

Fire Control

T 1 - Fundamentals of the firing activity of artillery units

References and further reading 1/3:

MO ČR. *Bojové použití dělostřelectva Armády České republiky*. Dě1-1-1. Praha: 2002. 92 s.

MO ČR. *Dělostřelecký průzkum, topograficko-geodetická a meteorologická příprava dělostřelectva všeobecné palebné podpory*. Dě1-6-4. Praha: 1996. 144 s.

MO ČR. *Palebná služba pozemního dělostřelectva*. Dě1-3-1. Praha: 1995. 185 s.

MO ČR. *Doktrína Armády České republiky*. Praha: 2004. 148 s.

References and further reading 2/3:

MO ČR. *Bezpečnostní strategie České republiky*. Praha: 2003. 22 s.

AAP-6 (STANAG 3680), *NATO glossary of terms and definitions, Přehled termínů a definic používaných v NATO*. Brusel: NSA, apríl 2007.

AArtyP-1(A) (STANAG 2934) *Artillery Procedures, Dělostřelecké postupy*. Brusel: NSA, březen 2004.

AArtyP-5 (STANAG 2484) *Field artillery tactical doctrine, Taktická doktrína polního dělostřelectva NATO*. Brusel: NSA, leden 2002.

References and further reading 3/3:

AAP-38 (STANAG 2484) *NATO Artillery Glossary, Terminologický slovník dělostřelectva NATO*. Draft document. Brusel: NSA, únor 2001.

STANAG 2014 *Formats for orders and designation of timings, locations and boundaries, Struktura rozkazů, uvádění časových údajů, názvů, míst a rozhraní*. Brusel: NSA, říjen 2000.

ČOS 10001 *Dělostřelecké zbraně názvy a definice*. Praha: Úřad pro obrannou standardizaci, katalogizaci a statní ověřování jakosti, 2006. 20 s.

Course Objectives:

Explain the basic concepts related to fire artillery units. Clarify the basic attributes of artillery fire, including the use of firing tables.

Content:

- 1) The notional apparatus
- 2) The flight path elements
- 3) SAFETY AND RISK SAFETY DISTANCES
- 4) THE ARTILLERY COMMANDS ABBREVIATIONS
- 5) Principles of ranking the targets with artillery battalion and battery

1) The notional apparatus

☐ accuracy of fire

- ☐ The precision of fire expressed by the closeness of a grouping of shots at and around the centre of the target.

☐ acknowledgement

- ☐ A message from the addressee informing the originator that his communication has been received and is understood.

☐ altitude

- ☐ The vertical distance of a level, a point or an object considered as a point, measured from mean sea level. Related term absolute altitude; altitude datum; barometric altitude; calibrated altitude; critical altitude; cruising altitude; cruising level; datum level; drop altitude; elevation; height; high altitude; minimum safe altitude; pressure-altitude; transition altitude; transition level.

1) The notional apparatus

☐ artillery fire plan table

- ☐ A presentation of planned targets giving data for engagement. Scheduled targets are fired in a definite time sequence. The starting time may be on call, at a prearranged time or at the occurrence of a specific event.

☐ artillery manoeuvre area

- ☐ An area within which artillery is authorized to deploy but which is not reserved for its exclusive use.

☐ artillery preparation

- ☐ Artillery fire delivered before an attack to disrupt communications and disorganize the enemy's defence.

1) The notional apparatus

☐ artillery reserved area

- ☐ An area reserved exclusively for the positioning of artillery assets.

☐ artillery survey control point

- ☐ A point at which the coordinates and the altitude are known and from which the bearings/azimuths to a number of reference objectives are also known.

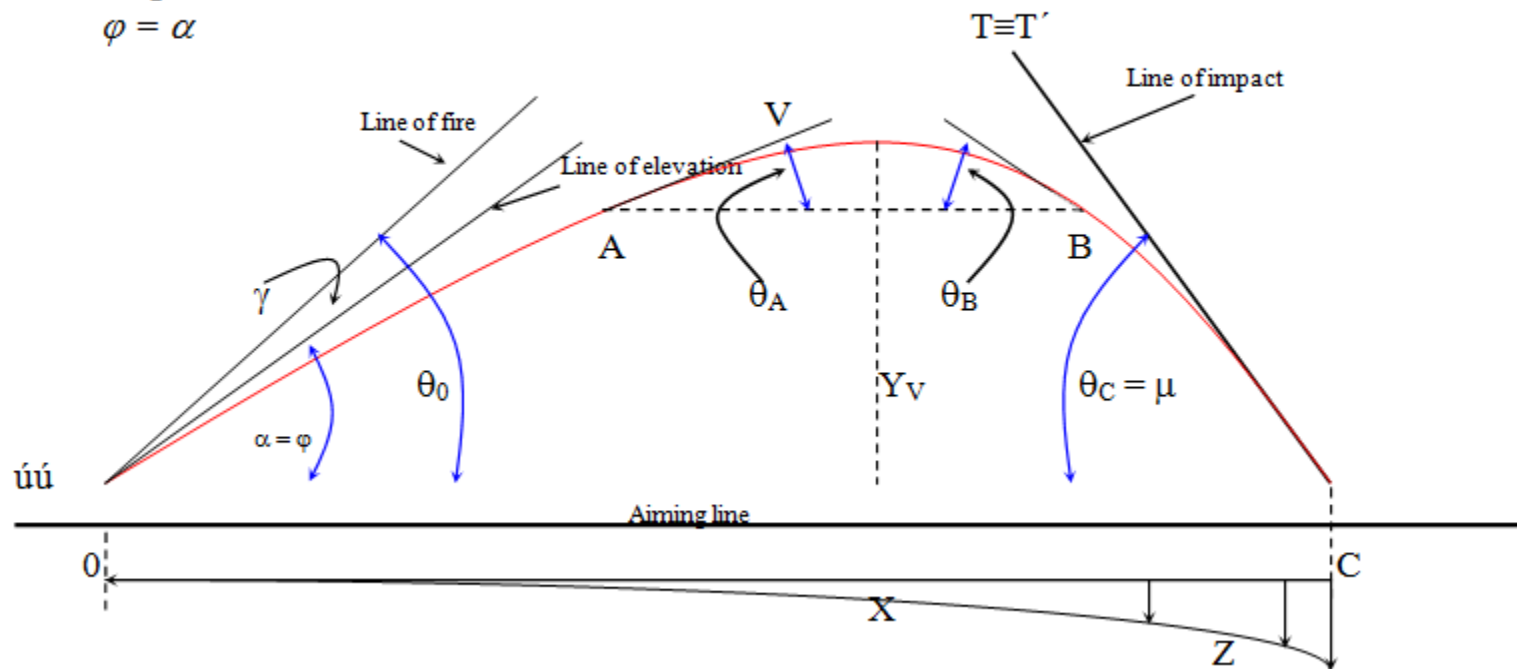
☐ at my command

- ☐ In artillery and naval fire support, the command used when it is desired to control the exact time of delivery of fire.

2) The flight path elements

- target in the muzzle level

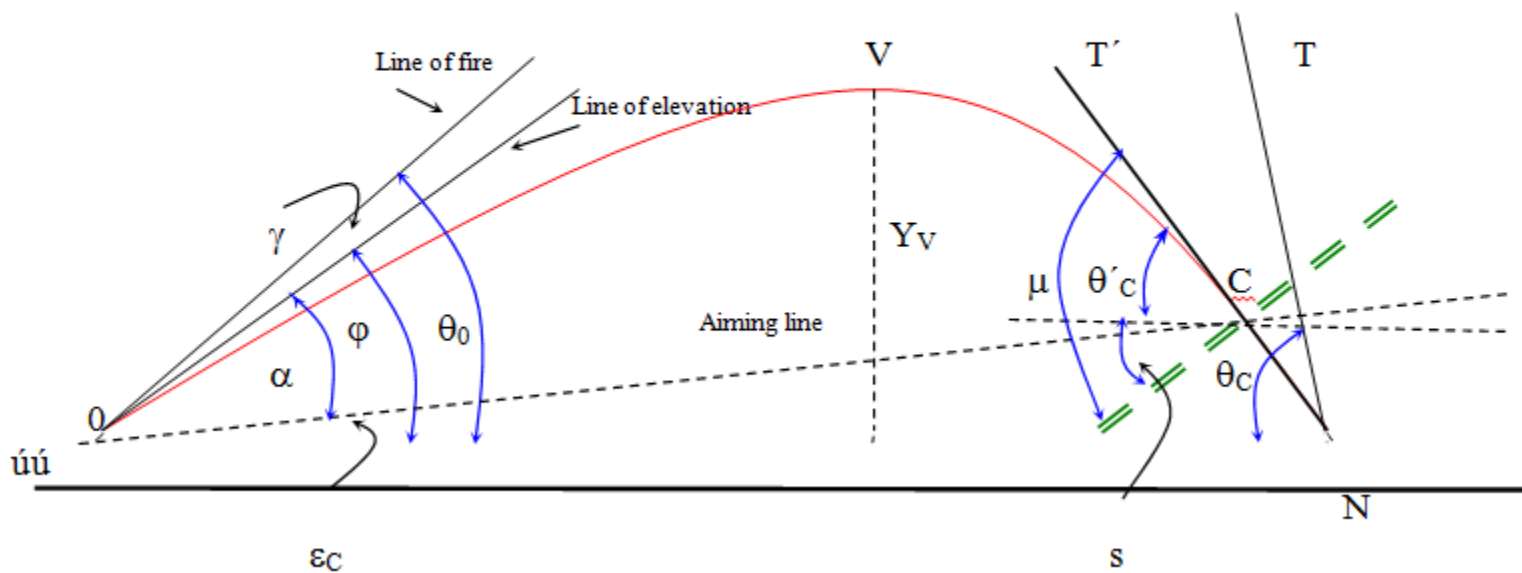
$$\varphi = \alpha$$



2) The flight path elements

- surmounted target – forward slope

$$\begin{aligned} \varphi &= \alpha + \varepsilon + \Delta\alpha_\varepsilon & \mu &= \theta_C + s \\ \varphi &= \alpha + \Delta\varphi & \Rightarrow & \Delta\varphi = \varepsilon + \Delta\alpha_\varepsilon \end{aligned}$$

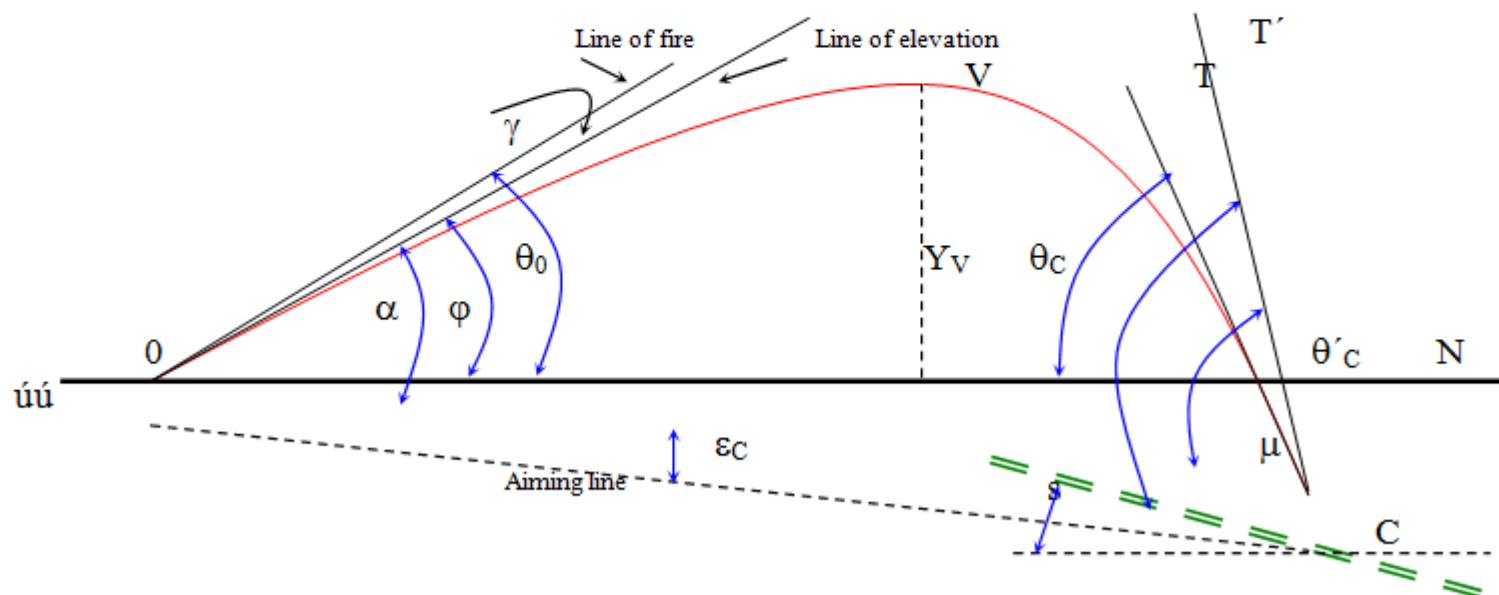


2) The flight path elements

- lowered target – slope averted

$$\varphi = \alpha - \varepsilon_C - \Delta\alpha_\varepsilon \quad \mu = \theta_C - s$$

$$\varphi = \alpha - \Delta\varphi \quad \Rightarrow \quad \Delta\varphi = \varepsilon + \Delta\alpha_\varepsilon$$



3) SAFETY AND RISK SAFETY DISTANCES

Safety distances (minimal) depend on:

- errors of determining the firing data in the distance,
- projectiles dispersion,
- radius of the effective spray.

$$L_{\text{MSD}} = 4Ex_v + r_{\text{str}}$$

or

$$L_{\text{MSD}} = 4\sqrt{Ex^2 + \acute{u}d^2} + r_{\text{str}} \left(Ex_v^2 = Ex^2 + \acute{u}d^2 \right)$$

3) SAFETY AND RISK SAFETY DISTANCES

Minimal safety distances

Character of concealment of own troops	Projectile and fuse type											
	OF-540, striking (OF-843)			OF-540, proximity			OFd, striking (OFd)			OFd, proximity		
	To 10 km	Above 10 km	After reg. fire	To 10 km	Above 10 km	After reg. fire	To 10 km	Above 10 km	After reg. fire	To 10 km	Above 10 km	After reg. fire
In tanks	400 (400)	600 (500)	200	500	600	300	500 (500)	600 (500)	300	600	700	400
In ditches, IFV, in another armored vehicles			300			400			400			500
Exposed troops	600 (500)	800 (600)	400	700	800	500	600 (600)	700 (600)	500	800	900	600

3) SAFETY AND RISK SAFETY DISTANCES

Risk safety distances

Weapon, projectile and fuse type		PI – 10%			PI – 0,1%		
		$\frac{1}{3} D_{\max}$	$\frac{2}{3} D_{\max}$	D_{\max}	$\frac{1}{3} D_{\max}$	$\frac{2}{3} D_{\max}$	D_{\max}
152mm ShKH vz. 77	OF-540, striking	100	125	150	200	280	450
	OF-540, proximity	125	145	175	230	290	465
	OFd, striking	150	180	200	280	300	475
	OFd, proximity	195	235	275	365	390	520
82mm M vz.52	O	75	85	100	165	185	230
120mm M vz. 82	OFd, OF, OF-843	85	100	125	175	200	300
122mm RM vz. 70	JROF	700	500	300	800	600	500

4) ARTILLERY COMMANDS ABBREVIATIONS

C.n.	Meaning	Abb	C.n.	Meaning	Abb
1	ballistic adjustments	bo	63	unit of fire	papr
2	gun tier	bat	64	infantry	pech
3	gun tier ready	batp	65	standing-by (done)	hot
4	close to own troops	bvv	66	barrage fire	pp
5	close to target	bc	67	auxiliary target	pc
6	recoilless rifle	bzk	68	progressively concentrated fire	psp
7	compass	bus/buz	69	attention	!
8	target number JE1101	cJE1101	70	observation post	poz
9	training	cv	71	right	p
10	time/timing/platoon	c	72	antitank gun	ptk
11	indication	ct	73	frontage	pru
12	fourth cannon	4d	74	first platoon	1c
13	distance	da	75	armour-piercing	ptp

4) ARTILLERY COMMANDS ABBREVIATIONS

14	far from targe	dac	76	high explosive	prup
15	cannon	d	77	anti-tank guided missile	ptrs
16	artillery battalion	do	78	radar	rl
17	joint artillery battalion	smdo	79	radio station	rst
18	artillery brigade	db	80	rocket launcher (rocket)	rm
19	mil	dc	81	rocket launcher gun tier	rmbat
20	over 50 (plus)	+50 (+)	82	rocket launcher platoon	rmc
21	to the left (left hand)	- (l)	83	rocket launcher battalion	rmo
22	to the right (right hand)	+(p)	84	hit	r
23	smoke	dym	85	4 hits time after time	4rnr
24	hlásím (hlaste, hlášení)	hl	86	unfurl	roz
25	fiktivní pomocný cíl	fpc	87	volley fire	sa
26	main direction	hs	88	self propelled gun	shd

4) ARTILLERY COMMANDS ABBREVIATIONS

27	depth	hlo	89	north,(northern),	s,sv,s
28	south, southeasterly, southwestly	j,jv,j z		northeast, northwest,	z
			90	close	sev
29	fire coefficient	kos	91	angle of strike	sm
30	machine gun	kul	92	coordinates	sou
31	short 80 (minus)	-80 (-)	93	consumption	spo
32	covered	kt	94	is firing	strl
33	level	li	95	scale (by scale)	st
34	left	l	96	width	si
35	meteorologic al	met	97	tank	t
36	mortar (mine)	min	98	disruptive (high- explosive)	th (tsth)
37	mortar	minb at	99	scatter (scatter and disruptive)	ts (tsath)
38	mortar platoon	minc	100	effective fire	us

4) ARTILLERY COMMANDS ABBREVIATIONS

39	place of command	mv	101	sheaf	vj
40	loaded/load	nb	102	unfurled sheaf	vjs
41	distributed fire	nlm	103	majority plus (minus)	+> (->)
42	charge, full charge,	n, npl	104	all plus (minus)	\oplus (\ominus)
43	reduced charge	nzm	105	above (high)	v
44	fourth charge	n4	106	air fictitious auxiliary target	vpc
45	impact	nr	107	sight	zaj
46	guiding device	nz	108	base line / west	z
47	uncovered	nkt	109	trench	zak
48	unobserved	?	110	incendiary	zap
49	incorrectly	nepr	111	delayed	zp
50	unexploded	nv	112	list as target	zjc
51	down (low)	n	113	hit	zs (\pm)
52	armoured carrier	ot	114	defect	zav

5) Principles of ranking the targets with artillery battalion and battery

Performer	Method of ranking	Targets, projectiles, fuses
Artillery battalion (concentrated fires of battalion)	with batteries by double concentration	<ul style="list-style-type: none"> – shooting with high explosives projectiles with impact (proximity) fuses – shooting on individual unobserved and group unobserved and observed targets
	with batteries stepwise	<ul style="list-style-type: none"> – shooting with high explosives projectiles with delayed action fuse – shooting on convoys
	with distribution the targets among batteries	<ul style="list-style-type: none"> – shooting on targets, which are need to be disabled in the same time
	with distribution the sections of targets (lines) among batteries	<ul style="list-style-type: none"> – shooting on targets with sizes bigger then maximal section for battalion or on target which has irregular elongated shape and we know the coordinates of the most important elements – application of defensive barrage fires

5) Principles of ranking the targets with artillery battalion and battery

Artillery battery (separated fires of batteries)	by double concentration	– shooting on individual unobserved and group unobserved and observed targets
	with platoons by double concentration	– shooting on group observed targets with 100 meters bigger depth
	with platoons stepwise	– shooting with high explosives projectiles with delayed action fuse
	with distribution of the targets among platoons	– shooting on targets, which are need to be disabled in the same time
	with distribution the sections of targets (lines) among platoons	– shooting on targets with sizes bigger then maximal section for battery or on target which has irregular elongated shape and we know the coordinates of the most important elements – application of defensive barrage fires