



## Overhead transmission lines

*Over the last 25 years Mott MacDonald has engineered more than 10 000 km of transmission lines.*

Mott MacDonald provides comprehensive design, engineering and management services for transmission line projects, including feasibility studies and site supervision. We use the latest analysis and simulation software to deliver profile optimisation and tower design that complies with international codes. We also possess extensive foundation design capabilities.

Our expertise encompasses condition monitoring and assessment and optimised refurbishment. We have worked on major projects of up to 500 kV in locations world-wide, including the UK, Hong Kong, Indonesia, Jordan, Malaysia, Namibia, Nigeria, Oman, Syria and the United Arab Emirates.

Mott MacDonald's transmission line team specialise in services for lines from 11 kV up to 500 kV, including:

- **Engineering**

Complete management of transmission line projects, including route selection, design, specification, environmental assessment, tendering, auditing detailed designs, inspection and testing of materials and line components, foundation testing, site supervision and commissioning.

- **Structure design**

Mott MacDonald uses the latest tower modelling software, which enables us to design transmission line towers, substation structures and radio masts. These can be new designs or re-assessment of existing structures to carry different loads – such as larger conductors for transmission lines or a different array of antennae or aerials for radio masts or towers.

We undertake designs for all types of structure, including steel lattice, wood poles, concrete poles, tubular steel and folded plate poles. Short circuit effects can be considered in our designs for gantries at line terminations and within substations.



*Our global experience has taken in a huge variety of terrains and climate conditions.*



*Optical systems are used on many of our transmission line projects.*

#### Contact us

Europe/Africa/Asia-Pacific

Dr Keith McLeay

T +44 (0)141 222 4617

E keith.mcleay@mottmac.com

UK

Joy Louis Aloor

T +44 (0)1273 365260

E joy.aloor@mottmac.com

USA

Trevor Foster

T +1 781 915 0015

E trevor.foster@mottmac.com

Middle East

Paul Looker

T +971 506 626 568

E paul.looker@mottmac.com

China

Dr Aijuan Wang

T +44 (0)1273 365196

E aijuan.wang@mottmac.com

[www.mottmac.com](http://www.mottmac.com)

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#### ▪ Tower testing

We have experience with tower testing stations around the world and regularly witness full-scale tower tests to prove tower design capabilities.

#### ▪ Insulation

Our experience in insulation design standards is considerable and covers the widely diverse performance requirements of climates across the world. Services include establishing insulation levels, appropriate insulator materials and shed shapes, insulator washing systems and insulation co-ordination throughout the line.

#### ▪ Foundation design

Mott MacDonald has many years of experience in foundation design to suit a wide variety of structure types and various soil conditions. These include pile, raft, pad and chimney and rock anchors.

#### ▪ Line profiling and routing

We utilise PLS-CADD for the optimisation of tower positions on line profiles. In addition, we undertake conductor and earth wire sag/tension calculations, creep calculations and erection sags/tensions using this software or our own in-house software.

Routing is undertaken on the ground and by aerial survey to investigate viable alternatives leading to the most cost effective route. In tandem with the survey process, Mott MacDonald's is also able to undertake environmental impact studies for projects.

#### ▪ Conductor ratings

These include the calculation of continuous and short circuit ratings for conductors on transmission lines and in substations.

#### ▪ Optical fibre

Optical systems are used on many of our transmission line projects and we are familiar with OPGW, self-supporting, and wrap-around systems and their fittings.

#### ▪ Line working procedures

Mott MacDonald can develop procedures for the erection and maintenance of conductors and insulators, including the selection and application of appropriate equipment. We can also provide advice for the installation of foundations and the erection of towers.

#### ▪ Condition assessment

Condition assessment and monitoring of existing assets has become more significant in recent years. To aid us in this area, we have developed a risk-based strategic analysis process that provides a cost effective approach to this work. This process is being applied to transmission lines in the UK and the US. The information gained can be used to develop asset management, refurbishment and maintenance plans.

#### ▪ Emergency restoration systems

We design emergency restoration schemes for overcoming temporary loss of an overhead line, including the development of procedures and the selection and application of appropriate equipment.

#### ▪ Training courses

Mott MacDonald has provided training courses on overhead line design to various transmission and distribution utilities throughout the world. A full prospectus is available on request.