An aerial view of a city intersection illustrating smart infrastructure. The image features several cars, a truck, and pedestrians. Overlaid on the scene are various icons: Wi-Fi symbols, cloud symbols, and circular detection zones. Labels include 'INTELLIGENT SIGNALS' on the left and right, 'PEDESTRIAN DETECTION' on a crosswalk, 'VEHICLE DETECTION' near a red car, and 'NETWORKED' along a road edge. The central text reads 'SAFE SYSTEM FOR INTERSECTIONS TOWARDS "MOBILITY CITY"'.

SAFE SYSTEM FOR INTERSECTIONS TOWARDS "MOBILITY CITY"

ZAHER MASSAAD

INTRODUCTION

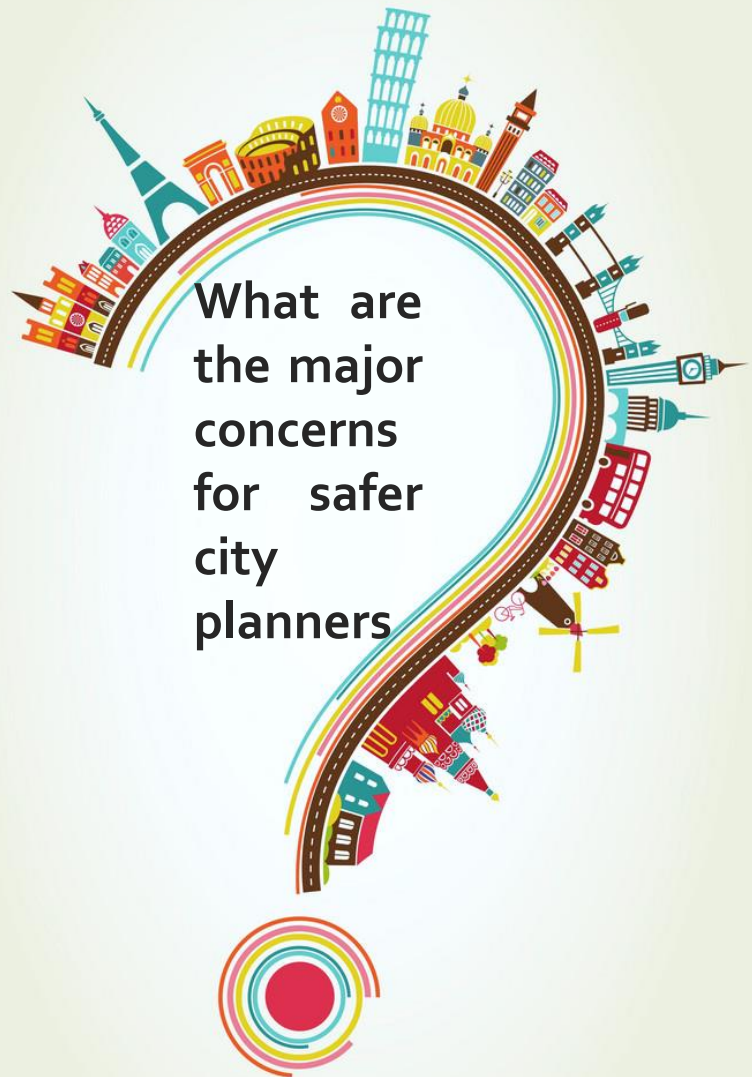


WHAT IS SAFE SYSTEM INFRASTRUCTURE

System DESIGNERS and OPERATORS need to take into account the limits of the human body in designing and maintaining roads, vehicles and speeds.



ROAD SAFETY PROBLEM



1

- Where are the Risk

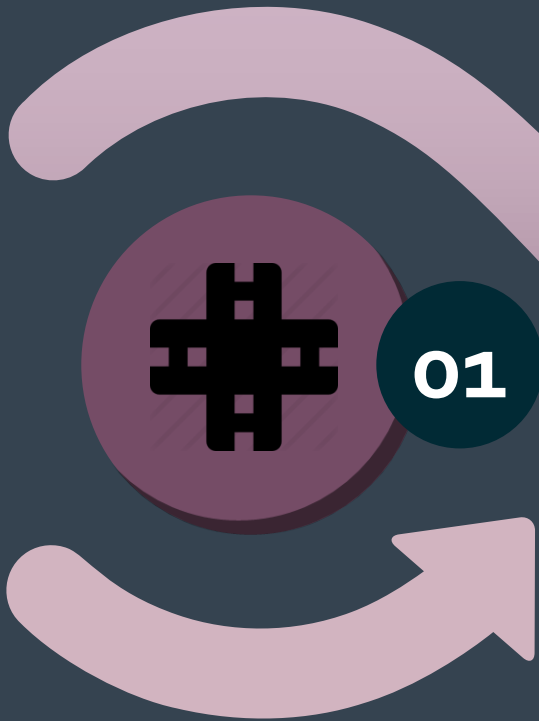
2

- What is the Required Fix

3

- How to protect Vulnerable citizens (Ped. & cyclist)

INTERSECTION DESIGN PRINCIPLES



INTERSECTION CRASHES
ACCOUNT FOR MORE
THAN 25% OF SEVERE
INJURIES.



SAFE SYSTEM
INTERSECTION
DESIGN PRINCIPLES



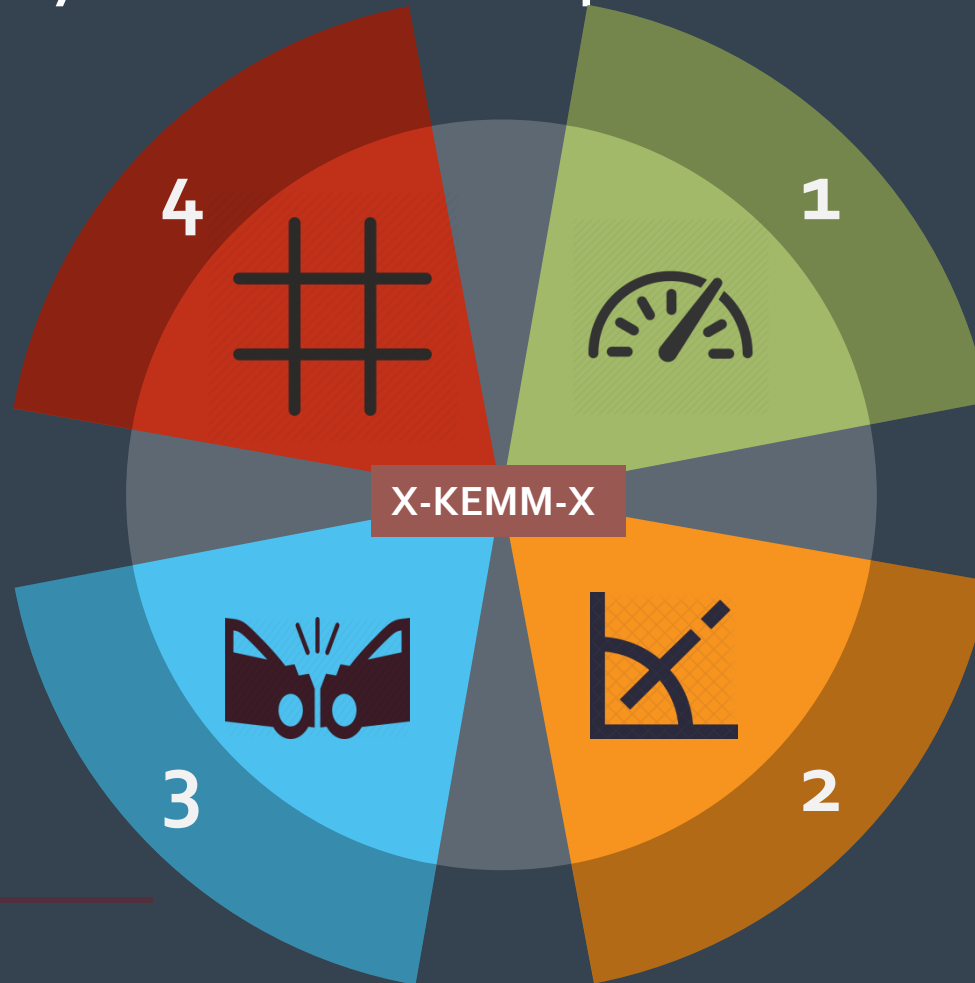
FOR ALL
ROAD
USERS



INTERSECTION DESIGN PRINCIPLES

Recent international research has highlighted the importance of analyzing the critical aspects of safe system intersection performance

Kinetic Energy Management Model for Intersections



Influence of Change in speed during Impact

Considering multiple conflict points at a given intersection design

Effect of expected impact angles

Key crash configurations (frontal, near-side, far-side, rear, pedestrian)

Relative FSI Probabilities | KEMM

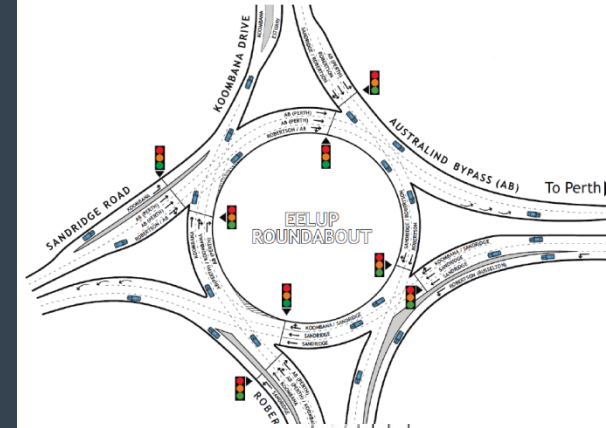
01

Signalized intersection with safety platforms



Signalized Roundabout

02

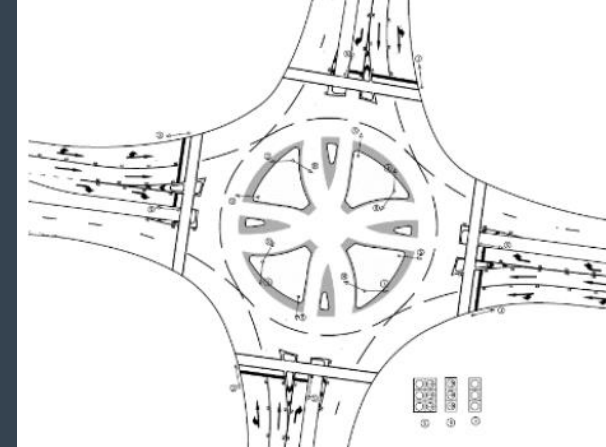


03

Roundabout with safety platforms

Cut-through signalized intersection

04



Relative FSI Probabilities | KEMM

Signalized intersection with safety platforms



IMPROVING OPERATIONAL EFFICIENCY

THE EFFICIENT APPROACH TO TMO



IMPROVING OPERATIONAL EFFICIENCY



SMART TRAFFIC OPERATION MANAGEMENT

1

Predictive safety analytics that incorporate continuous measurement of multimodal users, including pedestrians and cyclists

2

Active safety measures that detect when there's a safety risk and that respond accordingly

IMPROVING OPERATIONAL EFFICIENCY

Vehicle Conflict Analysis

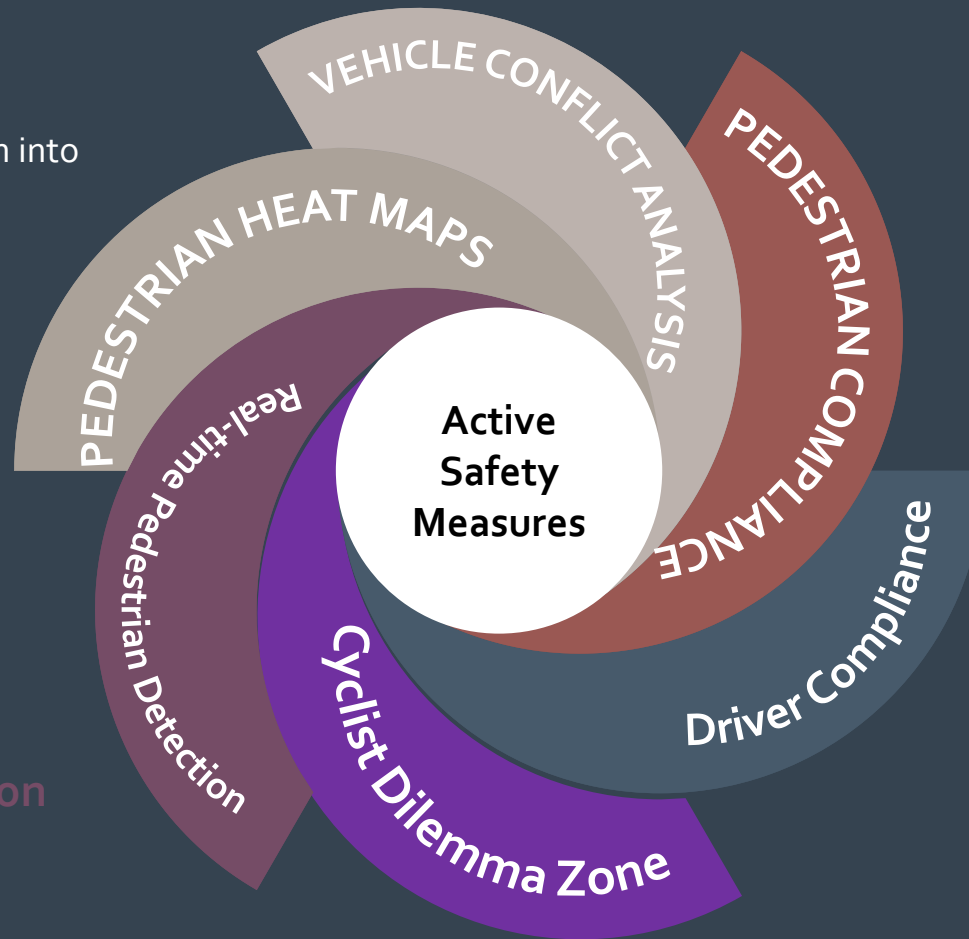
discover traffic dangers before they turn into accidents

Pedestrian Heat Maps

Pedestrian heat maps visualize pedestrian behavior and compliance

Real-time Pedestrian Detection

Continuous V2I messages alerting of pedestrian presence



Pedestrian Compliance

Measure pedestrian compliance (Jaywalking)

Driver Compliance

Driver compliance measurements (Crosswalk interference, red light running)

Cyclist Dilemma Zone

Extend green for cyclists caught in dilemma zones

THANK YOU

PEDESTRIAN
DETECTION

VEHICLE
DETECTION

INTELLIGENT
SIGNALS

INTELLIGENT
SIGNALS

NETWORKED

