



Professional Drilling Management

Online Course

MODULE 3: BOREHOLE DRILLING & SUPERVISION

ORIENTATION VIDEO



MODULE GOAL



This module will enable you to:

- Appreciate that there are technical reasons for immediate and long-term borehole failure.
- Understand more about the skills and equipment required to ensure that boreholes drilled to a high quality.
- Appreciate the importance of drilling supervision.
- Know the responsibilities of the drilling supervisor and actions to be carried out at each stage to ensure that the driller delivers the borehole as specified in the contract.

The module discussion forum will enable you to will reflect on the drilling supervision practices your organisation, or more widely in the country or the context in which you work.



ARE YOU NEW TO BOREHOLE DRILLING ?

RECOMENDED VIDEOS

Mechanised borehole drilling

- DANDO (2016) Dando Watertec 50, Tanzania, Dando Drilling,
<https://www.youtube.com/watch?v=2AW-J48ZkBM>

Manual borehole drilling

- Practica Foundation (2017) **Practica Found_Professionalizing Manual Drilling in Africa** [online]
<https://vimeo.com/178460626>

DRILLING EXPLAINED

- Wikipedia (2017) **Well Drilling** [Online],
https://en.wikipedia.org/wiki/Well_drilling

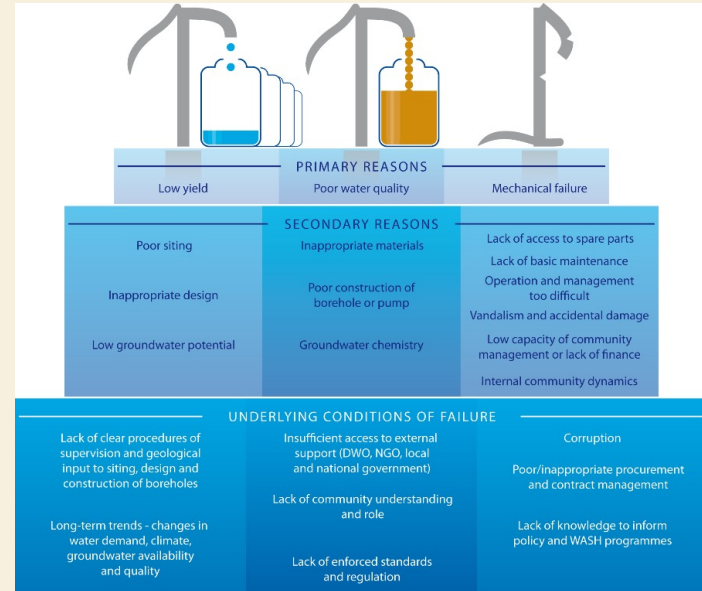


COST-EFFECTIVENESS

COST-EFFECTIVE BOREHOLES

- Drilling cost-effectiveness is “*optimum value for money invested over the long term*”.
- Thus, the cheapest borehole is **not** always the most cost-effective, particularly if construction quality is compromised to save money.

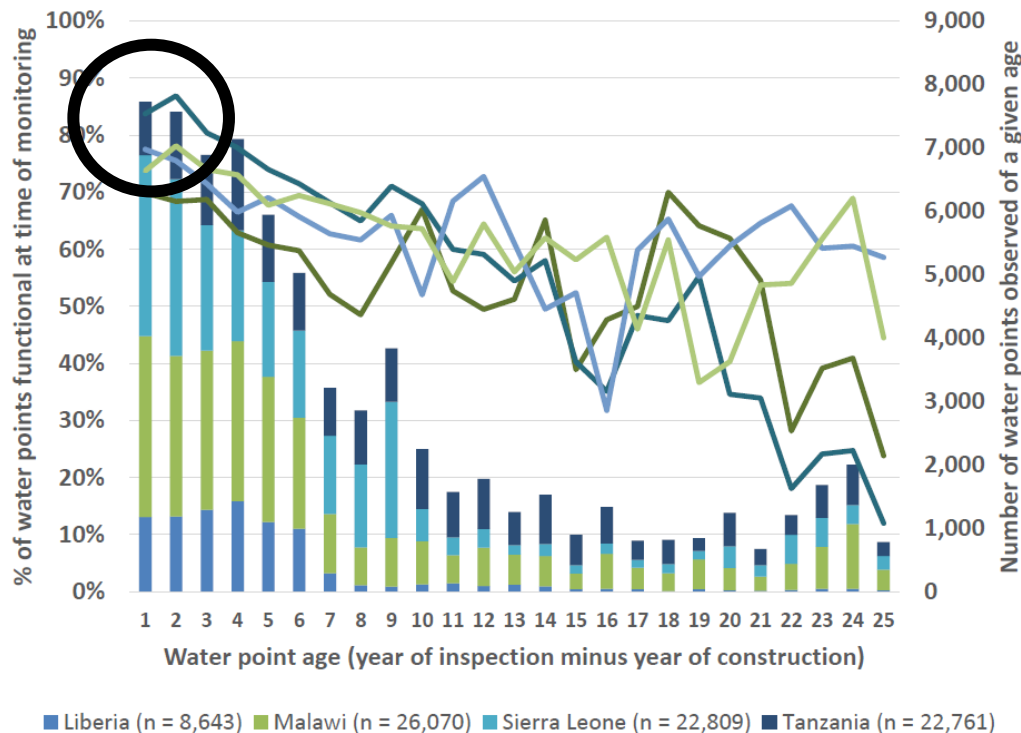
PRIMARY REASONS, SECONDARY REASONS AND UNDERLYING CAUSES OF FAILURE OF HANDPUMPS AND BOREHOLES



Source: BONSOR, H.C. OATES, N, CHILTON, P.J., CARTER, R.C, CASEY, V. MACDONALD, ETTI, B, NEKESA, J. MUSINGUZI, F, OKUBAL, P, ALUPO, G., CALOW, R., WILSON, P., TUMUNTUNGIRE, M AND BENNIE, M (2015a) *A hidden crisis: strengthening the evidence base on the current failures of rural groundwater supplies*, Briefing Paper 2181, 38th WEDC International Conference, Loughborough University, UK, 2015, Available from <https://wedc-knowledge.lboro.ac.uk/details.html?id=22149>

BOREHOLE SUCCESS & FAILURE (!)

Water Point Functionality Rates vs. Age of Infrastructure



MANDATORY VIDEO I

RWSN (2016b) *Why are some boreholes better than others?*

<https://vimeo.com/185289895>



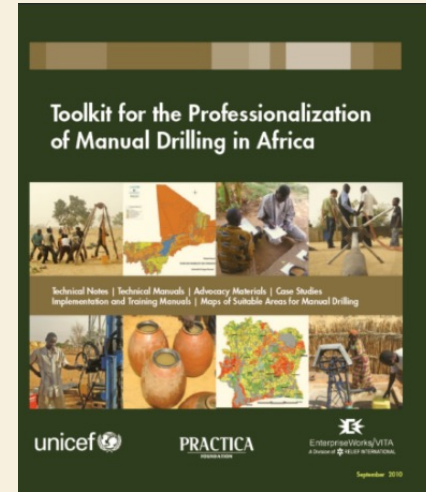
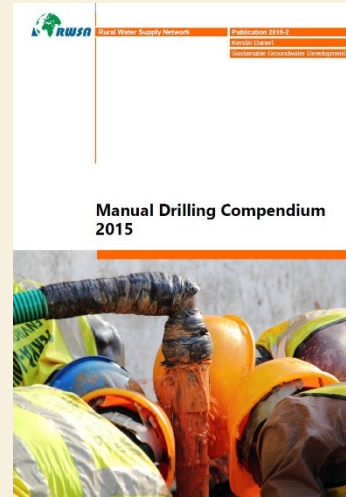
SOURCE: TINCANI, L., ROSS, I., ZAMAN, J., MURRAY, P., MUJICA, A., AND EVANS, B. (2015) "REGULATORY ASSESSMENT OF THE OPERATIONAL SUSTAINABILITY OF WATER AND SANITATION SERVICES IN SUB-SAHARAN AFRICA" VFM-WASH PROJECT REPORT, AUGUST 2015

BOREHOLE DRILLING AND COMPLETION

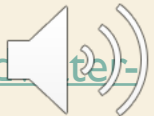
RECOMMENDED READING

- SCHNEIDER, S. J. (2014) **Water Well Guidelines for use in Developing Countries**, Third Edition, <http://www.rural-water-supply.net/en/resources/details/411>
- BALL. P (2001) **Drilled Wells**, Series of Manuals on Drinking Water Supply, Volume 6, Skat, <http://skat.ch/book/drilled-wells/>

LEARN MORE ABOUT MANUAL DRILLING



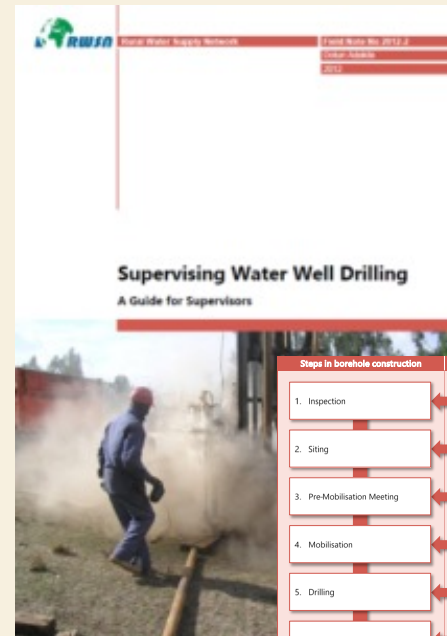
See: <https://www.rural-water-supply.net/en/sustainable-groundwater-management/manual-drilling>



SUPERVISION

MANDATORY MATERIALS

- RWSN (2015) *A borehole that lasts for a lifetime*
<https://vimeo.com/128478995>
- ADEKILE, D. (2014) *Supervising Water Well Drilling. A guide for supervisors*
<http://www.rural-water-supply.net/en/resources/details/392>



Steps in borehole construction	Driller's responsibilities	Supervisor's responsibilities
1. Inspection	Assemble equipment & personnel for inspection.	Inspect equipment and interview personnel.
2. Siting	Hydrogeological survey; geophysical survey; submit report.	Check equipment; provide guidance on siting borehole; approve siting report.
3. Pre-Mobilisation Meeting	Raise specific questions regarding the contract requirements.	Together with the client, thoroughly discuss the design, materials and procedures for each step of the.
4. Mobilisation	Submit program of work; submit samples of materials; move equipment to site.	Liaise with the community; approve drilling equipment & material; guide driller to site.
5. Drilling	Position and operate the rig; collect samples; report.	Monitor drilling; advise depth to stop drilling; log the borehole.
6. On-site Design Modifications	Install casing and screen; gravel pack; sanitary seal; report.	Instruct screening and casing depth; ensure gravel pack and sanitary seal properly placed.
7. Borehole development and site completion	Develop the hole; undertake test pumping; collect water sample; disinfect the hole.	Ensure water is clean; proper disinfection; supervise pumping test; ensure samples are taken and platform installed.
8. Demobilisation	Remove all equipment and rubbish from site; report.	Ensure the site is restored to its former state.
9. Complete documentation and handover	Submit all records. Hand over.	Hand over borehole to community. Report.

**RESPONSIBILITIES IN
BOREHOLE CONSTRUCTION
& SUPERVISION**



OTHER TECHNICAL ASPECTS AND THE BOREHOLE CAMERA

FIND OUT MORE



SOURCE: UNICEF/SKAT FOUNDATION (2016) PROFESSIONAL WATER WELL DRILLING: A UNICEF GUIDANCE NOTE, [HTTPS://WWW.RURAL-WATER-SUPPLY.NET/EN/RESOURCES/DETAILS/775](https://www.rural-water-supply.net/en/resources/details/775)

- UNHCR (2022) **Series of technical videos on**
 - [From well Construction to Pumping Tests](#)
 - [Casing](#)
 - [Gravel pack](#)
 - [Pumping Test Equipment](#)
- Geosystems (2014) **GeoVISION Borehole Camera**
https://www.youtube.com/watch?v=S_upRJFqUY80
- Dunne, A. (2009) **Borehole for water well, CCTV Camera**
<https://www.youtube.com/watch?v=N5fwgSgqatw>



KEY POINTS



1. There are numerous technical reasons for borehole failure.
2. Borehole failure can be due to poor siting, borehole design and construction in the first place.
3. Professional drilling supervision can assure construction quality.
4. Supervision can be full-time, or part time (i.e. milestone).
5. As a drilling programme manager you should be able to critically reflect on the borehole supervision process that is undertaken by your organisation or context.



