



Velocity of Detonation (VOD) is an important measure of explosive material characteristics as the performance of explosive invariably depends on its velocity of detonation. The power/ strength of explosive causes fragmentation of the solid structure; determines the efficiency of the Blast performed. It is an established fact that measuring velocity of detonation gives a good indication of the strength and hence the efficiency of the explosives used.

APPLICATIONS

✗	Open pit
✗	Civil construction
✗	Underground
✗	Quarry

BENEFITS

Safety, Quality and Environmental:

- ✗ Determine detonation performance –low or high-, or failure that may have occurred in the explosive column.
- ✗ Test the VoD as Quality Control to verify product specifications.
- ✗ Determine the effects of detonating cord downlines on explosives.
- ✗ Check timing accuracy of electric, electronic and non-electric delay detonators in full scale blasting environments.
- ✗ Evaluate length and type of material to use as stemming in decks to avoid sympathetic detonation, and/or explosive deck desensitisation.
- ✗ Determine the effects of dynamic pressures from adjacent holes on gas and micro-balloon sensitized products.
- ✗ Determine the effects of water, drill cuttings, rocks, stemming etc... trapped within the bottom, middle and top of the explosive column.

Economical:

- ✗ Determine the minimum booster size and type for any explosive column by measuring the run-up VODs in full scale blasting environments.
- ✗ Determine the minimum length of explosive column to use as an explosive deck in decked holes, considering the ingress of stemming and drill cuttings, water pick-up etc... and the explosive run-up distance to full VOD requirements.

EQUIPMENT

There are some commercial devices that can be used to determine VOD:

- ✗ Some of them portable and low cost, useful for periodic QC control in the operations
- ✗ Others are more sophisticated to perform more complex analysis

Analysis software is an important requirement, in order to get more accurate results.

Most of the actual commercial devices are based on measuring continuous wire resistance during an explosive column's detonation. Multipoint methods are old-fashioned.

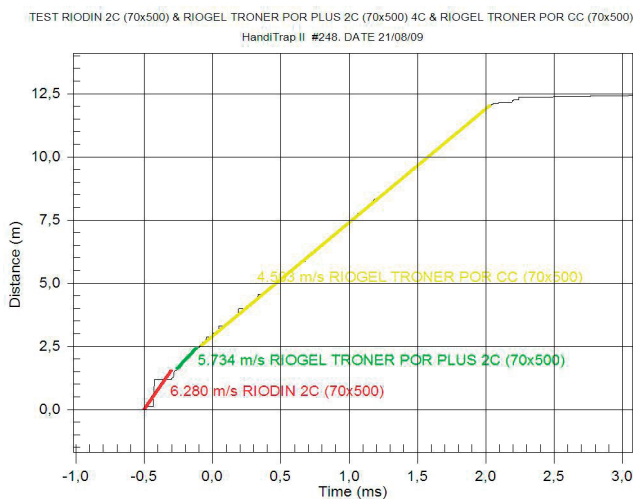
METHODOLOGY

Measurement methodology consists in using a high resistance cable –probecable– along the borehole length. The cable will be destroyed and short-circuited continuously by detonation shock wave and voltage variation will also be registered.

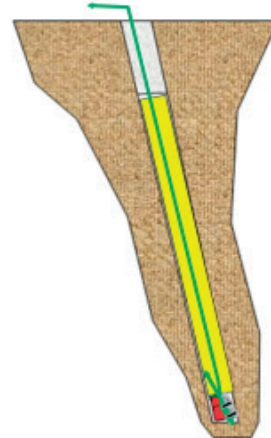
Cable has to be in a right position, without loops or rounds that could affect accuracy of measurement.

Safety rules have to be considered as well, in order to avoid loss of the equipment or even personal injuries.

VOD record graphic



VoD probe placement



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version 1.0 January 2016