

Vocational training programs subsequent to 9 years compulsory schooling

VG 1:

VG 2:

VG 3:

VG 1: Buildings and Heavy Construction	VG 2: Construction Technology	VG 3: Rock Engineering
	Rock masonry	Construction Operators heavy equipment Rock masonry
	Technology, climatics, energy and environment and more	mason, concrete, timbering, scaffolding, shot firing and more

Common programs cover many trades within buildings and heavy construction. Contents of topics for blasting competence. Further in- depth- studies may be organised through projects (??) :

Main sectors	Contents	constuction (basics) 1 år	VG 2 - Heavy Construction (tidl VK 1) 1 år	Construction (2 yers pract.training)	E k s a m e n / p r ø v e - S p	"Master course" (Manager) (7 weeks theoretical studies)
Trades	Info/motivation	Introduction to blasting operations within various trades. Introduction to explosives, trade names, various blastings (quarry-tunnel-underwater etc) Introduction to	Intro to trades where blsting operations are part of the commercial activities		E k s a m e n / p r ø v e - S p	
Trades	Laws and regulations	Kjenne til omfanget av brann og eksplosjonsvernloven og eksplosivforskrift Kjenne definisjonen av håndtering og hvilke tillatelser og sertifikater som kreves (1t)	Knowledge of law and regulations governing blasting operations: Generals How to purchase explosives Storing The use Neighbour law (important in Norway)	Learn to work in agreement with laws and regulations		More detailed knowledga of important laws and regulations.: Law on fire fighting and explosives Law on neighbours
Production	HSE	Learn important regulations (Internal control)	"Internal regulations" Documentation			Details on documentation
Trades	Working plans	Planning and the planning processes	How to plan, the stages of planning, cost estimates.	Learn to prepare a tender		Cost estimates Tendering Risk analyses
Production (VG1)	Safety	Learn important regulations (Internal control)	Danger factors: Throw, air blast, vibrations. Warning requirements Safety distances Cover Blasting plan. Plan for the round (Salvo)	Understand, prepare and use Blastplan Plan for the round (salvo) Prepare: Salvoreport Handling of explosives with due care and resonsibility		ROS-analyse(risks and vulnarability) Prepare: Blasting plans Plans for the round (salvo) Reports Blast progress, velocities and fragmentation
	Security		Storage Transports The use Society development	Learn the resonsible way of handling explosives		Detailed competence within "ROS" (Risks and vulnerability analyses)

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Production(V G1)	Geology	Learn about hard rock and soft rock	General Minerals Drillability, blastability Blastability versus geology Drilling methods, commonly used methods ans equipment (50 - 75 hrs)	To gain experience with various kinds of rock (blastability versus geology)	r e n g E k s a m e n / p r ø v e - S p r e n g	Rock Engineering and Geological maps and reportsVurdering av ingeniør- geologiske kart og rapporter
	Explosives (theory)		Detonation. Transition process solids/gases. Primary explosives, Secondary explosives. Ignition process: matches, cord, detonators, primers, explosives. Electric, Nonelectrical, controls. Couplings			In-depth knowledge og chemical composition. Stability / lifespan Sensibility Areas of use Destruction
Produksjon (VG1)	Products	Familiar with various:: Detonaters Explosives Bulk qualities ANFO Slurry Matrixes and emulsions Blasting materials: Ignition devices Tools	Understand the differences and be able to select: Detonators Explosives Bulk qualities: ANFO Slurry Matrixes and emulsions Other materials Ignition devices	Handling of various kinds of explosives, detonators and additional materials necessary for the blasting operations.		Detonators Explosives Bulk qualities:: ANFO Slurry Matrixes and emulsions Blast materials: Equipment Standards (NS-DIN-BS)
	Blasting techniques		Basic rules of blast planning. Quantity of explosives per m3, drilling pattern, selektion of detonators and ignition systems			Familiar with all techniques
	Drilling technology		Drilling pattern. Delays Drill hole deviation. Bench blasting. Ditches Tunnels The influence of geology on drill pattern Drilling machinery			
	HOURS	ca 13 hours	200 - 250 hrs ?? MEF: ca 200 hrs EFEE: ca 175 hrs	2 years		220 hrs??? Ca 7 weeks

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