

Modernising road planning and designing in Yemen



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Roads are fundamental to the development of Yemen and the well being of its population. The deserts and mountains that characterise the country make building and maintaining roads a challenge. The network of paved roads is limited and many remote communities are still isolated. A good road network is essential to bring rural areas into the mainstream and to boost development.

The Government of Yemen drew up plans to improve the road network across the country. To translate these plans into action though, the Ministry of Public Works and Highways (MPWH) knew it needed to urgently update its information technology. Although MPWH had qualified engineers, in 1999 its computer hardware and software was old, slow and inefficient. This meant that designs of roads and bridges were not up-to-date, and that they were often not constructed and maintained as well as they could be.

In 2003, the Islamic Development Bank (IDB) technical assistance project helped modernise the use of information technology in MPWH, putting in place up-to-date systems and training staff. MPWH had asked for assistance because it recognised the importance of IT for planning and managing the road network. When the project was completed, the Ministry went on to build on the systems and skills developed through technical assistance. The Ministry is now in a good position to design roads and bridges that are fit-for-purpose, and to make sure that they are properly built and kept in good condition.



Up-to-date IT systems and staff training have improved the quality of design, project implementation and quality assurance.

Starting from scratch

In the early 2000s, plans by the Government of Yemen to expand the country's road network were hampered by the gap between existing IT equipment and skills and what was needed to design, plan and supervise construction of roads and bridges effectively. The Ministry of Public Works and Highways (MPWH) badly needed up-to-date computer hardware and software, and to bring staff IT skills up to speed. The Ministry did not have the IT solutions, database, systems and procedures it needed to keep track of projects and maintenance, or an electronic archiving system to store plans, research and reports. MPWH was eager to modernise but it was a matter of starting almost from scratch.

Putting the essentials in place

The IDB technical assistance project kick started modernisation by providing the Ministry with computer hardware and software, and training staff to use them.

IT equipment and systems

A technical expert helped MPWH put essential IT equipment in place. He advised on computer systems and applications, organised procurement, and supervised delivery and installation. He designed and set up an IT network, a roads database and an archiving system, and organised a cable internet connection.

Seeing the immediate benefits that these improvements made prompted the Ministry to invest in add-on equipment and to buy mapping software. Realising the value of access to the internet, the Ministry also upgraded the cable connection to high speed WiFi broadband.

Skills

In parallel with installing hardware and systems, the technical expert prepared a training plan, and organised in-house training for engineers and draftsmen. Throughout the project the expert was also on hand to mentor staff.

Nine engineers were sent to the Eldar Alarabia for Industrial and Managerial Development in Egypt for a 10-day training course on all aspects of road construction, from planning to final evaluation. Depending on their responsibilities they took courses in managing build-operate-transfer (BOT) projects, privatisation and public-private partnerships, pavement standards and road classification.

IT staff recruited by the Ministry were among those sent to Egypt for training. These individuals became champions for the new systems. Their ownership created a supportive environment and encouraged other staff. Staff in the IT Directorate trained 38 engineers and draftsmen as part of the in-house training programme. This ownership, together with Ministry initiatives to acquire more equipment and software, and improve connectivity, contributed significantly to the success of the project.

Learning resources

As well as hardware, software and training, 64 books and manuals (Arabic and English) on civil engineering and IT were purchased as staff learning resources.

Transforming the way of working

The technical assistance project came at an opportune time. The Ministry was poised for modernisation, and the project helped 'break the IT culture wall' and 'transformed the way of working'.

Although the project was completed in 2003 the transformation continued. By 2007, the Ministry had installed 44 more computers and by 2010 there were 140 computers in MPWH and most of these were connected to the internet. In all 135 staff were using the IT systems. The high-speed ADSL WiFi network was operating 24 hours a day 7 days a week and email was a routine way of communicating both internally and externally.

Standards and practices

In depth interviews with four members of staff confirmed that the training in Egypt had equipped them with both technical skills and know-how. The IT systems and the skills acquired by staff have improved the quality of design, project implementation and quality assurance.

The training course in Egypt also introduced staff to state-of-the art standards and best practices in road construction and management. The Ministry is now adopting performance-based management approaches, road management systems and build-operate-transfer (BOT) processes. This means the Ministry is better positioned to advance government plans for public-private partnerships and BOT projects to develop the country's road network.

Information systems

The Ministry now has an IT platform that includes a database of all road projects in Yemen and a geographic information system (GIS). The database, registration, GIS and archiving systems are fully functioning and institutionalised. Staff use the computerised road planning and management system to monitor work, and update the database to show new roads and those under construction. They back up data daily. The database is reliable and provides technical data and maps as required. This means engineers have all the information they need for designing, planning, building and maintaining roads at their fingertips.

The archiving system – on an Oracle platform – gives all authorised users access to research and information on work in progress and completed projects. Archiving is now a routine and the database is a cornerstone of management. Information from the roads database is often used in the Ministry magazine *Highways*, which informs a wide audience of progress on the Yemen road network.

Now that the Ministry has computers, plotters, scanners and appropriate software, drawing up designs and planning is more efficient. Computer-generated reports, plans and maps are also standardised and user friendly.

Ongoing upgrades

The Ministry has put in place measures to maintain and upgrade hardware and software. The Ministry's Networking and Maintenance Department retires about 10 computers each year and buys 15 to 20 to replace them. The Ministry is also gradually upgrading the intranet.

The Ministry has continued to recruit more and better qualified staff. Specially recruited IT engineers have been trained to support Ministry systems. The IT Directorate now has two geographic information system specialists, one of them the department manager.

The Ministry recently moved into a new building that is fully connected to the internet. Setting up a library in the new building is a priority.

"We started from scratch and now we are using IT solutions and our staff is well equipped with both the skills and the equipment." IT Director

Success factors

Champions

The high level of ownership by internal champions in strategic positions was a key success factor. IT champions rolled out the new technologies and helped other staff develop their skills. The General Directorate of Information Systems and the IT Directorate played an important role in ensuring that hardware and software were up-to-date, coordinating purchases with the project management unit and ensuring that equipment was assigned to appropriate staff.

Leverage

The other key success factor was leverage. The project was an 'eye-opener' – clearly demonstrating the huge benefits of using IT and leveraging the Ministry to invest additional resources. The Ministry was also able to leverage expertise from SMEC International, a consulting company, to upgrade software.



Designs for roads and highways meet high standards.



The roads database holds details of new roads and those under construction.

Overall, the project demystified the use of IT and changed the work culture in the Ministry. Building on progress, the Ministry is now looking to roll out IT to the offices in the governates that supervise work on the ground.

The Ministry has embraced state-of-the art IT.

Building on progress

The Ministry has made impressive progress in the years since the project was completed. The 2011 project post-evaluation report showed that the Ministry is 'definitely on the right track'.

Continuous improvement

The server and other equipment installed during the project are still being used. The Ministry continues to upgrade IT equipment and systems and has purchased servers, personal computers, printers, scanners, and software such as AutoCAD 2010, ArcGIS 9.2 and Google Earth. The Information Systems Directorate is fully capable of designing new applications to meet needs as they arise. The Ministry website, in Arabic, is gradually being updated.

Capacity development master plan

The project also prompted the Ministry to develop a master plan for capacity building. MPWH is now seeking funds from donors to carry it out.

Project monitoring

Lessons learned during this and other projects funded by external donors led the Ministry to set up a permanent International-Funded Projects Unit reporting directly to the Minister. The new unit evolved from the

office set up by the Ministry to manage the IDB technical assistance project and now monitors all projects.

Impact

Ripple effect

The modernisation in MPWH has had a ripple effect on the quality of government services in transport, public works, housing, and finance and administration.

Better roads

Not least, the project created an enabling environment that contributed to tripling the paved road network in Yemen from 5,234 kilometres in 1996 to 14,093 kilometres in 2010. Another 10,973 kilometres are under construction. The Deputy Minister for the Road Sector attributed the fall in the cost of imported goods by on average 20% to these improvements. The changes to the road network in Yemen are bringing rural areas into the mainstream and boosting trade, an important step forward in development.

Catalysing benefits

This IDB technical assistance grant although modest – in the order of US\$250,000 – played a catalytic role in realising enormous benefits.

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