Capacity Building for the Rural Road Research Centre in Myanmar

Final Report

Council for Scientific and Industrial Research (CSIR), South Africa

MYA2153A

June 2020

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Cover photo: Staff of the DRRD’s Research and Development Unit / B Verhaeghe (16 November 2018)

Quality assurance and review table

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<td>M Abedin, ReCAP PMU N Leta, ReCAP PMU</td>
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# Contents

Abstract.................................................................................................................................................. iv  
Key words............................................................................................................................................... iv  
Acronyms, Units and Currencies ........................................................................................................... v  
Executive summary.................................................................................................................................. vi  
1  Background ......................................................................................................................................... 7  
2  Objectives ......................................................................................................................................... 8  
3  Approach/Methodology and Results Achieved ................................................................................... 9  
   3.1  Inception Phase .............................................................................................................................. 9  
   3.2  Training of RDU Senior Staff in South Africa ................................................................................ 11  
   3.3  Training of RDU Staff in Myanmar ............................................................................................... 14  
   3.4  Stakeholder Workshop .................................................................................................................. 16  
4  Other Activities .................................................................................................................................... 17  
   4.1  Drafting of Project Concept Notes .................................................................................................. 17  
   4.2  Extended Abstract for TRB Conference on Low-Volume Roads .................................................. 19  
   4.3  Exploration of Additional LTPP Sections near Yangon ............................................................... 19  
   4.4  Updating of RDU Business Plan ................................................................................................... 20  
   4.5  Assistance with Prioritisation of Laboratory Equipment ............................................................. 20  
   4.6  ReCAP Articles ............................................................................................................................. 20  
5  Milestones and Delivery Dates ........................................................................................................... 21  
6  Identified Risk...................................................................................................................................... 22  
7  Way forward ....................................................................................................................................... 22  
8  References.......................................................................................................................................... 23  
Annex 1  Capacity Building Programme: RSU Staff Training in Myanmar ........................................... 24  
Annex 2  Extended Abstract for the 12th TRB Low-Volume Roads Conference .................................... 34  
Annex 3  ReCAP Article.......................................................................................................................... 39
Abstract

The Asia Community Access Partnership (AsCAP), funded by a grant from the UK Government through the Department for International Development (DFID), aims to promote safe and sustainable rural access in Asia through research and knowledge sharing between participating countries and the wider community.

Based on the outcomes of project-scoping studies undertaken in three AsCAP countries (Bangladesh, Myanmar and Nepal), the need for the establishment of road research capacity within the partner government departments was identified as a high priority to support and sustain research and knowledge management related to rural access. Business plans for the establishment of research capacity in the three countries were drafted in 2017.

Following the completion of the Research and Development Unit (RDU) Business Plan for Myanmar (ReCAP RAS2117A), it was agreed by the Department of Rural Road Development (DRRD) that a Rural Road Research and Development Unit (RDU) would be established, which would focus on research into rural road infrastructure and transport services in Myanmar. To support the establishment of the RDU, AsCAP initiated a project to build capacity among the staff at the newly established RDU facility of the DRRD.

This Final Report presents an overview of the interactions and activities undertaken since project initiation (October 2018). It provides a summary of the first visit to Myanmar undertaken in November 2018, the training provided in South Africa during March and April 2019 and the second visit to Myanmar during May-June 2019. It also addresses the updating of the RDU Business Plan, the finalisation of project concept notes, and the drafting of an extended abstract and article.

As a result of several logistical challenges, including as a result of the COVID-19 pandemic, the Stakeholder Workshop has been postponed to a future date. The outcomes of this Workshop will be presented in a subsequent report.

Key words

Rural Roads, Research Centre, Capacity Building, Research & Development, Knowledge Management, Laboratory Management, Field Studies
Acronyms, Units and Currencies

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Executive summary

The Asia Community Access Partnership (AsCAP), funded by a grant from the UK Government through the Department for International Development (DFID), aims to promote safe and sustainable rural access in Asia through research and knowledge sharing between participating countries and the wider community.

Based on the outcomes of project-scoping exercises undertaken in three AsCAP countries (Bangladesh, Myanmar and Nepal – see map below), the need for the establishment of road research capacity within the partner government departments was identified as a high priority to support and sustain research and knowledge management related to rural access. Business plans for the establishment of research capacity in the three countries were drafted in 2017.

Following the completion of the Research and Development Unit (RDU) Business Plan for Myanmar (ReCAP RAS2117A), it was agreed by the Department of Rural Road Development (DRRD) that a Rural Road RDU would be established, which would focus on research into rural road infrastructure and services in Myanmar. To support the establishment of the RDU, AsCAP initiated a project to build capacity among the staff at the newly established RDU facility of the DRRD.

In the Inception Report (Verhaeghe & Ventura, November 2018, AsCAP Project Code MYA2153A) the results of interactions held with senior officials of the DRRD and RDU staff in Nay Pyi Taw, Myanmar, during November 2018 were presented. The objectives of these interactions were to assess the current status of the RDU, to gauge progress made towards the establishment of the Unit, to revisit the Key Performance Indicators for the establishment and operation of the RDU as contained in the RDU business plan, and to identify the specific capacity building needs of the RDU and its staff.

The first Interim Report, drafted in June 2019, presented the progress made between November 2018 and March 2019 and highlighted some of the challenges (mainly logistical) encountered over this period. It also addressed the training programme prepared for the RDU Director and RDU Researcher in South Africa, and the assistance provided with the drafting of an Extended Abstract for the Transportation Research Board’s Low-Volume Roads conference.

The second Interim Report, drafted in May 2020, presented the Project Concept Notes prepared by senior members of the RDU, and the activities undertaken during the second training period held in Myanmar (May-June 2019).

This Final Report provides a summary of all activities undertaken during the execution of the capacity building programme, and provides recommendations for further support to be provided to the RDU.

On account of several logistical challenges, inclusive of these associated with the COVID-19 pandemic, the Stakeholder Workshop has been postponed to a future date. This date will be decided after the lifting of COVID-19 country lockdown measures and travel restrictions, and is dependent upon ReCAP being extended. The outcomes of this Workshop will be reported shortly after it has been held.
1 Background

The Asia Community Access Partnership (AsCAP), funded by the UK Government through the Department for International Development (DFID), aims to promote safe and sustainable rural access in Asia through research and knowledge sharing between participating countries and the wider community.

Based on the outcomes of project-scoping exercises undertaken in three AsCAP countries (Bangladesh, Myanmar and Nepal), the need for the establishment of sustainable road research capacity within the partner government departments of these three countries was identified as a high priority, also to address current constraints associated with research and knowledge management related to rural access in these countries. Lessons learnt from previous ReCAP initiatives showed that the establishment of local research or research management units/centres had all been key to local ownership and uptake of research.

To address the above need, AsCAP initiated a project (RAS2117A) in May 2017 to develop action/establishment plans for each country. These plans were intended to support the building of indigenous road research capacity in Bangladesh, Myanmar and Nepal by addressing issues such as sustainable institutional arrangements, capacity building interventions and funding sources to support the operation of the road research centres or units on an ongoing basis.

The objectives of RAS2117A were as follows:

1. Identify specific needs and gain understanding of the individual countries’ expectations with respect to the development of road research management capacity within their institutional frameworks.

2. Based on feedback obtained from (1), identify, propose and reach agreement on institutional arrangements and structures to support the entrenchment of such capacity in the three countries (i.e. establishment of rural road research (management) units/centres).

3. Develop national business plans for the establishment of research capacity in line with the above outcomes, inclusive of sustainable institutional arrangements, modes of operation, capacity building interventions and funding (indicative budgets).

The above project was completed over a 24-week period [May 2017 to November 2017, with the final business plans delivered in February 2018], during which regular visits were undertaken to the three countries to interact with key stakeholders in each country. Throughout the duration of the project, close liaison was maintained with the project counterparts designated by the respective partner government departments in the three countries. In the case of Myanmar, the project counterpart was U Soe Soe Oo of the Department of Rural Road Development (DRRD) within the Ministry of Construction.

The main outcomes of the in-country deliberations were captured in the approved final versions of the Business Plans developed for the three countries [February 2018]. The Business Plan for Myanmar offered guidance for the establishment of a Research and Development Unit (RDU) in the DRRD. This Business Plan was designed to assist the RDU in fulfilling its mandate and achieving its strategic objectives as set by the DRRD and endorsed by the Rural Road Research Steering Committee, and to provide the basis for strengthening the long-term capacity of the RDU to execute relevant, high-quality research into rural road infrastructure.

The Business Plan addressed the following:

- The vision, mission, goal and strategic objectives of the RDU
- Governance issues, including the role and responsibilities of the Rural Road Research Steering Committee, the institutional and physical location of the RDU, sources of funding, Key Performance Indicators (KPI), and strategic relationships and linkages
- Potential research areas, of which the future revision and prioritisation will be guided by Rural Road Research Technical Committee established in Myanmar
- Capacitation of the RDU in terms of human resources and research infrastructure
- Knowledge management, inclusive of information transfer
- Indicative budgets to be reassessed following the physical establishment of the RDU
Prior to and since the finalisation of the RDU Business Plan, several rural road and transport strategies and initiatives were (and have been) undertaken in Myanmar, as listed below. The Project Team has taken these into consideration in the development of the RDU capacity building programme, as well as in the revision of the RDU Business Plan and associated research priorities.

- The National Strategy for Rural Roads and Access [February 2017]
- The Rural Development Programme (RDP I to IV) of Kreditanstalt für Wiederaufbau (KfW)
- Initiatives funded by the World Bank (e.g. Landslide Emergency Recovery Project)
- Rural Road Improvement funded by Community Road Empowerment
- Submersible Bridge Project funded by Japan International Partnership
- UKAid/AsCAP Review of low-volume Rural Road Standards, as well as the upcoming Development of Guidelines and Specifications for Low-Volume Rural Roads in Myanmar
- UKAid/AsCAP ongoing capacity building project related to the long-term pavement performance monitoring of experimental trial sections in Shan State and Ayeyarwady Region
- Other UKAid/ReCAP projects that could be leveraged to support the Research and Development (R&D) agenda of the RDU

The following extract from the “National Strategy for Rural Roads and Access” should be noted:

91. Research and Development. The Department of Rural Development (DRD) [now: Department of Rural Road Development (DRRD)] under the Ministry of Construction (MOC) in collaboration with the Ministry of Border Affairs (MOBA) will set up a research and development unit that will be responsible for material testing, quality control, and the development and trialling of new standards. Laboratories will be set up and proper procedures will be developed for material testing, quality control and trialling of new standards. Development partners will be requested to support the setting up of the laboratories and the development of procedures, to assist in the trialling and development of new standards, and to build the capacity of DRD [now DRRD, MOC] and MOBA staff.

The above statement called on Development Partners to support the capacitation of the laboratories and to build the research capacity of DRRD, MOC (and MOBA) staff.

2 Objectives

The main objective of the project was to provide capacity building to staff at the newly established RDU facility of the DRRD. This project was to contribute to a broader capacity building programme with the aim to establish enduring and sustainable research capacity in Myanmar, and more specifically, within the newly established Research and Development Unit (RDU) of the DRRD. The aim of such capacity building is to enable the RDU to provide scientific, engineering and technological leadership (“RDU Vision”) on rural road infrastructure and transport services through research, development and the implementation of research outcomes (“RDU Mission”).

The above main objective and specific aims are aligned with the Vision and Mission of the RDU as stated in the RDU Business Plan:

**Vision:** To provide scientific, engineering and technological leadership to effect sustainable improvements in the quality and effectiveness of rural access in support of socio-economic development imperatives and the attainment of the Myanmar’s Sustainable Development Goals.

**Mission:** Through research, development, implementation of research outcomes and capacity building, to enhance rural connectivity and to ensure transportation of people, goods and services in a safe, economic and sustainable manner, contributing to economic, social and cultural development in Myanmar.

Having been established only recently, but as yet with no direct allocation of staff and resources, the RDU will require ongoing capacity building and skills development support to develop and strengthen its professional and managerial skills base. It also still requires the establishment of other essential key
functions and resources associated with its operations, such as laboratories and an information centre, in order for it to be able to fulfil its mandate as defined in the RDU Business Plan.

3 Approach/Methodology and Results Achieved

From the onset, and as guided by the project’s terms of Reference, the Project Team identified the following three key non-linear aspects that had to be addressed (CSIR, 2018):

1. Capacitation of the RDU, to include:
   - Intensive training of the RDU’s Senior Management (i.e. RDU Director and Senior Laboratory Manager) at the Council for Scientific and Industrial Research (CSIR) in South Africa
   - Hands-on training of RDU’s staff at the RDU’s offices and in the Nay Pyi Taw laboratory in Myanmar
   - Assessment, recommendations and actions to capacitate the RDU facilities, inclusive of the DRRD/RDU laboratories
   - Mentorship initiatives for all RDU staff

2. Review and updating of, as well as support for the implementation of the RDU Business Plan, to include:
   - Status review of the Rural Road Research Steering Committee and Rural Road Research Technical Committee, and recommendations
   - Assessment and review of Critical Success Factors, Key Performance Indicators and Targets for both the establishment of the RDU and the 5-year operation and management of the RDU
   - Review and reprioritisation of research needs
   - Review and updating of job descriptions for RDU staff
   - Review and updating of the research infrastructure requirements (e.g. research laboratory and testing equipment)
   - Review of RDU budgets in line with current and future RDU operations

3. Interaction between the RDU and key stakeholders in Myanmar and Development Partners to raise awareness, seek synergy and ensure that the RDU lives up to its mandate and secures funding for its capacitation and operations.

The above aspects were to be addressed during:

- The project inception phase
- Training of RDU senior staff in South Africa
- Training of RDU staff in Myanmar
- The Stakeholder Workshop to be held in Myanmar.

3.1 Inception Phase

3.1.1 Approach/methodology

Given the short project duration of six months as originally planned, the following activities were to be performed during the Inception Phase:

- Confirmation of the Counterpart Staff of RDU, DRRD to work with the Project Team. The Counterpart Staff was to be responsible for facilitating interactions between the Service Provider and key stakeholders (including the setting up of meetings), coordination of all in-country activities and assistance in the provision of relevant documentation and information.
- Development of a preliminary implementation plan in association with Counterpart Staff, and finalise preparations for the in-country inception meetings/workshops.
Inception Meetings in Nay Pyi Taw, Myanmar, on 6 November 2018 focussing on the following:

- Meetings with DRRD senior management to discuss and reach agreement on DRRD/RDU expectations, objectives and outcomes of the capacity building support programme;
- Review status of latest version of the RDU Business Plan, inclusive of KPIs and targets;
- Review status of Rural Road Research Technical Committee (RRRTC) and the rural road research Steering Committee;
- Assessment of RDU facilities, identification of gaps, provision of recommendations, and agreeing on preliminary resource plan for addressing:
  - The optimal usage of existing laboratory equipment and facilities, either located at the RDU or elsewhere;
  - New laboratory equipment/plant required to address immediate and future research needs;
  - Office accommodation;
  - The optimisation/implementation of ICT support infrastructure (e.g. IT networks, databases, etc.);
  - Systems and facilities for capturing and storing field and laboratory data and information in hard and/or soft format;
  - The provision of an information centre (library and document archiving facility, etc.);
  - Other facilities and equipment identified that may be required (e.g. vehicles for field studies, conference rooms for technical workshops and seminars, mechanical workshops, storage areas, etc.).
- Assessment of staff currently employed by the RDU, review of staff composition of the RDU (as per the Business Plan) and review of job descriptions;
- Aligned with identified short-, medium- and long-term research priorities, and based on current composition and competencies of RDU staff and status of research infrastructure, development of a draft Skills Development Plan in consultation with DRRD/RDU staff;
- Drafting of Implementation Plan for the Capacity Building Support Programme in association with RDU staff, followed by meetings with senior management of DRRD to discuss and agree on the intent, scope and timeline of the Implementation Plan;
- Agreement on revised KPIs and targets (to be reviewed periodically during project execution).

Finalisation of Implementation Plan and drafting of Inception Report capturing the outcomes of the Inception Meetings, confirming the methodology and presenting a detailed action plan for capacity building and skills development that will provide guidance and direction for all activities to be undertaken by the Project Team over the duration of the project.

### 3.1.2 Results achieved

The Inception Phase was initiated on 22 October 2018 and completed on 20 November 2018 with the submission of the Inception Report (CSIR, 2018). The Inception Phase included a two-week visit to Myanmar, i.e. from 6 to 16 November 2018.

The following were achieved during this period:

- With respect to RDU staff and capacity building:
  - Confirmation of full complement of RDU staff, with the DRRD Chief Engineer of the Chief Directorate Implementation acting as the RDU Director. However, the RDU is to operate as a virtual entity and cross-cutting function between Directorates, and draws on assigned staff to fulfil RDU-assigned responsibilities and activities on a needs basis.

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1 It should be noted that the assigned staff still operate in the Directorates in which they were appointed (e.g. Roads, Bridges, Quality Control and IT), but now have the dual responsibility to also work for the RDU if and when required. This will continue to be the norm as long as the RDU is not yet fully functional and therefore does not have sufficient projects for RDU staff to be committed to. In time, as the RDU becomes operational and is assigned an increasing number of projects, the RDU assigned staff will become more active in the operational activities of the RDU and spend less time in their current Directorates. (CSIR, 2018)
o Changes to the job description of RDU staff given that: (a) post-graduate qualifications are difficult to obtain unless acquired overseas; (b) senior engineers are more attracted to implementation rather than knowledge creation/adaptation; and (c) previous requirements were considered to be at a too high level, given the current realities in Myanmar.

o Preparations for the training of two RDU senior staff members at the CSIR in South Africa (i.e. confirmation of nominations, timeline, letter of invitation, travel logistics, etc.).

o Identification and prioritisation of training needs for RDU staff in Nay Pyi Taw.

- With respect to research infrastructure:
  o Inclusion of the DRRD quality control laboratory in Nay Pyi Taw on the RDU organogram, since they could potentially also be used for R&D purposes;
  o For these laboratories, identification of areas requiring improvements (e.g. equipment calibration, work flow, sample management and storage, result processing);
  o Provision of design assistance for the new DRRD laboratories to be established in Nay Pyi Taw;
  o Identification of priority laboratory and field equipment to be purchased by DRRD for the RDU;
  o Identification of a lack of DRRD vehicles to enable RDU staff to conduct field studies, which will impact on the operations of the RDU;
  o Identification of the impact of non-operative information and communication technology at the premises of DRRD on R&D operations, and the need for effective ICT systems for data/information retrieval, transfer and storage.

- With respect to the prioritised RDU research needs:
  o Review of the status of all prioritised research needs (and associated projects);
  o Identification of a new priority project (nominated by the Director General (DG) of DRRD: “Development of guidelines for the design and use of stabilised materials”) to be submitted to the Rural Roads Research Technical Committee (RRRTC);
  o Setting of a date for the RRRTC to meet (during week of 19 November 2018) to inform members on (a) the current status of the RDU; (b) planned research activities; and (c) the Capacity Building Programme.

- Review of the RDU Business Plan, including the Key Performance Indicators (KPIs). This assessment was done in conjunction with RDU staff, and the changes made were presented to the DG of the DRRD, and to two Deputy Director Generals (DDGs) of the DRRD, for information, as well as to obtain their agreement on the proposed changes to the overall Business Plan.

- Highlighting the importance of dedicated and year-to-year funding for the RDU (i.e. through a line item in the annual DRRD budget; through a levy imposed on construction/implementation projects funded by the MOC/DRRD and by Development Partners, or through a combination of these). It was also noted that additional sources of funding, such as direct investments by Development Partners in R&D or indirectly (e.g. construction of trial section) should still be pursued, although such funding is often not guaranteed. The DG of DRRD undertook to engage with the MOC to explore ways of raising funds required, as per the RDU Business Plan.

### 3.2 Training of RDU Senior Staff in South Africa

#### 3.2.1 Approach/methodology

In accordance with the Terms of Reference, two RDU senior staff members received capacity building support at an internationally recognised research facility. During the project inception period, DRRD nominated both the RDU Director and the Laboratory manager to undergo intensive training at the CSIR in South Africa. This training involved a number of CSIR experts and invited South African specialists, including road design/material/management experts; transportation experts; strategic research and knowledge management experts; laboratory and field-testing managers/technologists/technicians; statisticians; and other engineering and scientific experts operating in relevant disciplines. The Project Team was required to lead, manage and contribute to the execution of this intensive training programme.
The training of the RDU Director and the Senior Laboratory Manager had to cover as wide as possible fields, which included the following:

- **R&D-related managerial and leadership training**
  - Science, engineering and technology leadership
  - Strategic research management
  - Contract R&D management
  - Strategic business development
  - Project coordination and management
  - Financial administration and management
  - Human resource management
  - Knowledge management
  - Communication management
  - Operational management (e.g. facilities, environmental health and safety)
  - Processes and procedures associated with the above to effectively and efficiently operate a research centre

- **Exposure to technical subject areas in the fields of road and transportation engineering**
  - Structural and functional design of road pavements, and associated structural design systems and software
  - Road materials technology covering the full spectrum of granular, modified, cementitious and bituminous materials, as well as derivatives and innovations associated with those, taking sustainability into consideration
  - Best practices for cost-effective maintenance and upgrading/rehabilitation technologies, also focusing on solutions for extending maintenance cycles and obtaining associated financial and economic benefits
  - Climate change mitigation and adaptation procedures and methodologies, inclusive of settlement design approaches for climate change adaptation (e.g. the South African Green Book approach)
  - Road/bridge asset management
  - Geographic Information Systems (GIS) and spatial planning and modelling and design of transport systems that are accessible, acceptable, available and affordable
  - Appropriate transport systems that do not compromise primary resources such as energy, productive land and air quality
  - transport logistics

- **Training on the operation of a research laboratory**
  - Principles of ISO 17025 (laboratory accreditation) – procedures, policies and administration
  - General laboratory operations – administration and management procedures, potential conflict management, pricing and funding
  - Quality management
  - Accessibility of standards and other technical literature
  - Laboratory information management systems
  - Establishment and management of proficiency testing schemes, inclusive of applied statistical analysis methods for the evaluation of results
  - Granular, stabilised, bituminous and concrete materials testing (inclusive of binder testing)
  - Relevant aspects of field testing
  - Environmental health and safety

### 3.2.2 Results achieved

The above training at the CSIR in South Africa was scheduled to have taken place in early January to early February 2019. Unfortunately, on account of several logistical challenges at Departmental and Ministerial level in Myanmar, the training only took place in late March and early April 2019.
The following modules were presented during the RDU Senior Staff training in South Africa, with the names of the presenters and their designations shown in brackets:

- **Managerial and Leadership Training:**
  - Overall Perspective on the CSIR as an Organ of State (Mr B Verhaeghe, Impact Area Manager)
  - Strategic Research Management (Dr C Rust, ex-CSIR/Consultant)
  - Science, Engineering and Technology Leadership (Dr C Rust, ex-CSIR/Consultant)
  - Strategic Business Development and Contract R&D (Mr K Kistan, Executive Director)
  - Facilities Management (Mr M Khumalo, Business Operations Manager)
  - Human Capital Development (Mr J Tshikomba, Human Resource Manager)
  - Marketing and Communication Management (Messrs M Gcukumana and T Tsedu, Communication and Marketing Managers)
  - Knowledge Management (Ms M van Heerden, Information Centre Manager)
  - Operational Management (Ms J Benjamin, HSE Specialist)
  - Research Methodology (Dr M Mgangira, Research Group Leader; Dr J Anochie-Boateng, Principal Researcher)
    - Formulating of a research problem
    - Planning a research study
    - Drafting of concept notes and writing a research proposal
    - Data management and report writing

- **Technical Training:**
  - Road and Structures Asset Management (Mr M Roux, Principal Researcher)
  - Appropriate Transport Systems (Dr M Mokonyama, Impact Area Manager)
  - Modelling and Design of Transport Systems (Dr M Mokonyama, Impact Area Manager)
  - Overview of Geographic Information Systems (GIS; Mr G Mans, Research Group Leader)
  - GIS-based Decision Support (Ms A le Roux, Senior Researcher)
  - Green Book: Guiding Municipal Change Management (Ms W van Niekerk, Principal Researcher)
  - Road Materials Technology (Prof P Paige-Green, ex-CSIR Consultant)
  - Long-Term Pavement Performance (LTPP; Mr J Komba, Senior Researcher)
    - Overview of LTPP
    - LTPP protocols
    - Establishment of LTPP sections
    - Field measurements
    - Frequency of analysis and sampling
    - Laboratory evaluation of field samples
    - Data analysis and modelling
    - Data management
    - Visit to LTPP sections
  - Accelerated Pavement Testing (Mr I Akhalwaya, HVS Engineer)
  - Climate Change Adaptation (Mr B Verhaeghe, Impact Area Manager)
  - Structural and Functional Design of Road Pavements incl. Systems and Software (Dr M de Beer, Principal Researcher)
3.3 Training of RDU Staff in Myanmar

3.3.1 Approach/methodology

For in-country capacity building, the Project Team prepared a list of training modules that in their opinion would benefit the RDU staff. These were as follows:

- **Training on good research practices (induction in R&D)**
  - Principles of good research
  - R&D needs identification and prioritisation
  - Proposal formats, evaluation system/matrix and approval procedures
  - Resource allocation
  - Research execution
  - Management of data and outputs
  - Report structure
  - Quality and peer review processes
  - Knowledge management

- **Good laboratory practices**
  - Organisational structure of the laboratories
  - Laboratory layout for optimal operational efficiency and effectiveness
  - Administration and testing procedures for the laboratory
  - Handling of samples and their storage
  - Establishment of a work flow system, including the recording of incoming work
- Planning the work load
- Standardised test procedures and quality control of test results
- Reporting of test results
- Training of engineering/technical staff
- Equipment checks and calibration
- Health and safety in the work place
- Housekeeping
- Creation of a database for results and work control

- **General training related to RDU operations**
  - Training on how to write project proposals
  - Training on data collection, data management and statistical analysis of data
  - Hands-on training on how to conduct field investigations and perform technical audits and forensic investigations – to be linked to the TGI 1A monitoring sites
  - Hands-on training of laboratory engineers/technicians on test methods in the RDU Laboratory
  - Induction training on good practices for knowledge management, inclusive of ways to source data and information, dissemination of research outputs/outcomes, and pathways and processes for entrenchment in practice

- **Training in support of the career development of staff**
  - Highlighting the necessity for formal and informal training (i.e. continued education)
  - Guidance on the implementation of a mentorship programme that is supported by internal and/or external mentors
  - Drafting of individual career development plans, as well as the physical preparation thereof by each RDU staff member
  - Hands-on training on organisation/coordination skills for holding working group meetings, technical committee meetings, workshops, seminars and conferences (e.g. the organisation of the Stakeholder Workshop could be used as a potential training exercise)
  - Ways to disseminate research outputs/outcomes (e.g. to raise the profile of the staff members and the RDU)
  - Hands-on training on how to prepare conference papers
  - Hands-on training to develop and strengthen presentation skills

- **Technical training**
  - Training as per competence/skills development needs identified by RDU staff members (cf. Section 4.4.3), which will include technical training on aspects related to
    - the design (materials and structures), construction, maintenance and management of low-volume access roads;
    - transportation planning; and
    - transport services, traffic management and safety.
  - Technical training on research methodologies relevant to the execution of R&D projects that the RDU is currently undertaking and will undertake in future.

### 3.3.2 Results achieved

Given the exposure to the training programme that was presented in South Africa, which covered both institutional (i.e. managerial and operational requirements for a research institute) as well as engineering/technical aspects, the RDU Senior Staff members who attended this training were tasked to identify and prioritise the training areas that would benefit the RDU Staff members most and that would establish a sound knowledge base and practices to support the development and activities of the DRRD/RDU. They identified priorities in the following two key areas:

1. Training on the operation of a research laboratory, inclusive of hands on training
2. Exposure to technical subject areas in the fields of road and transportation engineering
The modules presented to the RDU staff members between 27 May and 7 June 2019 are shown in Table 1:

**Table 1: List of prioritised training modules (actual)**

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation</td>
</tr>
<tr>
<td>2</td>
<td>General laboratory operations</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory information and management systems</td>
</tr>
<tr>
<td>4</td>
<td>Laboratory accreditation</td>
</tr>
<tr>
<td>5</td>
<td>Operational management (health and Safety)</td>
</tr>
<tr>
<td>6</td>
<td>Materials testing: granular</td>
</tr>
<tr>
<td>7</td>
<td>Hands on training in material testing (4 days)</td>
</tr>
<tr>
<td>8</td>
<td>Research best practices</td>
</tr>
<tr>
<td>9</td>
<td>Long-term pavement performance</td>
</tr>
<tr>
<td>10</td>
<td>Road/bridge asset management</td>
</tr>
<tr>
<td>11</td>
<td>Climate change adaptation</td>
</tr>
<tr>
<td>12</td>
<td>Summary and Closure</td>
</tr>
</tbody>
</table>

A description of the modules presented and information on the hands-on training provided in the laboratory are summarised in Annex 1. Commentary on the current DRRD/RDU laboratories, are provided in the second Interim Report (Verhaeghe & Ventura, 2020).

![Figure 1: Classroom training in Nay Pyi Taw, Myanmar](image)

### 3.4 Stakeholder Workshop

#### 3.4.1 Approach/methodology

As per the [Inception Report](Verhaeghe & Ventura, 2018), a stakeholder workshop was to be held in Nay Pyi Taw at the end of the Capacity Building Programme (i.e. during the third two-week country visit). However, the workshop has been postponed due to the COVID-19 pandemic. Its implementation will now be subject to a DFID extension of the ReCAP programme.

All relevant national stakeholders, inclusive of development partners, were to be invited to this Workshop. Its core purpose would have been to demonstrate the current capacity and capability of the RDU to conduct relevant research. Other objectives would have been to describe the capacity building work conducted on this project and the results achieved, and also to present the updated Business Plan and the research objectives going forward. It was to highlight the need for all relevant stakeholders to support the further strengthening of the RDU so that it can become fully capacitated to address rural road infrastructure and rural transport challenges in Myanmar. The RDU should ultimately become self-sufficient
to the extent that it will operate as an entity with sustainable capacity to successfully address the country’s needs and challenges associated with rural road infrastructure and transport services.

The DRRD intended to invite all RRRTC and rural road Research Steering Committee members, as well as nominated development partners, to this workshop. The delegates would thus have included representatives of:

- the Ministry of Construction (MOC):
  - Department of Rural Road Development (DRRD)
  - Department of Highways (DOH)
  - Department of Bridges (DOB)
  - Department of Meteorology and Hydrology (DMH)
- the Ministry of Transport and Communications (MOTC):
  - Road Transport Administration Department (RTAD)
- the Ministry of Border Affairs (MOBA)
  - Progress of Border Area and National Races Development (PBANRD)
- The Ministry of Agriculture, Livestock and Irrigation (MOALI)
  - Department of Rural Development
- Universities:
  - Yangon Technological University (YTU)
  - Mandalay Technological University (MTU)
  - Myanmar Engineering Society (MES)
- Representatives of development partners, such as the Asian Development Bank, the World Bank, the German Development Bank (KfW), the EU, JICA and DFID.

3.4.2 Activities to be conducted

Subject to the easing of the COVID-19 pandemic and associated travel restrictions and an extension to the ReCAP programme, a third in country visit will be conducted in order to:

- Organise and conduct a workshop (cf. 3.4.1)
- Train, coach and mentor RDU staff on how to organise industry events, seeing that the arrangement and coordination of events will form part of the skills to be acquired by the RDU.

4 Other Activities

4.1 Drafting of Project Concept Notes

As part of the training in South Africa, the Project Team supported the RDU senior staff members in the drafting of Project Concept Notes for the following three projects:

- Complementary access infrastructure (i.e. footpaths, footbridges)
- Integration of rural road user and road safety considerations in policy and planning, and in standard procedures for rural road infrastructure provision
- Mentorship Programme for the DRRD/RDU

The objectives and expected benefits of the three projects are as follows:

1. Project 1: Complementary access infrastructure (i.e. footpaths, footbridges)
   a. Objective:
      The purpose of this project is to produce a guideline manual that: (1) will assist local engineers with the design and supervision of the construction of footbridges, footpaths and other basic infrastructure that can be used by pedestrians and motorcycles to access the road network and socio-economic opportunities; and (2) will assist local contractors and handicrafts workers on the proper procedures for constructing these.
b. **Expected Benefits:**

Apart from benefiting the rural communities by the provision of sustainable access in order to improve community access to the road network and socio-economic opportunities, a number of additional benefits can be achieved by being able to introduce appropriate standards for the use of locally available natural materials in the construction of footbridges and footpaths for communities. A summary of some the expected benefits is presented below:

i. The generation of semi-skilled workers and employment creation

ii. The development of small contractors with minimal outlay required on plant and equipment

iii. The use of more local materials and a reduced reliance on industrial materials such as, for instance, steel girders, reinforced concrete, cement, crushed aggregate and steel plates that have to be imported at high cost for conventional bridge construction

iv. The ability to carry out rapid and effective repairs of localised failed areas by either re-using materials or replacing them with minimum additional skills requirements

v. Construction that can be executed by local handicrafts workers with labour supply plentiful at village level.

Construction of footbridges and all-weather footpaths is a relatively simple skill that can be easily learned and transferred. It is especially relevant to villages and remote area where labour costs are low, high-tech equipment is expensive. In addition the practice is highly sustainable.

2. **Project 2: Integration of rural road user and road safety considerations in policy and planning, and in standard procedures for rural road infrastructure provision**

   a. **Objective:**

   The purpose of this project is to better align land use practices with road functionality and safety objectives, and ensure/promote alignment with broader socio-economic imperatives. A key manner in which this should be achieved is through the integration of land use practices with road and transport investment decisions relating to planned rural road infrastructure.

   b. **Expected Benefits:**

   The integration of road user and safety concerns into policies and planning and investment decisions relating to rural road infrastructure may have significant benefits for rural communities. This may be provided in the form of various direct and indirect benefits such as overall safer rural transport networks (less accidents and fewer pedestrian injuries), greater economic benefits (more sustainable roads that have greater lifespans), social benefits (communities are less affected by losses of life or health risks such as noise and air pollution), and land-use benefits (e.g. road infrastructure is rendered more safe).

3. **Project 3: Mentorship Programme for the DRRD/RDU**

   a. **Objective:**

   This project will serve the purpose of knowledge transfer aimed at supporting the research capacity enhancement at RDU and having the right kind and number of researchers who can implement research projects. The mentorship programme is therefore meant to support the development of key research skills including implementation of research projects.
b. **Expected Benefits:**

A number of benefits will be achieved by implementing the Mentorship Programme:

i. It will provide the RDU staff with the opportunity to become more effective researchers and capable of communicating research outputs locally, through outreach and public awareness programmes and internationally at conferences and through publications.

ii. RDU staff will be able to provide innovative solutions, the design and maintenance of rural access roads with confidence.

iii. The programme will also develop knowledge and skill of less experienced researchers to ensure growth and the sustainability of RDU.

iv. It will assist in developing a team that can provide the required institutional accountability for the success factors and desired outcomes of research programmes.

v. It will also add value in sustaining existing professional engineering knowledge within the Myanmar Research Community.

vi. The development of the mentorship program will enhance RDU young researchers' technical skills and their future career development significantly and they will become more reliable researchers and capable of communicating research outputs locally through its programmes, workshops, conferences, also publications internationally.

vii. It will also support the gradual growth of RDU as a research centre with the appropriately skilled staff. At the same time the implementation of RDU research projects with its skilled staff will be beneficial to the country by providing innovative solutions for rural road sector development.

In communication with ReCAP/AsCAP, it was acknowledged that no ReCAP guidelines on complementary access infrastructure (Project 1) have been produced to date and therefore appreciated the need for such a project. They also indicated that the project had been prioritised, but that it only would be implemented after approval of a third phase of ReCAP by DFID UK. Hence, this project is only likely to be initiated after July 2020.

The Concept Note for Project 3 was submitted to the Project Management Unit of ReCAP in early June 2019 so that potential synergies between the mentorship programme proposed by DRRD and a mentorship programme that ReCAP intended to pilot could be explored.

### 4.2 Extended Abstract for TRB Conference on Low-Volume Roads

The Project Team assisted the DRRD/RDU with the drafting of an Extended Abstract submitted for the 12th Transportation Research Board (TRB) International Conference on Low-Volume Roads held on 15 to 18 September 2019 in Montana, USA.

The Extended Abstract titled “Research Capacity Building Intervention in Rural Road Sector in Myanmar” is reproduced in Annex 2.

### 4.3 Exploration of Additional LTPP Sections near Yangon

A meeting was held on 28 May 2019 between the Director General of DRRD and the Project Team in which new potential priority projects for the RDU were explored. At this meeting, the Director General requested that LTPP sections be established on the Shan Zu - Chaung Zauk to Hle Seik and the San Kin to Ka Lot Thauk road, both located in the Ayeyarwady region west of Yangon.
This request, as well as all available information captured by the Project Team, was shared with ReCAP and with the Team Leader of Project GEN2132A: Capacity Building and Mentorship for the Establishment and Implementation of Monitoring & Evaluation Programmes on Experimental and Long-Term Pavement Performance (LTPP) Sections in Six African Countries and Myanmar.

4.4 Updating of RDU Business Plan

The draft RDU Business Plan was updated in October 2018 and June 2019 based on discussions held with DRRD, and again in February 2020 based on feedback received from DRRD. The following sections of the Business Plan were reviewed:

- Members of the rural road research Steering Committee, and Chairperson of the Steering Committee
- Changes to the Directorates of DRRD
- Expected completion dates for the RDU laboratory
- RDU organogram
- RDU reporting structures
- Key performance indicators for (a) the establishment of the RDU and (b) the operations and management of the RDU
- Members of the Rural Road Research Technical Committee
- Number of RDU staff, and their competences
- The list of the main testing equipment needed for the RDU

It is expected that the RDU Business Plan will undergo further changes; it will remain a ‘living document’ until the RDU is fully established.

4.5 Assistance with Prioritisation of Laboratory Equipment

In October 2018, during the in-country training period in May-June 2019, and also remotely thereafter, the Project Team have assisted DRRD/RDU with the identification as well as the prioritisation of laboratory and field-testing equipment. The latest status of the equipment ordered was reflected in the February-2020 version of the RDU Business Plan.

4.6 ReCAP Articles

The Project Team also contributed to the drafting of articles for the ReCAP website. The draft content for one of these articles is reproduced in Annex 3.
5 Milestones and Delivery Dates

Since the finalisation of the Inception Report, the schedule of activities had to be modified continually on account of protracted delays, particularly with respect to the training in South Africa, but also regarding the in-country training as a result of, inter alia, deferments of the completion dates of the RDU laboratory, and the COVID-19 pandemic.

As reported in the Inception Report (CSIR, 2018), the training intervention in South Africa was planned to have taken place in January/February (see Table 2). This training eventually took place in late March, early April 2019.

These changes necessitated the setting of new dates for the in-country training in Myanmar. Table 3 presents the activity schedule as revised in April 2019 (CSIR, 2019). The second two-week visit took place as planned, i.e. during the weeks of 27 May and 3 June 2019.

The third two-week visit, which was planned to have taken place in July 2019, and which would also have included the Stakeholder Workshop, had to be postponed a number of times for several reasons, of which the unavailability of key staff and delays in the completion of the new DRRD/RDU laboratories were the main reasons.

Communication with DRRD in late 2019 and early 2020 suggested that the laboratories would only be completed and ready for receiving equipment towards July 2020. However, given the prospect that the ReCAP programme was likely to close towards mid-2020, the date for the Stakeholder Workshop was moved forward to May 2020.

The declaration of the COVID-19 pandemic and the enforcement of travel restrictions caused the Stakeholder Workshop to be delayed to a future date that will depend on the lifting of travel embargos and on the ReCAP programme being extended.

Given the above, the revised project milestones and delivery dates for this project are as follows:

- Inception Report: November 2018
- First Interim Report: April 2019
- Updated RDU Business Plan: February 2020
- Second Interim Report: May 2020
- Final Report: June 2020
- Stakeholder Workshop Report: (To be confirmed and dependent upon Covid 19 and subject to RECAP extension)

<table>
<thead>
<tr>
<th>TASKS (Revised Plan)</th>
<th>2018</th>
<th>2019</th>
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<tbody>
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<td>22/10</td>
<td>29/10</td>
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<tr>
<td>Project Activities and Reporting</td>
<td>MY</td>
<td>MY</td>
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<tr>
<td>a In-country (MY) and out-of-country (SA) activities</td>
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<td>b Reporting (Milestones / Deliverables)</td>
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<td>Inception Report</td>
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<td>Interim Report</td>
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<tr>
<td>Workshop Report</td>
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<tr>
<td>Draft Final Report</td>
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<tr>
<td>Updated RDU Business Plan</td>
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<tr>
<td>Final Report</td>
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6 Identified Risk

The greatest risks identified at the onset of the project were:

1. Resourcing the RDU and laboratories
2. Language barriers hindering effective capacity building
3. Cancellation/postponement of planned training interventions

All three of these risks have had a significant impact on the execution of the project, but despite the delays that they occasioned, they are surmountable in future DRRD/RDU capacity building initiatives.

7 Way forward

It is recommended, but subject to an extension of the ReCAP programme and the RDU laboratory establishment, that the remaining two-week period originally planned to be spent in Myanmar to support the DRRD/RDU be directed towards the following:

1. Provision of any additional technical training that the RDU staff may require;
2. Provision of assistance in the auditing of the RDU laboratory facilities (i.e. checking compliance with appropriate ISO requirements);
3. Assessment of laboratory equipment delivered (as well as a gap analysis), and provision of guidance on equipment commissioning and calibration requirements;
4. Recommendations on laboratory staff training and proficiency testing;
5. Drafting of guidelines and recommendations for the implementation of a localised mentoring support programme for DRRD/RDU staff, inclusive of identification and training requirements of local mentors and the development and preparation of a fit-for-purpose training plan for RDU staff members;
6. Holding a Stakeholder Workshop to inform stakeholders on the status of the DRRD/RDU and gain their long-term support for the DRRD/RDU – as per Section 3.4.1.
8 References


Annex 1  Capacity Building Programme: RSU Staff Training in Myanmar

Module 1: Opening, welcoming, introduction, overview and site visit

Mr Benoît Verhaeghe of the CSIR presented an overview of the programme, also noting that the structure is likely to change in line with the needs expressed by the RDU group.

Module 2: General Laboratory Operations

Mr Dave Ventura of the CSIR presented the 2nd Module to the RDU group on the 27th of May 2019. The Module covers General Laboratory Operations.

Summary of Module 2 presentation (Mr Dave Ventura)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>The presentation covered the most pertinent aspects of laboratory operations and included:</td>
</tr>
<tr>
<td></td>
<td>• Resources</td>
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<td>• Handling samples</td>
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<td></td>
<td>• Sample storage</td>
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<td>• Incoming work</td>
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<td>• Planning workload</td>
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<td>• Quality control of testing</td>
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<td>• Reporting results</td>
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<td>• Keeping records</td>
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<td>• Staff training</td>
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<td></td>
<td>• Calibration of equipment</td>
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<td></td>
<td>• Laboratory lay-out</td>
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<td></td>
<td>• Laboratory safety aspects</td>
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<td>• Laboratory housekeeping</td>
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| Resources                | The resources required both in terms of manpower and equipment is dependent on the amount of testing that is done by the laboratory on a regular basis. This has to be determined over a period of time, say one year, as the workload of laboratories is typically erratic. Sufficient resources should be available to handle the average workload. Too much equipment and staff will be expensive in terms of salaries, maintenance, capital costs etc., whereas too few resources will hamper laboratory operations and negatively affect production. An optimum level of resources is often difficult to achieve but should be strived for. Experience gained with time is the best indicator for determining these requirements. |

| Handling of samples      | Road materials testing laboratories work with sampled material. Handling of samples is the first step in materials testing and is obviously a very important one. It is thus imperative that sound sample management methods are used so that samples are not lost, misplaced, incorrectly numbered etc., and so that they may be handled as efficiently as possible. |

| Incoming work            | Requests for testing have to be recorded in order to keep track of the work details. This will normally be done in a job ledger. This may also be done electronically using a computer, which is preferred, as a computer programme is more versatile and is particularly useful when searches are carried out. The information required for the records is, however, the same whether it is done manually or electronically. |

<p>| Work load planning       | For work to be done efficiently it has to be planned and scheduled. This is especially important when several job requests are received simultaneously or more work is received than the testing facility can comfortably cope with within a specified time limit. In any event jobs normally have to be done within a certain time and within specific cost constraints and this can only be achieved if the workload is adequately scheduled. |</p>
<table>
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<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
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<tbody>
<tr>
<td>Work may be scheduled in various ways such as on a first come first serve basis or it may be prioritised according to the urgency of the situation. When scheduling work, factors such as use of equipment, optimal use of laboratory assistants, optimal use of technical staff etc., have to be considered.</td>
<td></td>
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<tr>
<td>Quality control of test results</td>
<td>It has to be ensured that the testing being done is of high quality. Test results have to be checked to ensure that they are correct and also that all the testing requested has been completed. All calculations should be done by means of a calculator or, if available, by computer and checked for correctness. Presently a variety of computer programs are available to calculate test results. Computers have the advantage that they are fast, accurate and can immediately store the test data. Drawing a graph by hand (say of a OMC/MDD curve) can be time consuming and is also not very accurate. A computer, on the other, will do this quickly accurately and consistently. Technical staff can without much effort be trained to use computer programs. It is also not expensive to purchase a computer and the necessary software. It is recommended that laboratories use computers to process data wherever possible. The laboratory manager should examine the final test results so as to assess whether these are realistic. The testing process should also occasionally be checked to ascertain whether the test method being followed is being carried out correctly. This is especially important when the person doing the test is not very familiar with test method, as is the case with a new employee or when someone is doing the test for the first time.</td>
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<tr>
<td>Reporting test results</td>
<td>Once the testing has been completed and the results checked the test results have to be reported to the person that requested the testing to be done. Normally such a person is only interested in the final test result. Sometimes, however, as in a research environment, the researcher is interested in all the details pertaining to the test. In such cases, he will wish to see the working sheets as completed by the technician doing the work as well as a summary of the test results. Summaries of test results should be made on standard forms, developed for that purpose and these given to the requestor. A full report may also be required, which should be written by the laboratory manager or the section head.</td>
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<tr>
<td>Training of technicians</td>
<td>The quality of the test data generated depends to a large extent on the skills of the technician. It is imperative that the technician doing a specific test is fully conversant with the test method and does the test to the best of his/her ability. The laboratory should have an ongoing training program to train technicians and ensure that skills levels are maintained. The training program must allow the technician to progress through the various test methods. This allows the technician to “grow” in his job. The technician experiences a sense of growth, which is good for his self-esteem and contributes to job satisfaction and is ultimately of benefit to the organisation.</td>
</tr>
<tr>
<td>Calibration and checking of equipment</td>
<td>From time to time it is necessary to check and calibrate the equipment used for testing. This is important to ensure that the test results obtained are accurate and repeatable. Equipment used for testing has to be used carefully and according to the instructions pertaining to the particular equipment. Nonetheless, use of</td>
</tr>
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</table>
equipment, no matter how careful, results in some wear and thus periodic maintenance and calibration is essential.

**Laboratory lay-out**
The layout of the laboratory is very important for aspects such as productivity, safety, work flow, cleanliness, ergonomics etc.

**Safety in the workplace**
An aspect of laboratory management that is often neglected or overlooked is a safe working environment. Unsafe working conditions can lead to numerous accidents. Accidents result in injury or, in worst cases, death to employees, resulting in pain and suffering. Also loss of productivity, which is costly to the organisation.

Recommended administration and testing procedures were also discussed.

**Housekeeping**
Good housekeeping was also addressed. This is linked to safety and productivity. Poor housekeeping may lead to an unsafe working environment (objectives poorly stored, lying about). It is normally in the way of persons working leading to poor productivity. Also, it gives a bad impression to visitors and clients.

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**Module 3: Laboratory Information Management Systems**
Mr Dave Ventura presented the 3rd Module to the RDU group on the 27th of May 2019. The Module covers the various data management systems used in the laboratory.

**Summary of Module 3 presentation (Mr Dave Ventura)**

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| Why data management systems are important | • Record keeping for current use  
• Record keeping for future reference  
• Disputes  
• History of testing |
| Types of data management systems | • Bench worksheets  
• Job files  
• Summary sheets  
• Job ledger  
• Electronic data sheets  
• Electronic data base and data retrieval |
| Sample administration | • Sample numbering system  
• Sample details  
• Sample storage and recording  
• Sample retrieval and disposal |
| Worksheets | Most basic test data recording and its importance |
| Paper files | • Files containing information on the complete job  
• Storage of job files |
| Electronic records | • Advantages of an electronic system  
• Contents of electronic data management system:  
  o Date request for testing received; client details; testing required; date when testing should be completed; etc.  
  o Sample details including sample storage or disposal instructions  
  o Invoicing information, including cost of testing, persons responsible for payment, payment date, etc. |
| Equipment records | • Importance of equipment records  
• Maintenance of equipment records |
Module 4: Laboratory accreditation, ISO 17025

Mr Dave Ventura presented the 4th Module to the RDU group on the 28th of May 2019. The Module covers road materials testing laboratories accreditation according to the requirements of ISO 17025. The South African National Accreditation System (SANAS) was used as an example of a national accreditation body.

Summary of Module 4 presentation (Mr Dave Ventura)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
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</thead>
<tbody>
<tr>
<td>Laboratory Accreditation</td>
<td>The accreditation of the laboratories, although a costly and lengthy procedure, is very necessary for the sustainability and expansion of the client base and to ensure credibility of our work in the industry.</td>
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<tr>
<td></td>
<td>The accreditation of testing facilities is becoming increasingly important to the industry. Many materials testing laboratories have been accredited, whilst others are in the process of being accredited. Accreditation of laboratories’ is important for the following reasons:</td>
</tr>
<tr>
<td></td>
<td>• To maintain and expand the client base; Major clients are demanding that testing facilities be accredited, otherwise they will send their work elsewhere.</td>
</tr>
<tr>
<td></td>
<td>• Accredited laboratories enjoy more credibility in the industry. Research laboratories should be considered to do work of the highest quality. The perception amongst clients is that accredited laboratories do work of a higher standard than those that are not accredited.</td>
</tr>
<tr>
<td></td>
<td>• It is important that testing complies with accepted norms and accreditation. The accreditation of the laboratories to some extent ensures this. Also, testing has to be carried out in an appropriate environment, using suitable equipment, which is checked and calibrated on a regular basis and again, accreditation ensures that this is being done.</td>
</tr>
<tr>
<td></td>
<td>• Although certain standards and principles are adhered to when doing testing, these are the laboratory’s own standards and although they may be higher than the industry norms, they are not recognized by outside bodies. Accreditation is official recognition that a facility is competent to perform specifically defined functions and has a documented Quality Management System in place to facilitate this process. An accredited facility will have demonstrated through formal assessment that it is competent to perform the defined testing and that it satisfies both national and international criteria in this respect.</td>
</tr>
</tbody>
</table>

| Quality aspects                  | ISO 17025 Laboratory Accreditation is the criteria for laboratories to demonstrate the technical competence to carry out specific test methods; generate valid calibration data, test results, and operate an effective quality system. |
system. ISO 17025 applies to any organisation that wants to assure its customers of its precision, accuracy and repeatability of results.

ISO 17025 certified Laboratories demonstrate to their customers that the product quality is of a high standard and optimally perform specified tests on the products supplied; laboratory personnel are trained and qualified to conduct these tests; instruments utilized are calibrated and serviced, results are properly reported, and that all of these processes have been confirmed by an independent auditor.

SANAS is South Africa's government-endorsed accreditation body. SANAS-endorsed calibration certificates are widely recognized by many sectors of the South African government and industry. SANAS is also a signatory to the mutually recognised agreement of the International Laboratory Accreditation Cooperation (ILAC). This means SANAS-endorsed calibration certificates are accepted by many of South Africa's trading partners in Europe, North America and throughout the Asia Pacific region. Therefore SANAS-endorsed calibration certificates will give South African laboratories increased confidence in the data they produce, combined with greater acceptance of the data, both within South Africa and internationally.

Why Become An Accredited Laboratory?

Recognition of Testing Competence
Laboratory accreditation is a means of determining the technical competence of laboratories to perform specific types of testing, measurement and calibration. It also provides formal recognition to competent laboratories, thus providing a ready means for customers to identify and select reliable testing, measurement and calibration services able to meet their needs.

To maintain this recognition, laboratories are re-evaluated periodically by the accreditation body to ensure their continued compliance with requirements, and to check that their standard of operation is being maintained. The laboratory may also be required to participate in relevant proficiency testing programs between reassessments, as a further demonstration of technical competence.

Accredited laboratories usually issue test or calibration reports bearing the accreditation body’s symbol or endorsement, as an indication of their accreditation.

Clients are encouraged to check with the laboratory as to what specific tests or measurements they are accredited for, and for what ranges or uncertainties. This information is usually specified in the laboratory’s scope of accreditation, issued by the accreditation body. The description in the scope of accreditation also has advantages for the customers of laboratories in enabling them to find the appropriate laboratory or testing service. Laboratory accreditation bodies publish the scopes of accreditation for their accredited laboratories in either hardcopy directories or on the internet.

A Benchmark for performance
Laboratory accreditation benefits laboratories by allowing them to determine whether they are performing their work correctly and to appropriate standards, and provides them with a benchmark for maintaining that competence. Many such laboratories operate in isolation to their peers, and rarely, if ever, receive any independent technical evaluation as a measure of their performance.

A regular assessment by an accreditation body checks all aspects of a facility’s operations related to consistently producing accurate and dependable data. Areas for improvement are identified and discussed, and a detailed report provided at the end of each visit. Where necessary, follow-up
Action is monitored by the accreditation body so the facility is confident that it has taken the appropriate corrective action.

In addition to commercial testing organizations may use laboratory accreditation to ensure the testing of their products by their own in-house laboratories is being done correctly.

**A Marketing Advantage**
Accreditation is an effective marketing tool for organisations, and a passport to submit tenders to contractors that require independently verified laboratories.

Laboratory accreditation is highly regarded both nationally and internationally as a reliable indicator of technical competence. Many industries, such as the construction materials industry, routinely specify laboratory accreditation for suppliers of testing services.

Laboratory accreditation uses criteria and procedures specifically developed to determine technical competence, thus assuring customers that the test, calibration or measurement data supplied by the laboratory are accurate and reliable.

SANAS, the South African accreditation body, also publishes a directory of accredited laboratories, which includes information on their accreditation status (i.e., tests which they are accredited for).

**Technical Requirements**
The technical requirements of accreditation according to ISO 17025 were discussed, which included: Human Factors; Accommodation and Environmental conditions; Test Methods and Validation; Testing Equipment; Measurement traceability; Sampling; Handling of test items; Reporting results; etc.

**Management Requirements**
The management requirements of ISO 17025 were discussed and this included: Organisation; Management system; Document control; Review of requests, tenders and contracts; Subcontracting of tests and calibrations; Purchasing services and supplies; Service to the customer; Complaints; Control of nonconforming testing and/or calibration work; Improvements; Corrective action; Preventive action; Control of records; Internal audits; Management reviews, etc.

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**Module 5: Operational Control: Operational Health and Safety**

Mr Benoit Verhaeghe presented the 5th Module to the RDU group on the 27th of March 2019. The Module covered Operational Control (Occupational Health and Safety). CSIR (South Africa) was used as a case study.

**Summary of Module 5 presentation (Benoit Verhaeghe)**

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| OHS Act 85 of 1993       | • Legal framework for the employer and employees  
                          | • Risk based statute  
                          | • Certified to management system standards |
| OHS Principles           | • All work requires a risk assessment to identify hazards  
                          | • Example: Binders Laboratory – Effect of chemicals of health of staff |
| OHS Act S8               | Duties of the employer  
                          | • Provide a safe, healthy work environment  
                          | • Elimination of hazards before PPE  
                          | • Provision of information, training and supervision |
Discussion Topic / Theme | Presentation Notes
---|---
Prohibiting of work without precautionary measures
Compliance with the Act and enforce health and safety measures
General supervision

General duties of the employees
Take care of his / her own health as well as of those who may be affected by actions or negligence
Where the Act imposes a duty, cooperate with the employer
Report unsafe or unhealthy conditions to the employer
If he / she is involved in an incident that may influence their health or cause an injury, report in to their employer or health and safety representative no later than the end of the day.

Penalties for contravening the OHS Act
In South Africa, as an example, any person who contravenes or fails to comply with a provision of the OHS Act could be guilty of an offence and on conviction be liable to a minimum fine of USD 3,000 and / or to imprisonment not for a period not exceeding one year.

Typical SHE Structure
Technical Safety Manager
Explosives Manager
SHE Representatives
Laboratory Supervisors
Hazardous Chemicals Co-ordinator
Building Evacuation Co-ordinator
Fire Aiders / Fighters

Module 6: Granular materials testing
Mr Dave Ventura presented the 6th Module to the RDU group on the 28th of May 2019. The Module covers the more common granular/aggregate materials tests, which are currently carried out in road materials laboratories.

Summary of Module 6 presentation (Mr Dave Ventura)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| Importance of testing | Cost of road building and optimising costs
Road failures
Cost of road repairs |
| Test methods discussion | Sample preparation
Grading analysis
Atterberg Limits
Optimum Moisture Content (OMC)
California Bearing Ratio (CBR)
Unconfined Compressive Strength (UCS) test
Indirect Tensile Strength (ITS) test
Determining the pH value of soils |
| Test methods Laboratory | Laboratory demonstration of testing of granular materials |
| Aggregate testing | Introduction and general discussion |
| Aggregate testing laboratory demo. | Aggregate Crushing Value (ACV)
Determination of the 10% fines (10% FACV)
Aggregate Impact Value (AIV)
Determination of the Dry bulk density, apparent relative density and water absorption of coarse and fine aggregates
Determination of the Flakiness Index of aggregates
Determination of the Average Least Dimension (ALD) of aggregates |
Module 8: Research Best Practice

Mr Benoit Verhaeghe presented the 8th Module to the RDU group on the 3rd and 4th of June 2019. The module covers research management, research project coordination, research data management, and the drafting of concept notes and reports.

Summary of Module 8 (Benoit Verhaeghe)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| Research management      | • Why research management?  
                          | • Innovation value chain  
                          | • Identification & prioritisation of research needs  
                          | • Systems approach |
| Research project coordination | • Developing research funding proposal  
                              | • Setting up research projects  
                              | • Research project reporting |
| Research data management | • Creation of data and planning for its use  
                          | • Organisation, structure  
                          | • Data storage. |
| Drafting of concept notes and proposals | • Describe the research area of interest  
                                         | • Provide an outline of proposed research  
                                         | • Identification of resources necessary for conducting the research  
                                         | • Identify suitable supervisors  
                                         | • Overall planning of research process |
| Drafting of reports      | • Who are you writing for?  
                          | • Report categories  
                          | • General structure of reports |

Module 9: Long-Term Pavement Performance

Mr Benoit Verhaeghe presented the 9th Module to the RDU group on 4 June 2019. The module covers the establishment and operation of Long-Term Pavement Performance (LTPP) monitoring programmes.

Summary of Module 9 (Benoit Verhaeghe)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| overview of LTPP programmes | The presentation covered an overview of LTPP programmes. The aspects included were:  
                              | • Definition of the LTPP concept  
                              | • Defining the goals of an LTPP programme  
                              | • Core functions of an LTPP programme |
| General LTPP monitoring protocol | The presentation focused on the definition of the various LTPP protocols and their functions. A general LTPP protocol is an umbrella protocol that serves the overall programme. It contains sub-protocols that control various aspects of the programme.  
| Site identification | Identification of the test section and the primary performance parameters to be evaluated, as well as the possible benefits to be obtained.  
| Test section establishment protocol | • The test section establishment protocol covered:  
                                      | • Historical data  
                                      | • Historical material properties  
                                      | • Finalise location – safety, sampling, logistics, politics  
<pre><code>                                  | • Evaluate frequency |
</code></pre>
<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
</table>
| Field and laboratory testing protocol | The presentation covered the field and laboratory Testing Protocol, consists of:  
- Field sampling procedure  
- Identification of all relevant tests or data parameters  
- Field evaluation  
- Laboratory evaluation  
- Laboratory testing sequence  
- Sample storage  
- Laboratory testing quality control |
| LTPP Data analysis and modelling | The presentation covered an overview of a typical application of LTPP data including:  
- Development/calibration of pavement design models  
- Improve the understanding of pavement performance  
- Guiding the pavement management and rehabilitation decisions  
- Guiding the selection of the most cost-effective pavement design |

### Module 10: Road/Bridge Asset Management

Mr Benoit Verhaeghe presented the 10th Module to the RDU group on the 5th of June 2019. The Module covered road and bridge asset management.

#### Summary of Module 10 presentation (Benoit Verhaeghe)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Asset Management</td>
<td>Structure Definitions – bridges, culverts, other structures, low level river crossings</td>
</tr>
<tr>
<td></td>
<td>Overview of Structures Management System - inventory data, inspection data, condition analysis, prioritisation and ranking, deterioration analysis, repair costs, validation</td>
</tr>
<tr>
<td></td>
<td>Inventory Information - numbering of structures, location details, required inventory data for structures, additional inventory data for structures, recommended inventory photos</td>
</tr>
<tr>
<td></td>
<td>The DER Rating System – description of the DER rating system, DER rating values, procedure for rating defects</td>
</tr>
<tr>
<td></td>
<td>Overview of Defects on Structures – deficiencies, damage, deterioration, ancillary bridge elements, typical retaining wall defects, typical gantry defects, typical road tunnel defects</td>
</tr>
<tr>
<td></td>
<td>Inspection Items and Inspection Sheets - inspection items, number of inspection items per structure type, inspection sheets</td>
</tr>
<tr>
<td></td>
<td>Inspection Procedure and Quality Assurance - types of inspections, qualifications and experience of inspectors</td>
</tr>
<tr>
<td></td>
<td>Repair Cost Calculations – urgency ratings, remedial activities, position codes</td>
</tr>
<tr>
<td>Road Asset Management</td>
<td>TMH 22 manual – background, purpose</td>
</tr>
<tr>
<td></td>
<td>Elements of asset management</td>
</tr>
</tbody>
</table>
### Components of asset management

- organisation
- inventory data
- asset valuation
- usage and condition data
- indices
- situational analysis
- needs determination
- asset management plan
- feedback loop

### Module 11: Climate Adaptation

Mr Benoit Verhaeghe presented the 11th Module to the RDU group on the 6th and 7th of June 2019. The Module covered: climate risk and vulnerability assessment methodologies; engineering adaptation; and linkages between vulnerability assessments and asset management (Module 10).

#### Summary of Module 11 presentation (Benoit Verhaeghe)

<table>
<thead>
<tr>
<th>Discussion Topic / Theme</th>
<th>Presentation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>• Global perspective on climate change</td>
</tr>
<tr>
<td></td>
<td>• Climate change effects on road assets</td>
</tr>
<tr>
<td></td>
<td>• Challenges</td>
</tr>
<tr>
<td></td>
<td>• Overview of AfCAP Project</td>
</tr>
<tr>
<td></td>
<td>• Overview of Handbook and Guidelines</td>
</tr>
<tr>
<td><strong>Climate Adaptation Handbook</strong></td>
<td>• Objectives of Handbook</td>
</tr>
<tr>
<td></td>
<td>• Components of Handbook</td>
</tr>
<tr>
<td></td>
<td>• Application of Handbook</td>
</tr>
<tr>
<td></td>
<td>• Scope of Handbook</td>
</tr>
<tr>
<td></td>
<td>• Overview of Methodology</td>
</tr>
<tr>
<td><strong>Climate Risk &amp; Vulnerability Assessment</strong></td>
<td>• Transport and Climate</td>
</tr>
<tr>
<td></td>
<td>• Risk &amp; vulnerability assessment Framework</td>
</tr>
<tr>
<td></td>
<td>• District level climate risk screening for rural road infrastructure</td>
</tr>
<tr>
<td></td>
<td>• Project level climate risk screening for rural road infrastructure</td>
</tr>
<tr>
<td><strong>Linkages to Asset Management</strong></td>
<td>• Visual assessments</td>
</tr>
<tr>
<td></td>
<td>• Vulnerability assessments at local/project level</td>
</tr>
<tr>
<td></td>
<td>• Embedment in Asset Management</td>
</tr>
</tbody>
</table>
Annex 2  Extended Abstract for the 12th TRB Low-Volume Roads Conference

Research Capacity Building Intervention in Rural Road Sector in Myanmar
(No. 19-06168)

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INTRODUCTION
Myanmar has to cope with major technical and financial challenges associated with the rural road sector. Myanmar, as a developing country, is being challenged by the lack of adequate rural road infrastructures, requiring the rural population to travel long distances to access markets and essential services. It is estimated that 9.2 million people living in rural areas have no access to any form of road. Another 11.3 million people are connected by non-all-weather roads, significantly impacting on access and mobility during the wet season (ADB, 2016). As there is a strong relationship between the provision of rural access, and socioeconomic development and the improvement of quality of live in rural communities, a reliable rural road network is important for the country's socioeconomic development.

The establishment of the Research and Development Unit (RDU) was identified as a high priority for the Department of Rural Road Development (DRRD), which falls under the Ministry of Construction and whose mandate is to systematically develop Myanmar’s construction sector. The goal of the RDU is to serve the rural road engineering and transport needs of the public and private sector of Myanmar through the development, application and dissemination of best practices and new knowledge, and the development of human capital.

As a newly established entity, there is currently no completed research programme to report on, but there is already one ongoing project that was recently initiated. It is envisaged that several research projects will be activated once the RDU is fully established. The completion of these projects will benefit and significantly contribute to the sustainability of the rural road system in Myanmar.

METHODOLOGY
The strategy to establish capacity for road research has been supported by technical assistance provided by the Research for Community Access Partnership (ReCAP) programme. ReCAP is a research programme funded by UK Aid with the objective to promote safe and sustainable transport for rural communities in Asia and Africa. The capacity building programme initiated in Myanmar, and more specifically within the RDU of DRRD, is aimed at providing scientific, engineering and technological leadership on rural road infrastructure and transport services through research, development and the implementation of research outcomes.

Once fully established and operational, the RDU will add value to Myanmar through the provision of:

- a multidisciplinary skills and expertise base in rural road and transport engineering, which could include specific competences in geometric design; road design; performance evaluation; materials design; construction and maintenance methodologies; quality control; asset management; road safety; traffic management; and rural transport services;
- core competences to support the development or updating of guidelines, norms and standards for rural roads;
- when the RDU material testing laboratory is established, access to research infrastructure;
- access to several technology and software platforms that will provide technical support to the roads sector and support advanced research;
- an information resource centre that will be accessible to all stakeholders; and
- capabilities for developing solutions that will address rural road and transport-related problems in support of national priorities and contributing to socio-economic development and public service delivery.

At present, the RDU has 11 staff members, with the potential to grow to at least 20 staff members in five years' time. The internal structure of the RDU is shown in Figure 1.
Figure 1: Internal Structure of the RDU

A Rural Road Research Technical Committee (RRRTC) was established in 2017 with the responsibility to identify and prioritize potential research areas. The current ten prioritized research areas/projects recommended by the RRRTC are listed below.

1. Rural road and bridge standards and development of a low-volume rural road design manual
2. Road protection measures (drainage and slope protection)
3. Geometric design guidelines for rural roads
4. Road surfacing trials
5. Asset management
6. Climate adaptation of rural road networks
7. Best practice guidelines for the maintenance of rural roads
8. Guidelines for the optimum utilization of local materials in rural roads
9. Complimentary access infrastructure (i.e. footpaths, footbridges)
10. Integration of road safety considerations into land use planning decisions and investment decisions on rural road infrastructure.

CURRENT ONGOING EXAMPLE PROJECT

Research Area (4), namely the monitoring of road surfacing trials on Road TGI 1A, which is situated in Taung Gyi (Shan State), is currently one of the projects that is ongoing. Two teams, with an appointed leader for each team (flexible pavements, and rigid and semi-rigid pavements), have been formed for the assessment of structural and functional performance; data capturing, processing and reporting. It is expected that new trial sections will be established, which will be incorporated in World Bank and ADB implementation projects.

Civil Design Solutions (CDS) has been appointed as advisor for the TGI 1A trial sections. CDS has provided site training to RDU staff on the establishment of monitoring trial sections and on how to conduct most of the standard measurements along project road TGI 1A, which was done during their initial visit in July 2018 and their second visit in October 2018 (CDS, 2018). Monitoring is being carried out with the help of Myanmar’s Draft Guidelines for the Visual Assessment of Road Pavements. These Guidelines provide procedures for the visual assessment of road conditions and describe the various methods of assessment used. They provide detailed descriptions of the various distress types, the various degrees of distress and color photographs of typical examples of each distress type.

The project road TGI 1A was upgraded to a paved road standard in 2016 using four different surfacing types for research purposes. The surfacing trials comprise: (a) Penetration macadam; (b) Double-chip seal (DBST); (c) Non-reinforced concrete slabs; and (d) Concrete block paving. All experimental sections were designed using Overseas Road Note 31. Activities undertaken on the four experimental sections include: (1) measurement of surface roughness; (2) rutting measurements; (3) drainage factor measurements; and (4) visual condition assessments.
Following the first monitoring exercise, it was found that: (i) the trial sections are performing reasonably well after two years in service; (ii) the paved road width (4.5m) is too narrow (leads to edge breaks and edge drops); (iii) the concrete slabs were displaying cracks; (iv) some blocks of the concrete block paving had cracked; (v) bleeding occurred in the DBST section; (vi) the drainage system (side drains and culverts) was performing adequately despite the lack of maintenance of the drains; and (vii) that the project road is probably not a low-volume road since the traffic using the road includes a wide range of vehicles other than motorcycles, up to heavily laden 6-axle trucks. Also, trucks were seen to carry rock from the numerous quarries along the road as well as agricultural produce. Consequently, the volume of traffic is high for a rural road. A traffic count and axle load survey are required to verify whether the road falls into the definition of a low volume road (i.e. carrying less than 1 million equivalent single axle loads over its design life). In addition, some baseline data were collected by the RDU team with the help of the CDS team, and the CDS team discussed the requirements for future monitoring and data collection.

ACHIEVEMENTS
Successfully completed key activities include a review of the existing RDU business plan (Verhaeghe, 2018), assessment of RDU facilities, evaluation of job descriptions for all staff positions, and the implementation of skills development plan. The key performance indicators (KPIs) outlined in the Strategic Plan are taken into consideration to fulfill RDU’s goals and operational objectives in the short to medium term. One of the KPIs was the recruitment of RDU staff. This was completed in November 2018.

A management plan for the trial sections has been established. It is essential that local road maintenance teams are aware of the locations of the trial sections and have full responsibilities to ensure that any activities to be undertaken are brought to the attention of the monitoring team immediately, to react to any actions affecting the trial sections, including maintenance activities. Signboards have been installed, indicating the location and purpose of the trial sections, to provide useful information for local communities, and to discourage disruptions and vandalism.

CHALLENGES TO SUSTAINING THE RDU
To ensure the sustainability of the capacity building efforts, the RDU will require funding with long-term guarantees to support its operations. There are two strategic options in order to ensure long-term sustainability of road research capacity. These are: (i) a line item in the annual DRRD budget, and (ii) introducing a levy on construction/implementation projects that are directly funded by MOC as well as by development partners.

The immediate constraints identified as barriers to an effective implementation of the capacity building and development of the RDU include the lack of (i) adequate research infrastructure, such as a comprehensive laboratory facility, (ii) an operational information center for knowledge management and dissemination, (iii) information and communication technology (ICT), and (iv) vehicles for field studies. However, DRRD has road materials testing laboratories in Naypyitaw and Yangon that are temporarily being used by the RDU. A fully funded RDU laboratory development plan for Naypyitaw has been approved, and construction is expected to be completed in September 2019 with the facility becoming operational by December 2019.

Capacity building is an ongoing process for the institutional development of RDU. The CSIR and other research entities will continue to provide technical support as well as mentorship of staff to undertake road research. In addition, collaborative research will be undertaken with other local and international research entities through the establishment of formal linkages.
CONCLUSION
The objective of the article was to highlight the activities that have been undertaken by RDU since its inception. It is evident that RDU is going to contribute to the improvement of the Rural Road System in Myanmar. Capacity building is currently being prioritized but it has been possible to establish an LTPP monitoring programme that will be undertaken systematically, and will also benefit the road sector in Myanmar through the review of guidelines and design manuals. The assessment of the baseline conditions, and evaluation of features most critical for the success of the different designs in the trial sections has and will continue to benefit the development of low-volume rural road standards and specifications for Myanmar. The draft final report of Rural Road Standard and Specification Manual in Myanmar was submitted in March 2018 (Dingen, 2018).

The above has been made possible through the support provided by the ReCAP programme for rural road sector improvement. Constraints that may create barriers to the successful implementation of the capacity building initiative have been identified, and measures have been put in place to mitigate their impact.

REFERENCES


Annex 3  ReCAP Article

Establishment of research capacity in Myanmar

The Department of Rural Road Development (DRRD), a department of the Ministry of Construction whose mandate is to develop Myanmar’s construction sector systematically, identified the establishment of a Rural Road Research and Development Unit (RDU) as a high priority for Myanmar.

ReCAP assisted the DRRD with the drafting of a business plan for the RDU. This plan defined the purpose of the RDU, namely to serve the rural road infrastructure and transportation needs of the public and private sector of Myanmar through the development, application and dissemination of best practices and the development of human capital.

At the request of DRRD, ReCAP also provided support with the establishment of the RDU through the implementation of a capacity building and skills development programme aimed at building and strengthening the RDU’s technical and managerial skills base. This programme also supported other essential key functions and resources associated with the operations of the RDU, such as its laboratories. As part of the programme, senior management of the RDU underwent three weeks of intensive training on all aspects of research and development at the CSIR in South Africa, with reciprocal visits of CSIR researchers to Myanmar to capacitate RDU researchers and laboratory staff.

The DRRD considers this programme critical for fostering sustainable research capacity in Myanmar. It will enable the RDU to fulfill its mandate as defined in the RDU Business Plan, namely to provide scientific, engineering and technological leadership (“RDU Vision”) on rural road infrastructure and transport services through research, development and the implementation of research outcomes (“RDU Mission”).

Training in Myanmar

DRRD Senior Management and RDU staff members