



1- Project Title:

An Asphalt Pavement Mix Design Using Available Aggregate in Eastern Province

Students:

Bader Saud AlRushaid, Ammar Hamad AlHammad, Shaher Tariq AlAnsari

Advisors:

Dr. Sami Abdalla Osman; Dr. Mohammed Abubakar Dalhat

Abstract:

Asphalt Mixtures is a homogeneous mixture of paving materials such as bitumen and aggregate of different sizes. Improving pavement performance is a complex and ongoing challenge. The researchers are working to address this challenge through experimental and theoretical works worldwide by utilizing additives to improve the asphalt mixture properties. The aim is to improve pavement performance, which means increased pavement durability and reduce life-cycle cost. This report presents experimental results and data on hot mix asphalt (HMA). Mechanical properties of aggregate from various source of eastern province of Saudi Arabia is being investigated. The variation aggregate properties with source and it effect on properties on HMA properties is being investigated.

Despite the expansion of the road network in the eastern region of the Kingdom of Saudi Arabia, but there is a phenomenon that legislates the attention of those interested in the performance of roads, which is the deterioration of the surface layer compared to the design age of the road, where can be found after a short time of construction of the road, that most of the defects of paving start to appear, especially holes, rutting and cracks.

Various aggregate tests have been carried out. Then asphalt mix has been desined and developed using different aggregate sources (from 10 sources) around the Eastern Province. Mix performance and properties such as: rutting, fatigue cracking, stability, density, air voids, voids in mineral aggregate, voids filled with bitumen, flow of mix all these properties have been tested and evaluated. Conclusions and Recommendations were generated based on the findings and reported. The conclusions come to answer this some important question that: why is the deterioration of roads in the eastern region



compared to the age of design? Is the defect in the materials of mixture component? or in the climate factors?

2- Project Title:

Development of a pavement condition assessment system

Students:

Ali Hassan Alahmed; Murtadha H. Albin Ahmed; Abdulrahman Abdullah Aldakhil

Advisors:

Dr. Wael M. Eldessouki; Dr. Sami A. Osman

Abstract:

Ride quality has been known as influence by pavement condition, but it is less clear how exactly pavement conditions are related to traffic crashes. Improving road safety through proper pavement maintenance is one of the goals of pavement management. Various studies results have been published examining the influence of road conditions on the accident occurrence and to characterize the correlations between different parameters of pavement engineering characteristics PCI, Skid resistance, PSI, and others compared with number of accidents.

The project aim is to design and develop a simplified system for pavement condition assessment to be utilized by stakeholders in municipalities and local authorities which will enable early detection of pavement distress and allow for preemptive actions that can avoid an expensive pavement rehabilitation in future.

The work focused on two types of distress. The first is road longitudinal roughness and the second is lateral rutting. Roughness is a condition parameter used to characterize deviations from the intended longitudinal profile of a road surface. Roughness data is typically measured with an Ultrasonic profiler installed into a purpose built survey vehicle. An IRI score is recorded for each section of road, and this data is averaged out over the length of each road segment. Road profile was measured by three Ultrasonic sensors combined with GPS recorder installed on one side vehicle that assist on calculating International Roughness Index (IRI) for the measurement of road longitudinal roughness. Measurement of lateral rutting is done by an installed camera



and laser on the back of the vehicle combined with rotary encoder fixed on one of the back wheels. Captures taken every certain distance by camera along with image processing will carry out the calculation of the lateral rutting. The output of the system will be compared with Ministry of Transportation (MOT) results and it will be represented visually through a geographic information system.



3- Project title:

IAU Female's Campus Al-Rayan Transportation Master plan

Students:

Abdullah Eldausry; Saleh Ahmed Alderah; Sami Albadiri Aljadaan; Mansour Alhallafi

Advisors:

Dr. Farhan Mohamme Butt; Dr. Ashaar Ahmed

Abstract:

Study of IAU Al-Rayan Campus master plan is being carried out for existing and future stage investigation of traffic movement pattern along Al-Rayan campus. The Campus is located at downtown of Dammam city with traffic demand coming from residential area, schools, and some market stores. Traffic volume data was collected near the vicinity of campus both inside and outside. State of the art simulation software “Vissim” was used to simulate both existing base model and future scenarios. A Validated and calibrated model was developed inside Vissim using traffic volumes, vehicle delays and travel time information from selected locations of the campus. For future scenarios, demand forecasting was carried out using survey questionnaires, building capacities and vehicle occupancy rates. For safety aspect, road safety audit was carried out along with auto turn software at major roads, intersections, and parking areas inside campus. This study showed improvements were observed in parking distributions and travel time along with the reduction in vehicle delays and congestions both inside and outside the campus.

4- Project title:

ROAD SAFETY AUDIT, RIYADH DRY PORT AREA

Students:

Ahmed Abdulhamid Almunif and Yazeed Farraj Alqahtani

Advisors:

Dr. Farhan Mohamme Butt; Dr. Dr. Sami, Dr Al Mojil and Dr. M. A. Dalhat



Abstract:

The project presents a comprehensive road safety audit (RSA) conducted for the Riyadh Dry Port and the roads in the vicinity. Riyadh dry port as part of port business attracts and produces a lot of freight trips to and from the port area. The trips include a good mix of traffic, most of it including freight trucks as well as some proportion of cars. The frequent movement of trucks and automobiles poses serious safety concerns especially with respect to design standards of transportation facilities in port vicinity. Riyadh Dry Port is a dry port in the city of Riyadh. It is the largest inland port in Saudi Arabia. The port is located on off Exit 16 in Al Malaz, adjacent to the Riyadh railway station. Riyadh Dry Port covers an area of 918,639 m² and accommodates six 6,480 m² warehouses. The main Objectives of the project are to: conduct a comprehensive RSA to identify design related safety issues and will suggest improvements as per standards (GCC\ASSHTO\HSM\MUTCD) and specifications; to analyze the causes of various traffic safety related issues and to provide recommendations for the improvement of the dry port area in terms of road safety. The scope of the works has been divided into four parts as: Road Safety Audit; Freight Movement design consideration; Geometric design consideration; Traffic sign and pavement marking consideration. As part of the RSA, assessment on offsets identified from design standards and specifications conducted for the dry port area including implementation strategies. This was done with regards to traffic crashes; some of the methods employed included collecting data on traffic volumes, speeds, travel times, traffic crashes, and conducting the road safety audit. These methods helped develop several countermeasures which targeted to reduce crashes and the severity levels associated with them, and hence improve the overall traffic safety situation in the area. For the pavement condition survey, it can be concluded that based on the PCI ratings: there are three very poor sections which are 1,4 and 9. Three poor sections which are 2, 3 and 6. And three fair sections which are 5, 8 and 10. And only one Good section which is 7. Therefore, to improve the dry port performance and pavement conditions quality of pavement must be considered first by rehabilitation of the existing pavements, some section must be removed and repaved. Also, consideration should be taken to pave containers yards with rigid pavement.

جامعة الإمام عبد الرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY





Title: IAU Main Campus Parking & Transportation Master-plan

Students: Abdulmuohsen Alsaqyan, Ahmed Alarfaj, Maged Mtaafi, Soliman Alahmadi

Advisor: Dr. Wael ElDessouki

Abstract:

Master plan is a study which include designing and optimizing the future state based on data and analyses from the current situation. This Study will be focusing mainly on enhancing the transportation performance and evaluating the current and future parking needs. Imam Abdulrahman Bin Faisal University is one of the recent founded universities in KSA, it was a branch of King Faisal university 9 years ago, since that IAU is developing with high expectations. IAU Main Campus total area is around 3.3 Km². The next decade is promising for the university because there will be Large expansions and developments. Therefore, the future demand will expand as a result of the growth of the university. Moreover, a new traffic will be added gradually after allowing the female to drive. All the added traffic must be organized in future to avoid congestions and insure a smooth movement inside the main campus. The project aims to micro simulate the existing and the future situation by building a micro simulation model using PTV Vissim. The model should reflect the outcomes of the project and show simulation scenarios for the future expansion based on data calculated in the base year. Observing the future problems on the model gives the opportunity to recommend traffic solutions and show results. Females driving scenarios are taking a big part of the master plan because there will be a tremendous change in traffic and the future traffic estimation can't be estimated easily. In this study a Site Safety Assessment has been conducted to ensure the safety in the two campuses by evaluating geometric design of the existing roundabouts and speed limit enforcement. If The outcomes of this project is implemented the university's network performance will improve.