

Teaching Geology to Non-Geologists: getting back to the Rocks

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In the integrated world of the oil industry it is critical that the various disciplines understand each others' roles. Fortunately, it is relatively straightforward to introduce non-geologists to the science of Geology, because it is based primarily on observation and interpretation, rather than on complex equations. Factors such as the scale and character of the reservoir can be appreciated much better if the engineers in the team have had the opportunity to see real rocks. While core provides some idea of the micro-scale to meso-scale attributes of the reservoir, outcrops provide ideal analogues to appreciate scale, sedimentology and structure.

Over the past ten years I have set up several "Geology for non Geologists" training courses (G4NG). Locations have varied from the Dorset coast to the Canadian Rockies, as well as courses in Utah and Southeast Spain. Typically the course is divided into a classroom session, focussing on the basics of geology, followed by a one to three day field geological field excursion. Outcrops are chosen to demonstrate the widest possible range of depositional environments, in areas where natural exposures are common. Ideally the outcrops should feature potential reservoir rocks, source rocks, seals and traps. Typical themes to be explored include sedimentology, palaeontology, structural geology, oil genesis and migration, and basin evolution. Many of the field areas have been chosen because they include a working petroleum system, and tying the exposed rocks to the producing fields in the subsurface provides a "red thread" to underpin the course.

After the classroom session, and before the field trip, the participants are given a thorough safety briefing. They are not allowed out into the field without proper protective and safety equipment. The group is divided into teams, made up of a variety of disciplines, which helps to maximise the learning experience. Wherever possible working geologists will also attend the field trip, with one assigned to each team. At each outcrop, before attacking the geology, a participant is selected to give a short introduction to what their own job entails, so that the other non-geologists can learn more about the industry in which they work.

Simple exercises have been developed at each outcrop to introduce new concepts, and to make the participants think. These may involve observation of sedimentary structures, simple volumetric calculations, or even logging sections. All of the exercises teach the participants how to observe rocks and then interpret them. Each outcrop is carefully chosen, and each associated exercise designed, so as to build upon previous ones and facilitate understanding of the basic geological concepts. At the completion of each exercise a team is chosen to present their findings to the other groups, and a facilitated discussion follows.

The field trip usually concludes at a producing field where the ideas are brought together to show how the various geological elements of a petroleum system work in concert to trap hydrocarbons. That evening each team is given a geological theme to present on, such as trace fossils, sedimentary structures or reservoirs. They address these themes using outcrop examples drawn from the field trip. Feedback is sought from each attendee to continually improve the course. While it is obviously not possible to “make” a geologist from an engineer over the course of a few days, the G4NG courses provide a great opportunity to provide key awareness of basic geological concepts that can then be directly applied back in the workplace, while ensuring that geologists and their counterparts are “speaking the same language”.

initiatives.