



3D pedestrian crossings

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Part of the [Tranzinfo Hot Topics](#) series, this issue offers a selection of material on three-dimensional pedestrian crossings, a road safety measure where paint on the road produces an optical illusion in an attempt to get drivers to slow down. 3D crossings have been installed all over the world, including in Australia, to a mixed reception. Advocates have welcomed the innovation, saying it has slowed traffic, while opponents argue that the crossings are confusing for motorists and any road safety benefits have been short-lived. 3D crossings are often seen as preferable to traditional speed bumps, which can contribute to air pollution and damage a car's suspension.

Contents:

[Trials](#)

[Research](#)

Trials

[3D pedestrian crossing trial coming to Manly in NSW first](#)

Northern Beaches Council, Friday 28 October 2022

Three new pedestrian crossings are being trialled in high traffic areas of Manly over summer, the first in NSW.

The locations include two at the intersection of South Steyne Road and Wentworth Streets and South Steyne Road near Victoria Parade.

The new crossings create an optical illusion, appearing to rise up from the pavement, and slow motorists.

[Outback town takes a 3D approach to slowing motorists at pedestrian crossings](#)

ABC News, 29 May 2018

Boulia, in the heart of the channel country in central-west Queensland, is the first Australian town to introduce a three-dimensional zebra crossing, where white blocks appear to rise up from the road in an optical illusion.

[Victoria's first 3D pedestrian crossing in Fitzroy North](#)

City of Yarra, 2 November 2018

As part of the Local Area Place Making study of Fitzroy North, the community raised concerns with pedestrian safety and traffic and parking management in the area, resulting in a new 3D pedestrian crossing on Best Street in Fitzroy North.

[Cairns to introduce mind-boggling three-dimensional pedestrian crossing](#)

News.com.au, March 22, 2018

Cairns Regional Council signed off on \$30,000 to paint a 'three-dimensional' zebra crossing outside a hotel and shopping complex in the CBD of the north Queensland tourist hub.

[Managing urban traffic: 3D zebra crossings spread across Europe](#)

EuroCities, September 2021

Several cities across Europe are trying creative ways to reduce road accidents. They do so by forcing drivers and cyclists to reduce their speed and respect pedestrians. And particularly with the ease of COVID-19 restrictions, the concern is that numbers might rise once again as more people return to the roads, either to travel or to commute to and from work. One such solution is 3D zebra crossings, a novelty designed to force drivers to reassess their speed.

[3D zebra crossings for Tauranga a unique way to slow drivers down](#)

Stuff.co.nz, January 22, 2019

Tauranga City Council is using optical illusions to give pedestrian crossings a modern twist.

Zebra crossings have been painted in such a way to make them appear as if they are raised from the road. It is hoped the new design will make drivers slow down in pedestrian-heavy areas like The Strand.

[3D zebra crossings are being trialled in Iceland](#)

Motoring Research, 27 September 2017

A company in Iceland is trialling a 3D painted zebra crossing in a bid to slow motorists down.

Vegamálun, the Icelandic firm behind the work, says the idea originated from the Indian capital of New Delhi, where 3D zebra crossings have also been used to reduce average speeds. They've been introduced in the Chinese capital of Beijing as well.

[Optical illusion: 3D zebra crossing tricks drivers, slows them down in Delhi](#)

Hindustan Times, July 22, 2016

New Delhi Municipal Council's newly installed 3D zebra crossing painted at central Delhi's Rajaji Marg has started yielding results. Delhi Traffic Police officials said ever since the crossing was installed on July 9, the average speed on the stretch has come down to 30 km per hour.

[Back to top](#)

Research

[3D crossings installed in Manly – but do they work?](#)

The Age, Friday 11 November 2022.

Research is divided on the safety and efficacy of three-dimensional pedestrian crossings, which are currently being trialled in Manly.

[Illusion of safety? Safety-related perceptions of pedestrians and car drivers around 3D crosswalks](#)

Siebert, FW et al., Transportation Research Part F: Traffic Psychology and Behaviour, vol. 91, 2022, pp. 213-22.

Facilitating safe pedestrian road crossings is a major prerequisite for safe urban environments. In multiple cities around the world, 3D crosswalks have been painted, which provoke an optical illusion, of e.g., a crosswalk floating above the road, in car drivers who approach the crosswalk. However, to date, no detailed study of road users' safety related perceptions on 3D crosswalks has been conducted. Hence, we investigated car drivers' and pedestrians' perceptions of a 3D crosswalk, and how they rate its safety in comparison to traditional (non-3D illusion) crosswalks. Both pedestrians and car drivers rate the 3D crosswalk as safer for road crossing than a traditional crosswalk. Overall, the data points to significant increases in the perceived safety of drivers as well as pedestrians around the 3D crosswalk. Future studies need to investigate how these perceptions translate to actual safety related behaviour.

[Evaluation of three-dimensional pedestrian crossing trials](#)

Cerema, February 2021.

A number of publicity campaigns presenting the three-dimensional pedestrian crossing as a spectacular and innovative solution for improved pedestrian crossing compliance were successfully undertaken in a number of countries from early 2017 onwards. Some French municipalities, unfamiliar with the regulations governing signs and marking in France, took the plunge and installed these 3D crossings, which were offered in catalogues.

[Urban school area road safety improvement and assessment with a 3d piano-keyboard-styled pedestrian crossing approach: a case study of Chiang Mai University Demonstration School](#)

Pichayapan, P et al., Sustainability, 2020, vol. 12, no. 16, 6464.

Traffic accidents are a major cause of death in Thailand. Thailand is ranked third in the world by the World Health Organization for traffic-related deaths. Decreasing road accidents is one of the Thailand National Strategy Goals and also the United Nations Sustainable Development Goals. Several traffic calming tools for school areas were reviewed for safety improvement. An approach of creating a three-dimensional piano-keyboard-styled pedestrian crossing was implemented. The results showed that after the new crossing was installed, vehicle speeds drastically decreased. After three weeks, vehicle speeds began to increase. After twelve weeks, the vehicle speeds had gradually increased toward the same level as before the installation.

[Pedestrian crosswalk design based on the assessment of driver recognition](#)

Juyoung, L, Journal of Environmental Science International, vol. 29, no. 4, 2020, pp. 361-369.

This study proposes an evidence-based design solution for improving crosswalk function by conducting simulations and field experiments. Four different crosswalk design patterns were prepared: (1) a zebra pattern, (2) zebra pattern with coloured triangles, (3) 3D pattern, and (4) art pattern with unique colours and design. The results supported that the zebra pattern with coloured triangles could be the most effective solution for crosswalk design by increasing visibility, attention, deceleration, and landscape aesthetics. This study provided objective data to support the performance of various crosswalk patterns and suggested the need to re-evaluate the present crosswalk design guidelines.

[Utilization of 3D visual effect crossing facility to enhance pedestrian safety](#)

Gen, NL et al., IOP Conference Series: Earth and Environmental Science, vol 498, 2019.

This study is to determine the effect of using a 3D visual crossing facility and its functionality. The 3D visual effect road crossing then is designed by using the perspective view from the driver height sight. After the installation of the road crossing, there was a significant association between speed of vehicles and the installation of 3D visual crossing facility. The effect of the 3D visual crossing facility shows that the motorists will slow down their vehicle speed immediately after the installation.

[Perception of 3D virtual road markings: based on estimation of vehicle speed](#)

Trifunovic, AV et al., FME Transactions, vol. 47, no. 2, 2019, pp. 360-69.

Analysis of the influence of geometry in drivers' behaviour has been widely performed by different researchers. One way to improve road safety is to provide adequate visibility in order to help drivers adopt adequate behaviours. When the budget is not sufficient for expensive traffic solutions, innovative but simple solutions can be implemented. In this study, the experiment was performed to explore how drivers' perception and behaviour are influenced by two virtual 3D shapes' projections - a 3D alternative

crosswalk pattern and speed bumps consisted of triangular prisms. The results show statistically significant differences between drivers' willingness to reduce vehicle speed as a response to the two types of road markings: the first one with the square shape base (rectangular prism) and the second one with triangular shape base (triangular prism).

[3D crosswalks can result in 'unsafe behavior,' says FHWA](#)

Smartcities Dive, July 30, 2019.

The City of Cincinnati has recommended against using 3D crosswalks as a strategy to increase pedestrian safety, citing a Federal Highway Administration (FHWA) guidance that says the idea 'can result in unsafe behaviour by drivers.'

[Evaluation of 3D crosswalk design](#)

Rebelo, F et al., In book: Advances in Ergonomics in Design, pp. 89-96, 2019. In order to increase crosswalk conspicuity, some countries such as Iceland, Japan and India have already adopted a new system using 3D crosswalk to increase drivers' awareness. This study intends to evaluate efficacy of 3D crosswalks comparing them with traditional 2D crosswalk. In this study, the driver reaction was evaluated using static images of urban road situations including 2D and 3D crosswalks. For stimuli presentation we used a constant stimuli methodology with two forced choice paradigm. Results seem to show that people take longer to respond to the 3D crosswalk but make more mistakes on the 2D crosswalk.

[Method of mathematical justification for using 3D zebra crossing](#)

Burlov, V & Gomazov, F, Transportation Research Procedia, vol. 36, 2018, pp. 95-102.

One of the methods that causes drivers to reduce speed is the use of a stereo effect when "zebra" marking on the roadway. As a result, this marking for the driver looks like three-dimensional objects lying on the road, which makes him/her reflexively reduce their speed. In the course of studying this issue, the use of 3D "zebra" marking is mathematically justified and its effect on the safety index is estimated. To justify and calculate, the method of synthesis-based system construction is used and inverse control problem is solved.

[Effects of symbol prompts and 3D pavement illusions on motorist yielding at crosswalks](#)

Cambridge, NM, MA Thesis, Western Michigan University, 2012.

3D pavement illusions have been previously studied in transportation application; however no formal evaluations have examined the effectiveness of 3D pavement illusions on motorist yielding behaviour. A multiple baseline study was conducted across two uncontrolled crosswalks sites. Following a baseline condition, an in pavement "Look for Pedestrians" message marking was placed in advance of the crosswalk. Next, 3D pavement illusions were added to the pavement marking message. The pavement marking message increased yielding behaviour and the initial installation of the 3D illusions were effective at increasing yielding further, however over time the novelty of the

3D pavement illusions reduced motorist yielding back to the previous pavement message only condition.

[Back to top](#)

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