing theory; shared by both criminologists and urban designers. So until society solves the problems of disaffected youth tagging walls, you can look for this common sense and

intuitive method to prevail. And for structural engineers, it might be helpful to just think of it like strut-and-tie analysis. It's intuitive, it's common sense, and there's a scientific underpinning.

So take a deep breath bridge engineering colleagues! The next time your project artist walks in the room please know that you're both working toward public safety. Because if we build bridges people care about, bridges with locally meaningful motifs and bridges with charm. . . then the public will protect them.

References

1. Casteel, Carri, and C. Peek-Asa. 2000. "Effectiveness of Crime

Prevention Through Environmental Design (CPTED) in Reducing Robberies." *American Journal of Preventive Medicine*, 18(4 Suppl): pp. 99-115. DOI: 10.1016/S0749-3797(00)00146-X

- Eck, R., and D. Martinelli. 2014. "Assessment and Mitigation Measures for Graffiti on Highway Structures." *TRB Record*, 1642(5). DOI: <http://dx.doi.org/10.3141/1642-05>

References for further reading

Atlas, Randall (Ed). 2008. *21st Century Security and CPTED: Designing for Critical Infrastructure Protection and Crime Prevention*. CRC Press, Taylor & Francis Ltd., Milton Park Abingdon, UK, 500 pp.

Jacobs, Jane. 1961. *The Death and Life of Great American Cities*. Random House, New York, NY, 598 pp.

Jeffery, C. Ray. 1977. *Crime Prevention Through Environmental Design*. Sage Publications, Beverly Hills, CA, 351 pp.

Washington State Department of Transportation (WSDOT). 2015. *WSDOT Design Manual*, M 22-01.12, Chapter 950, Public Art. WSDOT, Olympia, WA.

AESTHETICS COMMENTARY

by Frederick Gottemoeller



I'm glad to see the recognition this article gives to the role of public art in bridge design. Having a background in architecture and urban design as well as engineering, many of these ideas are familiar. But, as the article points out, art's effect is more than just aesthetic enjoyment, as important as that is. Art's effectiveness in evoking Natural Surveillance and Natural Territorial Enforcement means significant reductions in vandalism and the costs of remediating it. To add to that

list, public art can evoke significant civic pride and community solidarity when it is used to enhance spaces under bridge approaches and viaducts so that they are more amenable to civic uses. As I said in the Spring 2016 edition of *ASPIRE*TM:

"In recent years, with the growing public interest in urban living and making cities more livable, there has been new interest in taking advantage of the space under viaducts, and not just for organized parking. Parks and playgrounds and farmers' markets are all uses that are now occurring under viaducts."

In Hastings, Minn., the south approaches to the new US 61 Bridge over the Mississippi River cross over the town's historic shopping avenue, Second Street, with minimal vertical clearance. The space below the bridge had the potential to end up like so many others, dark, unpopulated and threatening, with consequent negative impacts on the shopping street. The first step toward avoiding that was to use a post-tensioned, cast-in-place, minimal-depth concrete slab for the structure. This maximized the vertical clearance under the structure and created a smooth and light colored underside which facilitated the penetration of daylight into the space under the bridge. The second step was to place the south abutment as far back as reasonable from the curb line in order to make the space under the bridge more useful for civic activities (Fig. 1). The third step was to place all piers outside the building lines for Second Street so that the "space of the street" was not narrowed as it passes under the bridge (Fig. 2).

The final step was to place a natural stone "mural" on the south abutment wall. This work depicts the history of Hastings in variously colored natural stones (Fig. 3). Contrary to the usual expectations, it was the result of a collaboration between the design-build contractor, an artist retained by the contractor, and the citizens advisory committee. The design-build contract required that the contractor find an artist who could develop a theme satisfactory to the committee. The artist proposed the historical mural of colored stone and the committee accepted it.

The south approaches have become a source of civic pride. Residents take visitors to see it, and the area under the bridge has become an important focus of the summertime historic car rallies that are a Hastings tradition. And it was all done in the context of a competitively bid, design-build process.



Figure 1. Weekend historic car rally on Second Street. Photo: Dale Thomas.



Figure 2. Daylight and space at the south abutment. Photo: Frederick Gottemoeller.



Figure 3. A visitor to Hastings exploring the mural. Photo: Frederick Gottemoeller.