

OPENING SPEECH

**YB TUAN BARU BIAN
MINISTER OF WORKS, MALAYSIA**

**PIARC INTERNATIONAL SEMINAR ON
TOWARDS ADVANCED TECHNOLOGY AND MATERIAL IN
BRIDGE ENGINEERING**

**Sunway Putra Hotel
1 April 2019 (Monday)**

[Final salutations to be provided on event day]

Distinguished guests and Speakers,
Members of the media,

A very good morning to the bridge engineering fraternity who have come from far and wide present here this morning.

1. It is a great honour for me to be here with all of you today at the PIARC International Seminar, hosted by the Ministry of Works, Public Works Department (JKR) and World Road Association (PIARC) in collaboration with the Road Engineering Association Malaysia (REAM).

2. I would like to take this opportunity to thank the organizing committee of the **PIARC INTERNATIONAL SEMINAR ON**

“TOWARDS ADVANCED TECHNOLOGY AND MATERIAL IN BRIDGE ENGINEERING” for inviting me to deliver the opening speech today. It is indeed a great pleasure and a privilege to be amongst this distinguished audience, comprising experts, senior public-sector officials and captains of industry in the fields of bridge engineering.

3. Before I proceed, let me extend to all our international guests a very warm welcome to Malaysia. **“Selamat Datang”** **“Anun bala?” (How are you?)**. I am very pleased to note that there are about 300 professionals from 16 countries represented here. It is a very impressive number. I would like to cordially thank all of you for coming to Malaysia and participating in this seminar.

4. I am pleased with the support and response by the local and international industry players and am confident your presence here in Kuala Lumpur will be a fruitful experience and that this seminar will be yet another great success. My sincere congratulations to the Organizing Committee for their efforts in making this seminar a resounding success in terms of participation and organizational professionalism.

INTRODUCTION

Ladies and Gentlemen,

5. Bridge Engineering is one of the many aspects of structural engineering. Bridges are key structures that serve our communities in different aspects. They are vital linkages for transportation networks but can also become iconic symbols of a city. Therefore, an efficient and reliable transportation system which includes advanced bridge engineering technology is key towards better regional cooperation and wealth creation among nations.

6. This seminar's theme is ***Towards Advanced Technology and Material in Bridge Engineering*** supported concurrently by the PIARC Technical Committee Meeting, thus adding the much sought after international flavour to the event. The theme is timely, considering the backdrop of escalating cost worldwide in providing bridge engineering consultancy services towards-sustainable construction for the future.

7. Over the years, innovative and advanced technology has arisen far and wide in the construction industry and the bridge engineering sector is no exception. This advancement in technology covers the design, construction, and maintenance stages and also materials technology.

8. This seminar provides a great platform for the experience of 23 experts and lessons learned in the planning, design, construction maintenance, and rehabilitation process to be disseminated and shared among its participants. In addition, the organizers have also invited speakers with extensive knowledge on the breakthrough technologies applied in bridge engineering to share their expertise and experience. I wish to take this opportunity to thank the speakers for accepting our invitation to come and share your knowledge and experience.

9. Credit goes to the Public Works Department (PWD), as the technical arm of the Government, which has been entrusted to play a key role, not only in the planning, design and construction of bridge infrastructure in Malaysia, but also in establishing world class quality, cost effectiveness and best practices. The PWD also acts as the Secretariat to the committee in formulating policies by providing systems, standards and technical consultancy.

ROLE AND RESPONSIBILITY

Ladies and Gentlemen,

10. Section 83 of The Road Transport Act 1987, states that the Ministry of Public Works with the Public Works Department (PWD) is the custodian of federal roads and bridges in Peninsular Malaysia.

11. The Malaysian government through the Ministry of Works has carried out a series of studies to ensure that the existing federal bridge stocks are systematically maintained and professionally managed. The National Axle Load Study carried out in 1985 until 1990 showed the limitation of loading capacity of bridges to be a major constraint on federal roads if heavier permissible truck loads is to be allowed.

12. In 2014, an Axle Load Study of Bridges on Federal and Major State roads in Peninsular Malaysia was initiated to confirm the capacity of the bridges to take current traffic loads. As a result of these studies, the Government of Malaysia has made available a sizeable amount of financial resources to rehabilitate or replace bridges that were below the recommended axle load capacity. Work started in the early 90's and continues until today.

13. The rehabilitation and replacement works are needed to address the increase in traffic volume as the needs of the transportation industry requires that the loading capacity be

increased from 8 tonnes to 12 tonnes for roads and bridges, and widening of the road from 2 lanes to 4 lanes. The Weight Restriction Order (WRO) which started in the year 1989, and updated in 1991, 2003 and 2018, will continue to be reviewed to meet the demand due to these increases.

14. To manage the stock of bridges under our care, in 1988 PWD started undertaking an in-house development of a Bridge Management System (BMS) which is finally called the JKR BMS. The JKR BMS provides significant improvement to the collection of bridges' database which started off with using the traditional card system. The new system is computer based and was developed to keep relevant bridge data. The system is still being used with continual improvement to it.

15. The data for the JKR BMS program is collected through bridge inspections at regular interval. For this purpose, starting in 1995, an Annual Mandatory Bridge Inspection (AMBI) programme was launched by PWD Malaysia. A simple bridge inspection manual was published to guide inspectors in doing the bridge inspection. The data collected is scrutinised and then validated and systematically fed into the JKR BMS.

HISTORY OF BRIDGES

Ladies and Gentlemen,

16. Bridge structure types have been evolving throughout history. The uniqueness of the bridge structures lies in the selection of their design solution in coherence with functionality, environmental and geographical constraints, traffic networking and of course economic viability of the projects.

17. In the early years of bridge design, most of the bridges in Malaysia were conventional bridges, comprising of RC and Precast RC Beams. In the 1960's Prestressed Concrete beams were used, followed by the box girder in the 70's which then evolved to cable stayed bridges in the 1980's until now. Nowadays, integral bridges are commonly being constructed.

18. There are about 9500 number of crossings that comprises of road bridges, culverts, viaduct and pedestrian crossing in Malaysia. In ensuring public safety and ride quality, PWD continues to assess, repair and replace bridges on Federal Roads in Peninsular Malaysia which up till year 2010, has involved a total 554 bridges and amounting to RM1.6 billion.

19. In recent years, there has been significant increase in development expenditures in Malaysia to cope with the demands of a rapidly expanding economy. For instance, mega projects such as the Pan Borneo Highway, Central Spine Road and West

Coast Highway which are being constructed to overcome traffic congestions due to bottleneck problem, and to provide better infrastructures and accesses. These highways and expressways comprise of flyovers and bridges along the routes in order to improve the existing infrastructures and act as impetus for growth for the natural lands.

20. Moving forward to the future, sustainable and eco-friendly construction are also taken into account, such as the Rawang Bypass Project which is being built not only to overcome the traffic problem, but with care and expert planning, the elevated structure also serves to conserve the forest reserve with minimal impact to the environment.

BRIDGE ENGINEERING TECHNOLOGY

Ladies and Gentlemen,

21. In the digital age today, the adoption and adaption of new technologies and innovations is no longer an option but a necessity in our quest to enhance the productivity of the construction industry. As the world is evolving in terms of new state of the art technologies, the bridge industry is not excluded from catering to sustainable and greener construction of the bridges. The use of advanced technologies is the way forward

and we cannot afford to be left behind as Industry Revolution 4.0 and the Internet of Things continues to take shape around us as well as across the entire construction value chain.

22. Technology in the modern world is fast growing. In embracing technology, this is the platform that I am confident can yield great potential to assist us in sharing and delivering more innovative, and cost-efficient commissioning of bridges infrastructure.

Ladies and Gentleman,

23. The art of bridge design has evolved through the acceptance of well-established practices, codes and construction techniques. In fact, when new materials or methodologies are brought into the market, it often takes many years for the techniques to gain inclusion in the modern practice of bridge design.

24. In Malaysia, we also adopt the concept of Design for Maintenance. The maintenance of expansion joints and bearings in bridges has incurred huge expenses besides causing inconvenience to road users. In order to reduce these problems, PWD has proposed integral bridges to be constructed for

structures with a total length of less than 60m with skew angles not exceeding 30 degrees.

25. The elimination of expansion joints from bridges as a consequence of adopting integral bridge concepts has made it possible to accomplish the desirable design objectives such as long term serviceability of the bridge, minimal maintenance requirements, economical construction, improved overall performance of the facility and durable structure.

26. Nowadays there are many products to choose from in the market to cater to a more durable, aesthetically pleasant and eco-friendly product. In order to make our bridges environmentally friendly, longer spans are being used and lesser piers are being built in the rivers. Durability of the structures also plays a major part in design consideration and is closely related to the material used in the construction of bridges. Where bridges are located in aggressive environments, where other works are prone to chlorides, sulphate or any other detrimental effects that may cause durability issues, the use of High Performance Concrete is being used in order to preserve the integrity of structures from deterioration and damage.

27. Since 2005, PWD has revised the Concrete Specification to insist on higher grade and impermeable concrete in ensuring structures are more durable and have longer life cycles.

BRIDGE ENGINEERING HARDWARE AND SOFTWARE

Ladies and Gentlemen,

28. The Ministry of Works is moving towards “digitalising the construction industry” which aims to focus on upgrading and to optimise productivity in the construction industry through technology to push forward the initiatives of technology advancement, digitalisation and innovation. It is not merely just about the development of mechanisms, software and robotics but also to provide accurate data, real-time information and more efficient systems.

29. Technology and innovation such as drones in bridges inspections provide more quantitative data, and are safer, faster and can be used at lower cost. Drones are capable of collecting far more detailed inspection data compared to snoopers and other more traditional inspection equipment and can collect data without interfering with traffic. One of the various examples of drone utilisation is by Tenaga Nasional Berhad (TNB) which started using drones to perform aerial patrolling and inspection

of their grid infrastructure. Drones increase the visibility of grid equipment conditions and reduce the safety risk for maintenance staff. These new technologies inadvertently cater for factors such as time and cost-saving effectiveness, sustainable construction methods and materials, durability, aesthetics, site constraints and reduction of waste and fatality.

30. Advanced Computational Modeling (ACM) is a powerful tool for both the conceptual and design development phases. As bridge forms become increasingly more complex, up-to-date software can be used to quickly investigate form-finding and generate various geometrical options. As part of this process, the software platform can be used to refine and economize the design and promote early understanding of the structural behavior, visual appearance, fabrication complexities and sustainability issues.

31. These software packages, ubiquitous within the design community, facilitate development of forms that can be quickly exported into a structural analysis package and assessed for preliminary sizing and behavior. The ability to produce early 3D images and renderings is also important, not only for consolidating the design done by the team but also for producing visual graphics for clients, competitions and media.

32. Infrastructure projects today have become more complex. In addition, more than ever, operational and cost efficiencies are increasingly critical to the success of any project. In this environment, Bridge Information Modelling (BIM) is the way forward to escape the inefficiency traps of traditional design tools and workflows.

33. Changes caused by the global adoption of emerging digital technology in the design, construction and management of infrastructure assets have led to radical changes, resulting in greater efficiency, economy, adaptability and sustainability in the way our infrastructure is delivered and operated.

34. It is important to note that this process continues through the design development and is a tool rather than a driver of the design, and controlled through a collaborative and integrated process with the entire design team. Future demand for infrastructure including bridges have to take into account not only the demography but also multifaceted topography of the community including special needs users and an ageing society.

CONCLUSION

To our guests from abroad, participants, delegates and colleagues,

35. I invite all of you to seek partnerships and alliances with Malaysian companies to pursue ventures not only in Malaysia but also within the region and the world. I am hopeful you will all benefit from this meeting of minds, market of ideas and derive opportunities at this conference which will result in collaboration amongst the industry players in Malaysia and the region.

36. Without a doubt, modernization and the new technologies of the bridge infrastructure industry form the way for us to move forward. This PIARC seminar today marks an important platform, not just for the bridge industry in Malaysia, but also abroad, as we come together to share our expertise and drive technology and innovation in construction.

37. I am certain that the conversations we start and the knowledge that will be imparted here today and for the next two days will continue even after the end of the seminar. I wish to once again thank the distinguished speakers for their time and commitment in being a part of this seminar. To all delegates from abroad, I hope your stay here will be an enjoyable one and one that is not to be forgotten.

38. I would sincerely like to wish the ***PIARC International Seminar On “Towards Advanced Technology And Material In Bridge Engineering 2019”*** success in achieving its goal.

39. On that note, ladies and gentlemen, I take great pleasure in declaring the ***PIARC International Seminar On “Towards Advanced Technology And Material In Bridge Engineering 2019”*** officially open.

Thank you