



# SUSTAINABLE DEVELOPMENT GOALS

11 SUSTAINABLE  
CITIES AND  
COMMUNITIES



# City to Countryside Tourism Development Project Contest - 3rd Edition



The School of Hospitality and Tourism Administration at UPC and StartUPC, in partnership with the Ibero-American Institute of Rural Tourism (IBEROATUR), invited students from tourism, hospitality, gastronomy, or related fields from public and private universities to participate in the 3rd Edition of the City to Countryside Tourism Development Project Contest. This virtual event took place on November 22 and 23.

Selected projects had as their main characteristic to propose new employment and income alternatives to diversify the agricultural and agro-industrial activities of rural inhabitants, demonstrating benefits for both the business owners and the rural agricultural communities through the projects.



The goal of this competition was to foster projects that promote tourism flow to areas with great potential and development, with a special focus on rural tourism, such as agrotourism, wine tourism, gastro-tourism, and other related categories.



# Mujer Esperanza (Woman Hope)



In June 2023, the Office of University Life organized the event “Mujer Esperanza” (Woman Hope), held in the Alcedo Hall of the Segura Theater, featuring the Peruvian singer-songwriter Luz María Carriquiry.

The event aimed to give visibility to female singer-songwriters. Additionally, it provided opportunities for information, reflection, knowledge, art, culture, sports, and entertainment to students and members of the university community.



# Master class with the UPC Improv Ensemble



In August 2023, the Office of University Life organized the event “Master Class with the UPC Improv Ensemble,” held at the Metropolitan Museum of Lima. The objective was to spread the art of theatrical improvisation.

It was a master class where improvisational theater games were practiced, providing the members of the UPC Ensembles with the opportunity to showcase their artistic talents, which are part of their comprehensive education. The spectators enjoyed a show that promoted art and culture.





# Discussion Panel on Lima Criminal



In December 2023, the Office of University Life of UPC organized the Discussion Panel on Lima Criminal, held at the Julio Ramón Ribeyro auditorium of the Ricardo Palma Book Fair. The objective of the event was to offer a varied and quality program.

It was a discussion about the podcast “Lima Criminal.” The event provided content and experiences related to art, culture, and heritage, in an accessible and attractive format.

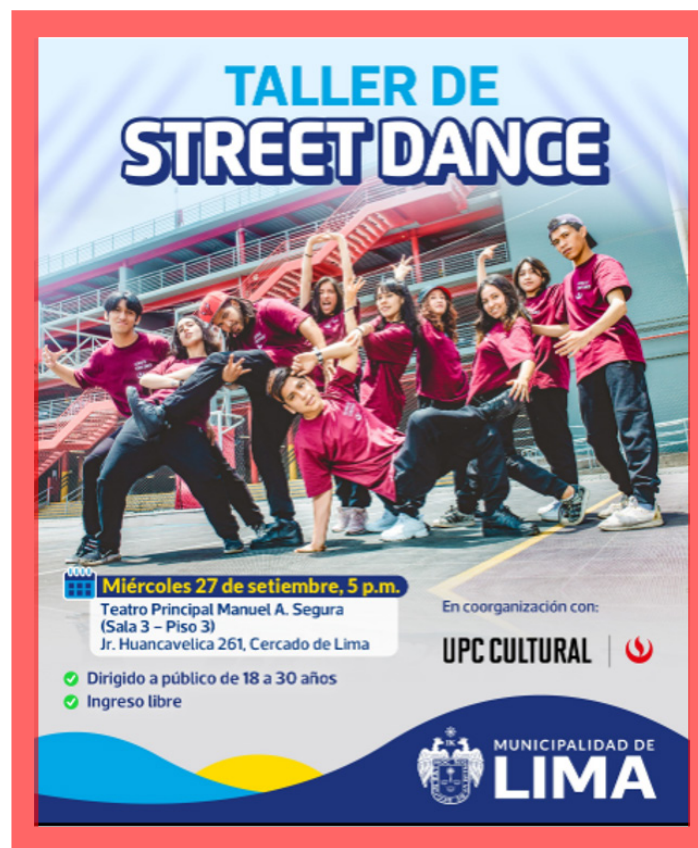


# Master class with the UPC Street Dance Ensemble



In September 2023, the Office of University Life organized the event “Master class with the UPC Street Dance Ensemble,” held at the Segura Theater. The objective was to learn more about urban dances and their genres.

Basic steps were taught, the context of urban dances was provided, and the members of the UPC Ensembles were given the opportunity to showcase their artistic talents, which are part of their comprehensive education. The spectators enjoyed a show that promoted art and culture.



# Discussion Panel: Challenges of cultural management facing post-pandemic consumption habits



In February 2023, the Office of University Life organized the “Discussion panel: Challenges of cultural management facing post-pandemic consumption habits,” held at the Luis Bustamante auditorium of UPC San Isidro and via Facebook. The speakers were: Marco Mühletaler, Grazia Rojas, Italo Ilizarbe, and Erika Lastra. The moderator was Carina Moreno.

The objective of the event was to provide the general public with an overview of the current state of cultural management and the consumption habits of Lima’s residents. Additionally, the event provided content and experiences related to art, culture, and heritage in an accessible and attractive format.



# FM Festival



In November 2023, the Audiovisual Communication and Interactive Media program at UPC participated in the “FM FESTIVAL,” a family music fair aimed at recalling and sharing the best hits from the past four decades.

The target audience was men and women aged 30 to 45, working parents seeking a recreational space to interact with their loved ones while striving to balance their work and family commitments. Additionally, they share a love for music, which further strengthened their bonds. The event’s objective was to encourage the search for new ways to promote and celebrate creativity.





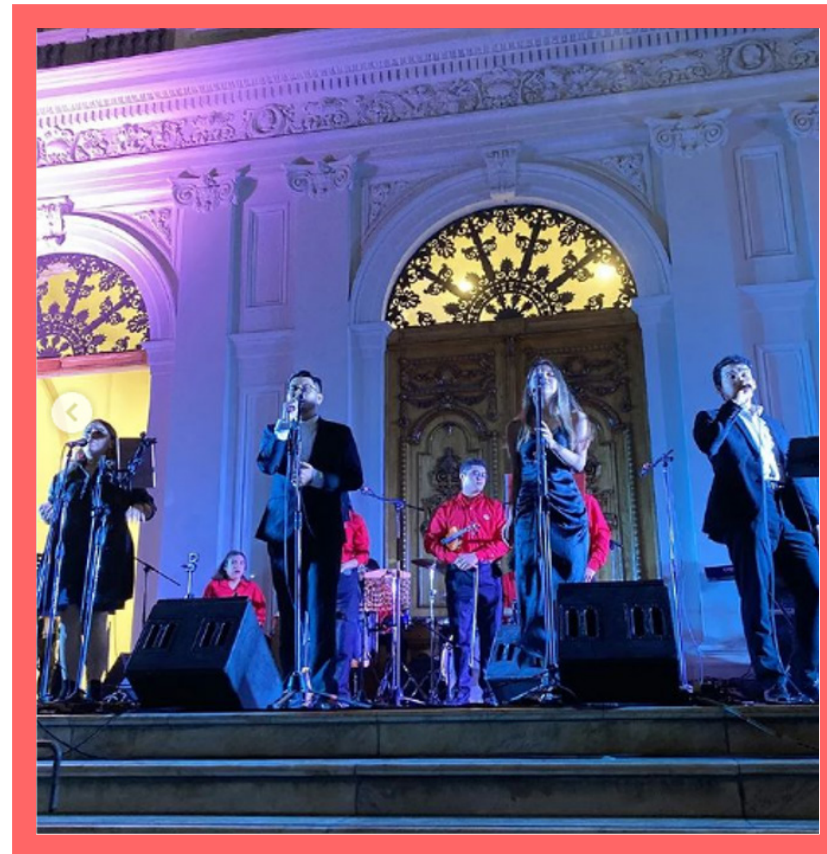
# MALI Night



In July 2023, the Office of University Life at UPC participated in the event “MALI Night,” held at the Lima Art Museum. The objective was to promote museum visits and participation in its activities.

On this occasion, the UPC Peruvian Music Ensemble participated in the closing of the “MALI Night” for the month of July. The ensemble shared the best of their repertoire, allowing attendees to enjoy the rhythm of Peruvian music.

This activity provided the members of the UPC Ensembles the opportunity to showcase their artistic talents as part of their comprehensive education. The spectators enjoyed a show that promotes art and culture.



# Raíces Libres



In October 2023, the Office of University Life at UPC participated in the event “Raíces Libres” (Free Roots), held at the Theater of the Alianza Francesa with the aim of offering quality cultural activities to the UPC Cultural audience.

Raíces Libres was born as a way to share and view Peruvian pluriculturalism through the artistic life experiences of Antonio Vilchez and Ricardo Gallardo. Opportunities were provided to engage with artistic and cultural expressions and to value national heritage.



# Musicotopia



Students from the Audiovisual Communication and Interactive Media program at UPC participated in the Musicotopia music festival, an event aimed at young people aged 18 to 36. The objective was to create a pleasant space where emerging local music bands could gain recognition. Eight bands of different genres participated.

Additionally, in partnership with the restaurant GastroSurco, university entrepreneurs were invited as vendors.



# Lima Art Fest



In November 2023, the Audiovisual Communication and Interactive Media program at UPC participated in organizing the Lima Art Fest. This cultural event provided a platform to showcase the talent of musical artists in genres such as K-pop, Pop, Punk, and Alternative Rock. Additionally, the event offered opportunities for entrepreneurs in fashion, jewelry, and makeup to commercialize their ventures.

The goal of the event was to enhance access to spaces for cultural expressions.





# New media for managing cultural initiatives

## First workshop of the Conecta program thanks to the alliance with UPC Cultural



In 2023, we were pleased to hold four workshops directed at cultural agents, thanks to the alliance we established with the Conecta program of the Ministry of Culture (Mincul).

The first workshop was called “New Media for Managing Cultural Initiatives” and was conducted by Professor Juan Carlos Luján. This event took place on April 17, 19, and 21, 2023.

**CONNECTA EMPRENDE**

¡PARTICIPA EN EL TALLER!

**Nuevos medios para la gestión de iniciativas culturales**

**Fechas:**  
17, 19 y 21 de abril del 2023

**Cierre de convocatorias:**  
9 de abril

**Publicación de seleccionados:**  
12 de abril

**Docente:** Juan Carlos Luján

PERÚ Ministerio de Cultura | UPC CULTURAL | Con Puro Corazón Perú | BICENTENARIO DEL PERÚ 2021 - 2024

The poster features a central photograph of a woman in traditional Peruvian attire, including a colorful headpiece and a white face mask. The background is a mix of teal and orange. Logos for the Ministry of Culture, UPC Cultural, and the 2021-2024 bicentennial are at the bottom.

# Factors associated with frequent marijuana consumption in young people before admission to juvenile detention centers in Peru



**Authors:** Al-Kassab-córdova, A.; Cornejo-Venegas, G., Gacharna-Madrigal, N., Baquedano-Rojas, C.; de la Borda-Prazak, G.; Mejia, C.R.

**Abstract:** Marijuana is the most widely used illicit drug in the world, especially among young people. This study is relevant to policy makers because it expands the knowledge regarding drug use in vulnerable youth, allowing health authorities to reduce marijuana consumption via educational, family, and governmental strategies and policies. The objective of this study was to determine the prevalence of frequent marijuana consumption and its associated factors in young people before admission to juvenile detention centers in Peru. The data was taken from the 2016 National Population Census of the Youth Diagnostic and Rehabilitation Centers in Peru. The final sample was made up of 1,848 people with ages between 14 and 22 years old, with a median age of 17 (95.6% males). The variable frequent marijuana consumption was defined as the use of marijuana at least once a week, prior to entering the center. The main factors associated with frequent marijuana use were male sex, running away from home before the age of 15, physical abuse during childhood, having a family member who consumed alcohol or drugs frequently, and the presence of criminal gangs in the housing area. Additionally, it was found that living with parents up to a specific critical age decreases the probability of frequent



# Factors associated with frequent marijuana consumption in young people before admission to juvenile detention centers in Peru



use of marijuana in young people. These results could aid the development of strategies and public policies that help prevent the consumption of marijuana and other drugs from an early age.

**Keywords:** Cannabis, marijuana use, Peru, substance-related disorders, vulnerable populations, Illicit drug, Drug use, Educational strategies, Family strategies, Governmental policies, Juvenile detention centers, 2016 National Population Census, Youth Diagnostic and Rehabilitation Centers, Frequent marijuana consumption, Associated factors, Male sex, Running away from home, Physical abuse, Family member substance use, Criminal gangs, Living with parents, Public policies, Prevention

Adicciones, Volume 35 , Pages 9-20

<https://doi.org/10.20882/adicciones.1506>



# Promoting early childhood development through built environment transformations: lessons from the safe route project in Lima, Peru



**Authors:** Cepero-Saravia, J.; Dreifuss-Serrano, C.; Ortigoza, A.

**Abstract:** Early childhood development is crucial for children's growth and long-term outcomes. In Peru, the government has made investments in education and health, aiming to support child development programs. However, more work is needed in other areas to ensure all children can thrive. This paper explores the potential of interventions in the built environment as a relatively unexplored area that could benefit child's development. We present the implementation of the 'Safe Route to the "Mercedarias" daycare' project as a successful experience for promoting child-friendly cities. The project involved collaboration among mid-level officers and frontline workers within a large municipality's organizational structure. The strategies we used allowed us to build a working group willing to collaborate on further projects. The process was successful without requiring additional expenses beyond regular costs. Officers that had never been involved before felt engaged with the initiative while testimonies from caregivers indicated positive outputs. The case study could serve as an example to other cities of a successful model for promoting early childhood development in cities by engaging stakeholders at all levels in the identification of challenges faced by young children and caregivers while underscoring the importance of investing in urban environment interventions for improving children's growth.

**Keywords:** Early childhood development; built environment; safe routes; Latin America; urban governance; urban health

Cities and Health, Volume 7, 2023, Pages 991-1001

<https://doi.org/10.1080/23748834.2023.2241603>





# Influence of Adaptive Traffic Lights for Delay and Conflict Reduction Applying the SSAM Model at an Urban Intersection



**Authors:** Breña, A.; Vasquez, J.; Silvera, M.; Campos, F.

**Abstract:** Undoubtedly, conflicts on intersection roads leading to accidents are very often observed. This is due to the ineffectiveness of fixed-cycle traffic lights that do not adapt to changing urban traffic situations. Based on this, the present research evaluated as a case study an intersection located at Habich Avenue with Tupac Amaru Avenue in Lima, Peru. The article also looks for alternative solutions based on the microscopic representation of the intersection using microsimulation programs such as VISSIM and SSAM. In addition, a codification of traffic light cycles was implemented to allow a continuous flow to the Bus Rapid Transit (BRT) system, indirectly reducing the number of conflict points in urban transport. Moreover, the relationship between the reduction of delays and conflicts was identified. The results indicate that a direct relationship between the evaluation parameters was found from the improvement in the traffic light phases. Delays on the east access decreased by 42% and on the west access by 31%. What is more, 12679 rear-end conflicts and 1727 lane change conflicts were reduced.

**Keywords:** Conflicts, Delay by control, Adaptive traffic lights

Smart Innovation, Systems and Technologies, Volume 353, 2023, Pages 506-516

[https://doi.org/10.1007/978-3-031-31007-2\\_48](https://doi.org/10.1007/978-3-031-31007-2_48)



# Prevalence of *Toxocara* eggs in Latin American parks: a systematic review and meta-analysis



**Authors:** Bonilla-Aldana, D.K.; Morales-Garcia, L.V.; Ulloque Badaracco, J.R.; Mosquera-Rojas, M.D.; Alarcón-Braga, E.A.; Hernandez-Bustamante, E.A.; Al-Kassab-córdova, A.; Benites-Zapata, V.A.; Rodriguez-Morales, A.J.; Delgado, O.

**Abstract:** Introduction: Toxocariasis is an infection caused in canines, felines, humans, and other vertebrates by species of the genus *Toxocara*, such as *T. canis* and *T. cati*. The embryonated eggs of these parasites are the main form of acquisition of the infection both for definitive hosts, such as the dog and the cat, respectively and for paratenic hosts, such as humans and other vertebrates. Toxocariasis infection in humans causes visceral larva migrans syndrome. When deposited on park soils, environmental contamination becomes a risk for environmental, human, and animal health.

**Objective:** To systemically estimate the prevalence of *Toxocara* spp. eggs in park soils in Latin America.

**Methods:** A systematic review and meta-analysis were performed to evaluate the prevalence of *Toxocara* eggs in park soils in Latin America, defined by copro-parasitological, molecular and immunological techniques. We searched PubMed, Scopus, Web of Sciences, Embase, LILACS and SciELO for studies published from 1900 through 28 January 2023. A meta-analysis was performed using a random-effects model to calculate the pooled prevalence and 95% confidence intervals (95% CI). Heterogeneity was measured through I<sup>2</sup> statistics.

**Results:** Forty-nine studies (2,508 parks and 12,833 samples) were included, of whom 44 had a low risk of bias. The poo-



# Prevalence of Toxocara eggs in Latin American parks: a systematic review and meta-analysis



led prevalence of Toxocara eggs in parks in Latin America was 50.0% (95% CI: 40.0%-60.0%). Argentina had the highest prevalence of Toxocara eggs in parks (100%), followed by Brazil (66%) and Venezuela (63%). The pooled prevalence of Toxocara eggs in soil samples was 20.0% (95% CI: 14.0%-26.0%); in faecal samples, it was 13.0% (95% CI: 6.0%-23.0%). **Conclusion:** The presence of Toxocara canis eggs in public parks in Latin America is a zoonotic and public health threat for the people who go to these places, especially if children play on the ground with dirt or contaminated objects; since many pet owners and general public are not adequately informed about the mode of transmission of this parasite.

**Keywords:** Latin America; Toxocara; meta-analysis; park; prevalence; systematic review.

Infezioni in Medicina, Volume 31, 2023, Pages 329-349

<https://doi.org/10.53854/liim-3103-7>



# Analysis of the influence of the use of the right lane of a stretch of road as a multiple stop on vehicle delays and capacity of adjacent lanes



**Authors:** Cesar Soria, Jhon Calcina, Manuel Silvera, Fernando Campos

**Abstract:** Vehicle congestion in a city affects users of public and private transport because it generates loss of time and money. However, this problem becomes more complex when there is no formal bus stop system and there are no defined stop zones for various bus lines. For this reason, this article aims to analyze vehicle delays and the capacity of all lanes in a section of an avenue in the center of Lima. Drone recordings were made to represent in a microsimulation model a section with multiple bus stops that generate traffic congestion. After calibrating and validating the model, 2 scenarios were built. The first scenario does not have bus stops along the section, and in the second scenario, bus stops are ordered and established with optimized distances. The results showed that the presence of multiple stops in the first lane generates an increase in vehicle delays of 114 seconds. In addition, the capacity in the section is 13% less than in a scenario without stops. On the other hand, the optimization of bus stops generates a decrease in vehicular delays of 58 seconds and increases the vehicular capacity in the section by 4.41%.

**Keywords:** Microsimulation, Vehicular delays, Vehicular capacity, Bus stops, Avenue section

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6

<https://doi.org/10.1109/CONIITI61170.2023.10324011>





# Evaluation of the Influence of Atypical Vehicles on Vehicle Delays at a Signalized Intersection



**Authors:** Brenda Capia; Manuel Silvera; Fernando Campos

**Abstract:** Cities in developing countries tend to have a high prevalence of atypical vehicles, therefore driving behavior characteristics and demand at intersections may vary. For this reason, the effects of rickshaw incidence on factors such as delays, queue length, and vehicular conflicts are analyzed. This is because rickshaws, being smaller in size and capacity compared to other types of transportation, can have a significant impact on traffic flow and road operations. Through the use of modeling and microsimulation techniques in Vissim 9.0, it is possible to identify the key parameters that contribute to these factors and quantify the specific impact of motorcycle taxis compared to other vehicles. Data collected and processed in the software revealed the influence of rickshaws on average travel times at an intersection, resulting in percentages of 32% for delays, 41% for vehicle conflicts, and 26% for queue lengths.

**Keywords:** rickshaw, heterogeneous traffic, delays, Vissim 9.0, micro simulation

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6.

<https://doi.org/10.1109/CONIITI61170.2023.10324252>



# Analysis of the use of user time based on access to bus boarding information at a BRT station



**Authors:** Carlos Sapacayo; Enrique Respicio; Manuel Silvera

**Abstract:** In many cities around the world, public transportation users must go to stops in advance due to the uncertainty of the bus boarding time. This causes them to stop investing their time in activities such as working, studying or leisure time. This research presents the analysis of the time it takes the average user to reach the station from their point of origin, the waiting times in electronic card recharge queues, the time it takes to reach the bus modules and the waiting time in boarding queues spent by users of a BRT station in Lima. Then, they are compared with an alternative to reduce waiting times based on access to precise information on the time of boarding. To do this, data from a survey carried out within the chosen station on the times of each phase were analyzed. Then, a comparison is made between the conventional situation and a scenario in which users know when they should go to the boarding modules to avoid wasting time. The results show that the proposed scenario reduces the time spent by users inside the BRT station from 22.57 minutes to 13.30 minutes compared to the current situation, which represents a reduction of 41.18%. Likewise, the waiting time in the proposed scenario for the boarding modules is 43% lower than the average time of users in the conventional situation. The current reduced times are significant, and, according to the survey results, these can be used in other activities such as leisure and work.

**Keywords:** BRT, delays, queues, boarding, capacity

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6

<https://doi.org/10.1109/CONIITI61170.2023.10324088>



# Remote sensing evaluation of the expansion of the Palcacocha Lake and Glacial Retreat in the Cordillera Blanca - Peru



**Authors:** Zavala, Rosa Maria Otiniano; Gomez, Angie Lucero Mulatillo; Mercado, Nicol Dayana Blas; Chuquillanqui, Anthonny Bryan; Aguilar; Malca, Ulises Francisco Giraldo.

**Abstract:** Currently, one of the worrying problems in vehicular traffic is the large number of cars making left turns at intersections. This phenomenon has generated various challenges in terms of road safety, traffic fluidity and transportation efficiency. To face this situation, today, alternative and innovative solutions are being proposed through the design of unconventional intersections. One of these is the displaced left turn (DLT) intersection. However, given that intersections of this type are few in Peru, it is necessary to evaluate the operational performance of this type of intersections. Therefore, this study evaluates the operability of DLTs using a scenario comparison study based on selected performance measures. For this, the case of a conventional intersection in the city of Lima is evaluated, in which the DLT was implemented in two accesses that have a greater flow of vehicles. The evaluation indicates that the DLT intersection proposed in this study has a high potential to reduce vehicular delays but may increase the number of conflicts. The study concludes by stating that, although the design with DLT reduces vehicular delays by 31.25%, at the same time it has negative impacts by increasing the number of vehicular conflicts by 73.57%. As a recommendation, it is suggested that appropriate safety measures be adopted, which must be designed and put into practice in order to increase the operability of the intersection.

**Keywords:** Climate change; ENSO; glacier mass loss; GLOF; NDWI

Liderazgo en Educación e Innovación en Ingeniería en el Marco de las Transformaciones Globales: Integración y Alianzas para el Desarrollo Integral”, Evento Híbrido, Buenos Aires - ARGENTINA, 17 al 21 de julio , 2023.

<https://dx.doi.org/10.18687/LACCEI2023.11.1084>



# Cine Tauro: a lustful island in the chaos of Lima. Subjects and heritage values around the modern object



**Authors:** Dordan Barboza, K.| Kohama Aréstegui, C.| Suarez Robles, G.| Yalán Reyes, I.

**Abstract:** The objective of this article is to present the development of the investigation of the case: “Cine Tauro: a lustful island in the chaos of Lima. Subjects and heritage values around the modern object”.

The main objective of this research is to understand the reasons why the Taurus cinema, a representative project of the modernity of Peruvian architecture of the early 1960s, remained isolated, decadent and dying in the officially called monumental urban environment of the 20th century of the Fence of Lima.

**Keywords:** Modernity; cultural heritage; assessment

Devenir vol.10 no.19 Lima ene./jun. 2023 Epub 29-Abr-2023

<http://dx.doi.org/10.21754/devenir.v10i19.1457>



# Analysis of the influence of traffic signalization using a stochastic algorithm in the reduction of queues and delays at intersections with high traffic flow



**Authors:** Jhonan Urbano; Fernanda Bassini; Manuel Silvera; Fernando Campos

**Abstract:** The constant increase of vehicular demand at intersections hurts intersection crossing times and queue formation on avenues. This paper presents a microsimulation model using a stochastic algorithm for traffic signal control based on two variables: queue length formation and crossing time delays. To address this problem, a stochastic algorithm is built using Python software with the total lengths of each traffic light cycle and the two variables to be solved (queue formation and crossing delays) as parameters, and the number of iterations to be performed will be included in the algorithm. These variables will be used as key indicators to obtain the green and red-light duration times for each traffic light at both intersections. To validate the effectiveness of the proposed model, different traffic simulations are performed in the intersection section using Vissim 9.0. Using this microsimulation software, it was possible to recreate the behavior of the vehicles that were analyzed using a filmographic record. Different iterations were used to determine the trend of improvement in the model using the results of the algorithm through different phase diagrams used in the microsimulation. By using the first iterations of the times generated by the algorithm, a considerable improvement in the performance of the traffic light control system was observed. A notable decrease in crossing times has been achieved, with reductions ranging between 5% and 9%. In addition, a considerable decrease in queuing has been observed, with a reduction ranging from 20% to 34%.

**Keywords:** queuing, delays, stochastic, algorithm, semaphores insert

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6.

<https://doi.org/10.1109/CONIITI61170.2023.10324268>







# Evaluation of the Compressive and Flexural Strength of Permeable Concrete with Substitution of Fine Aggregate by Glass Fiber in Urban Roads of the Peruvian Highlands

**Authors:** Erik Chavéz; Herber Cuba; Manuel Silvera; Fernando Campos

**Abstract:** Rigid permeable pavements are draining structures that allow the filtration and management of water in a sustainable manner. Unlike traditional systems, this type of material would avoid problems or failures due to surface runoff, ponding, and runoff. However, due to this quality his stamina tends to drop. For this reason, a concrete mix was developed with the use of fiberglass to increase its mechanical properties. The following work shows the analysis and comparison of conventional rigid permeable concrete mixes and with the addition of 1%, 2% and 3% fiberglass instead of fine aggregate, designed with the ACI 255R-10 standard. The results show that the compressive behavior, with respect to the base, increases by 1% and decreases for 2% and 3% (Base concrete: 215.55, Mix 1%: 262.25, Mix 2%: 252.65 and Mix 3%: 235.20). In the same way, the results of flexural resistance show that the base concrete is 30.6 kg/cm<sup>2</sup> and all exceed it, but the one that obtained the most resistance is mix 1 with 35.6 kg/cm<sup>2</sup>, which confirms its influence. of fiberglass augmentation. On the other hand, in the physical property of permeability, the results show more infiltration speed in mix 3 with 1.18 cm/s, where it can be deduced that it is due to the decrease in fine aggregate.

**Keywords:** Pervious Paving, Pervious Concrete, Fiberglass

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6

<https://doi.org/10.1109/CONIITI61170.2023.10324041>



# Feasibility of using Choosing by Advantages to improve multicriteria decision making in the subcontracting of precast concrete slabs in multifamily housing



**Authors:** Lopez De La Cruz, B.I.O.| San Bartolome Rey, B.I.G.| Jorge De La Torre Salazar, M.I.

**Abstract:** Over the past few years, multi-family housing has been subject to increased complexity due to the demand in the housing market. Because of this, the subcontracting of precast concrete slabs is considered a good solution option due to its ample benefits such as time and labor savings. In addition, it is the most widely used structural element for this type of building. However, to obtain these benefits, a proper selection of precast concrete slab subcontractors is necessary. Therefore, it is necessary to have a selection method for the proper development of this process since a wrong decision will generate cost overruns and delays on site. Therefore, this research presents Choosing by Advantages (CBA) as a viable solution. The validation that is given through an expert judgment determines that the factors quality, delivery time and production capacity are the most important in the decision-making process. Finally, a multicriteria decision-making case was made for the subcontracting of precast concrete slabs highlighting the importance of the application of CBA in multi-family housing.

**Keywords:** Feasibility, choosing by advantages CBA, multicriteria decision making, subcontracting, precast concrete slabs, multi-family housing.

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-7

<https://doi.org/10.1109/CONIITI61170.2023.10324029>



# Prediction model by probabilistic methods for the evaluation of variables in underground mining pumping systems of variables in pumping systems in subway mining



**Authors:** Paul Peralta-Rodriguez, Jhonatan Peña-Cajaleón, Humberto Pehovaz-Alvarez, Carlos Raymundo-Ibañez

**Abstract:** Recurrent flooding in the mining works, deficiencies in the operation of pumps, unforeseen stoppages, and lack of water availability in the processes, affect the operations in the subway mine. The traditional solution adopted is to wait for maintenance times for its post evacuation, generating stoppages, consumption of water from the wells and inefficiency in the daily water demand. Therefore, this article presents a new approach that will expand the traditional methods by introducing a prediction model using probabilistic methods. This approach will allow the design of an optimal water distribution system, the efficient control in the maintenance and covering of the recirculated water demand inside the mine. Variables describing problems related to pump flow, pressure zoning and the type of pump distribution, either in series or in parallel in the pumping system, will be determined. Also, an average data of failure and maintenance times was collected and will be introduced to the '@risk' software where a comparison of three probabilistic methods will be generated.

**Keywords:** probabilistic methods, pumping system, subway mining, pumps

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-4

<https://doi.org/10.1109/CONIITI61170.2023.10324154>



# Analysis of Conflicts and Delays of Cyclists, Vehicles, and Pedestrians at a Busy Intersection in Lima Downtown, Peru



**Authors:** Jose Silva, Vera Barua, Manuel Silvera, Fernando Campos.

**Abstract:** In Lima downtown, highly congested intersections with many cyclists and pedestrians can be observed, where conflicts are very common. Therefore, it is important to reduce conflicts to improve the mobility of all users at intersections. At the intersection of Garcilaso de la Vega and 9 de Diciembre avenues, located in the center of Lima, the behavior of the users was observed, especially that of the cyclists, where the spontaneous routes they have adapted to cross the intersection more quickly were visualized. In this study, two scenarios were evaluated: The first scenario used the current fixed traffic light cycle as the geometry of the location, and it also represented how cyclists cross through unplanned routes. In contrast, the second scenario involved adaptive traffic lights and formalized two routes for cyclists, allowing them to choose more than one alternative depending on the phase they are in when crossing the intersection. The Vissim software was used for modeling, and the SSAM methodology was employed for comparison, which counted the number of conflicts. As a result, the second scenario showed 18% fewer conflicts among users. Additionally, cyclists experienced 18% less delay.

**Keywords:** cycle lane,, intersection,, traffic conflicts, crossing delays, crossing routes, adaptive traffic light

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6

<https://doi.org/10.1109/CONIITI61170.2023.10324228>



# A system for detecting objects and estimating their distance using a neural network



**Authors:** Joan Salcedo; Nehemias Ramos; Leonardo Vincas; Dante Vargas

**Abstract:** This article proposes using neural networks to solve the challenge of accurately measuring the distance of an object using cameras and digital image processing. For this, a neural network was trained using a data set that includes information on the distance in pixels of the centers of mass of the object detected by the cameras. This data was used to teach the network to make an accurate estimate of the actual distance of the object. Image analysis methods were also used in conjunction with images of the object previously captured and trained with YoloV8 on Roboflow. The results obtained showed a notable improvement in the precision that is obtained when measuring the distance without the tedious calibration that is had in the other approaches considered for this investigation. Overcame the challenges associated with camera calibration due to possible distortion, accuracy, and generalization generated by changing the environment, resulting in an effective solution with 90% accuracy percentage and a dense neural network with an input layer, a hidden layer and an output layer with 2000 training cycles. These results demonstrate the potential of neural networks and image processing to address distance measurement problems in various applications, such as robotics, road safety, and autonomous navigation.

**Keywords:** Raspberry, YOLOv8, Image Processing, Neural Networks, Object Detection, Distance, Mass Center

2023 IEEE XXX International Conference on Electronics, Electrical Engineering and Computing (INTERCON), Lima, Peru, 2023, pp. 1-8

<https://doi.org/10.1109/INTERCON59652.2023.10326063>





# Evaluation of the visibility distance with the Istram program on third-class roads with a high accident rate



**Authors:** Barzola, Luis; Colán, Fátima; Silvera, Manuel; Campos, Fernando; Silvera, Manuel; Palacios-Alonso, Daniel

**Abstract:** In Peru there are many roads where accidents occur due to their inadequate geometric design. The traffic accidents with the most incidents are of the side collision or collision type with a percentage of 42.73%, and distraction with 20.19% [1]. This shows that it is necessary to carry out a redesign on this road that seeks to reduce the percentage of accidents in the area. For the case study, a section of a 3km highway located in Santiago de Chuco, north of the city of Lima, was used. Thanks to the photogrammetric record of the current state of the road, sectors with geometric deficiencies were identified, such as visibility distance and safety in terms of precariousness in the use of signaling. Likewise, the evaluation carried out in the stopping and overtaking visibility distance concludes that with a constant speed of 30 km/h there are stretches or sections that do not meet the necessary distance for its route.

**Keywords:** photogrammetry, visibility distance, roads, accidents.

Leadership in Education and Innovation in Engineering in the Framework of Global Transformations: Integration and Alliances for Integral Development”, Hybrid Event, Buenos Aires - ARGENTINA, July 17 - 21, 2023

<https://dx.doi.org/10.18687/LACCEI2023.1.1.500>



# Vehicular Conflict Assessment on a Road with Lane Reduction Using the SSAM Methodology



**Authors:** Diaz Crespo, Mariana Alexandra; Blas Cadillo, Silvia Rocío; Gonzales Baldeon, Shirley Alexandra; Damián Esperilla, Nicole Stefany; Giraldo Malca, Ulises Francisco

**Abstract:** In this article, an evaluation of the number of vehicular conflicts is carried out, in a section of road that is part of a traffic light intersection, with constant presence of traffic jams. In the trajectory of this section there is a reduction in lanes, variable lane widths and little uniformity, causing a bottleneck that produces different types of conflicts between vehicles. To carry out the evaluation, the VISSIM microsimulation software was used, here the real situation of the intersection is modeled and two new scenarios are proposed, in which geometric redesign proposals are made in the infrastructure of the section of road, in order to analyze variability in the number of vehicular conflicts. For the automatic counting of conflicts, the Surrogate Safety model (SSAM) is used. Vehicular conflicts are categorized according to their crossing collision angle (crossing), rear end collision angle (rear end) and lane change (lane change), and their severity levels in relation to the time before collision (TTC). The results indicate a count of 3916 conflicts in the microsimulation of the real situation. In the first proposed scenario, 2,231 conflicts were counted, which corresponds to a 43% reduction in relation to the current situation; while in the second scenario 3,835 conflicts were counted, a reduction of 2%. The TTCs ranged between 0.52 and 0.70, indicating a high risk of collision on the road.

**Keywords:** microsimulation, vehicular conflicts, VISSIM, SSAM, road safety.

“Leadership in Education and Innovation in Engineering in the Framework of Global Transformations: Integration and Alliances for Integral Development”, Hybrid Event, Buenos Aires - ARGENTINA, July 17 - 21, 2023.

<http://dx.doi.org/10.18687/LACCEI2023.1.1.499>



# Evaluation of the operational performance of unconventional intersections with high traffic flow



**Authors:** Steve Saavedra; Paola Comingez; Manuel Silvera; Fernando Campos

**Abstract:** Currently, one of the worrying problems in vehicular traffic is the large number of cars making left turns at intersections. This phenomenon has generated various challenges in terms of road safety, traffic fluidity and transportation efficiency. To face this situation, today, alternative and innovative solutions are being proposed through the design of unconventional intersections. One of these is the displaced left turn (DLT) intersection. However, given that intersections of this type are few in Peru, it is necessary to evaluate the operational performance of this type of intersections. Therefore, this study evaluates the operability of DLTs using a scenario comparison study based on selected performance measures. For this, the case of a conventional intersection in the city of Lima is evaluated, in which the DLT was implemented in two accesses that have a greater flow of vehicles. The evaluation indicates that the DLT intersection proposed in this study has a high potential to reduce vehicular delays but may increase the number of conflicts. The study concludes by stating that, although the design with DLT reduces vehicular delays by 31.25%, at the same time it has negative impacts by increasing the number of vehicular conflicts by 73.57%. As a recommendation, it is suggested that appropriate safety measures be adopted, which must be designed and put into practice in order to increase the operability of the intersection.

**Keywords:** intersections, unconventional, DLT, displaced left turn, traffic data, operational performance

2023 Congreso Internacional de Innovación y Tendencias en Ingeniería (CONIITI), Bogotá, Colombia, 2023, pp. 1-6

<https://doi.org/10.1109/CONIITI61170.2023.10324025>

