

VIÐ HÖFUM EKKI HANNAÐ
SJÁLFVIRKA BJÖRGUNARSVEIT
EN VIÐ GETUM ÞAÐ



JARÐTENGIERFI OG ELDINGAVARNIR
HAUSTFUNDUR RAFSTAÐLARÁÐS
VERKFRÆÐINGAHÚS 06. NÓV 2025



Gunnar Sigvaldason

2024 — M.Sc Raforkuverkfræði

2014 — B.Sc Rafmagnstæknifræði

2010 — Rafvirki

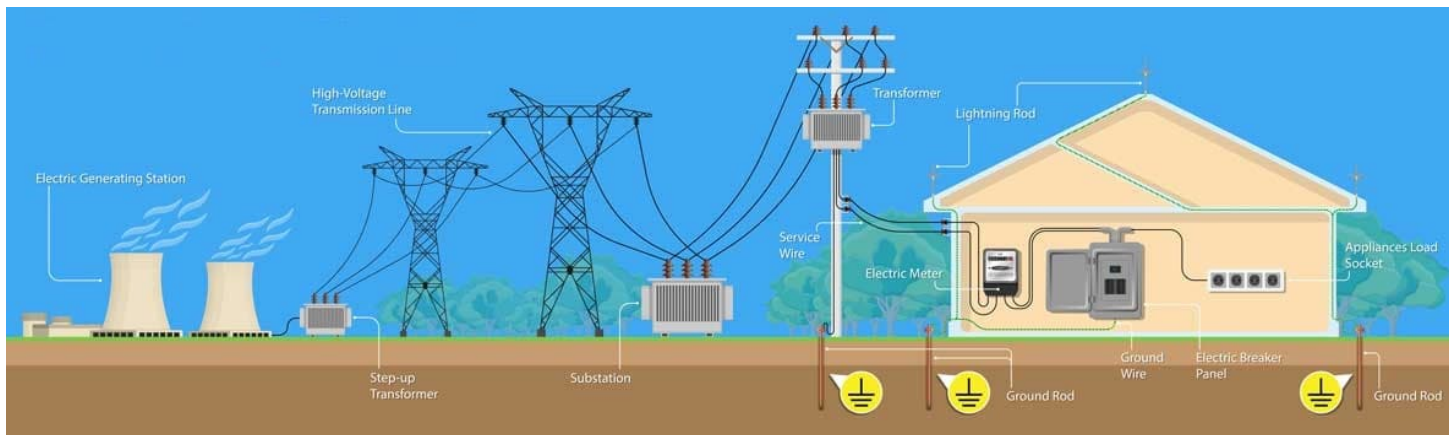
Unnið hjá Lotu verkfræðistofu síðan 2016

Hönnun jarðskauta og eldingavarnakerfa, hönnun og uppsetning á háspennu- og lágspennukerfum, áætlanagerð, verkefnastjórnun, uppsetning og rekstur rafmagnsöryggisstjórnkerfa (RÖSK), mælitækni og fl.



Jarðtengikerfi - Tilgangur og markmið

- Reglugerð um raforkuvirki 678/2009
- Tryggja virkni varnarbúnaðar með því að búa til leiðir fyrir straum til jarðar þegar kerfið er í venjulegu ástandi sem og í bilunarástandi svo að snertispenna leiðandi hluta nálægt bilunarstað verði aldrei hærri en leyfileg mörk.
- Undantekning eru rekstrarskaut háspennu sem notuð eru til að flytja rekstrarstrauma til jarðar í eins vírs jarðreknunum kerfum (EVJ)





ÍST EN 50522:2022

● Gildistaka - 20.4.2022

Earthing of power installations exceeding 1 kV a.c.

19.917 kr.



ÍST HB 200:2024 - Rafræn áskrift, lesaðgangur

● Gildistaka - 14.6.2024

Raflagnir bygginga - Handbók - Samantekt þýðinga á stöðlum úr staðlaröðinni ÍST HD 60364 / Electrical installations of buildings

37.200 kr.



IEC 60479-1:2018

● Gildistaka - 13.12.2018

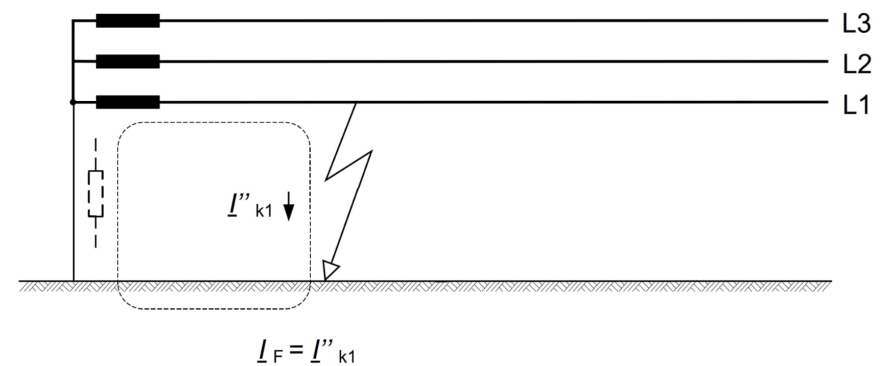
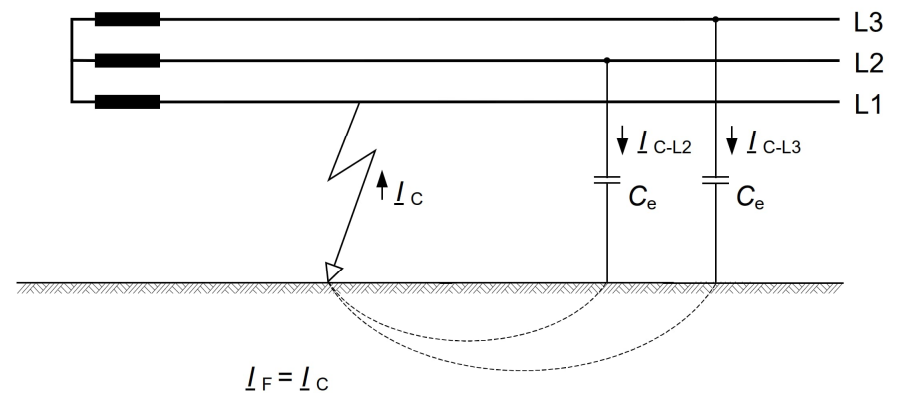
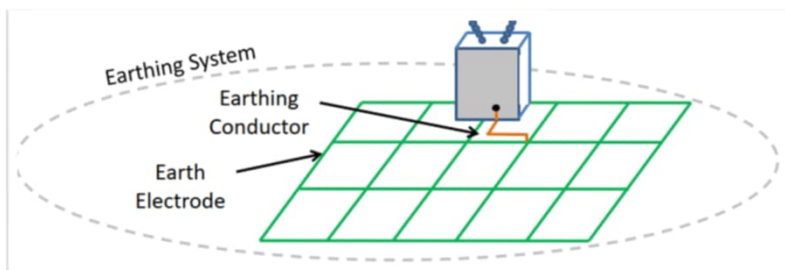
Effects of current on human beings and livestock - Part 1: General aspects

71.059 kr.

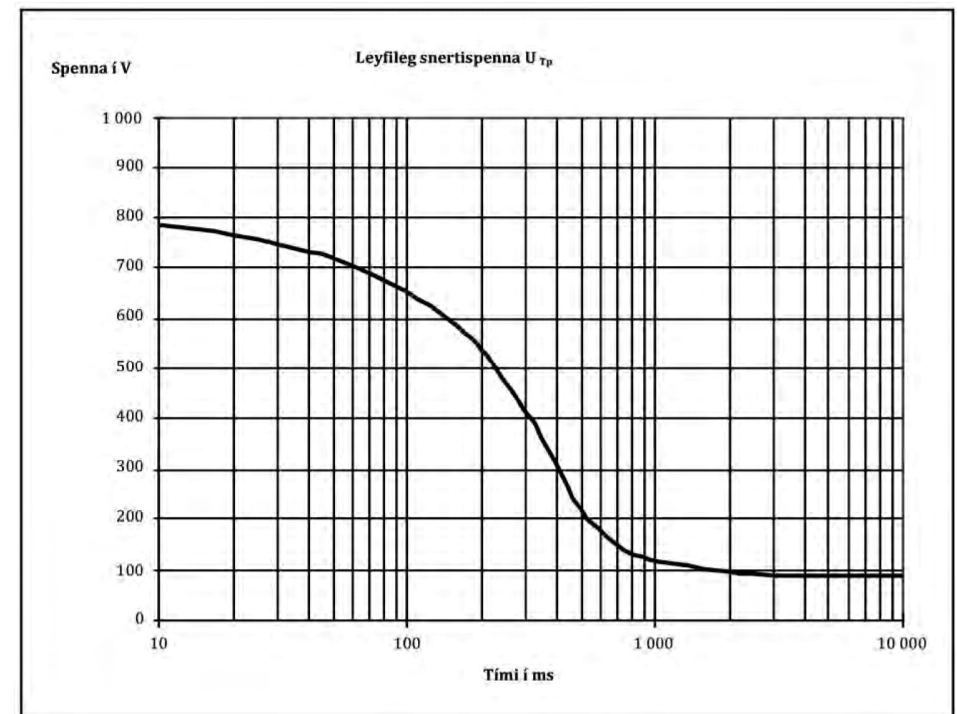
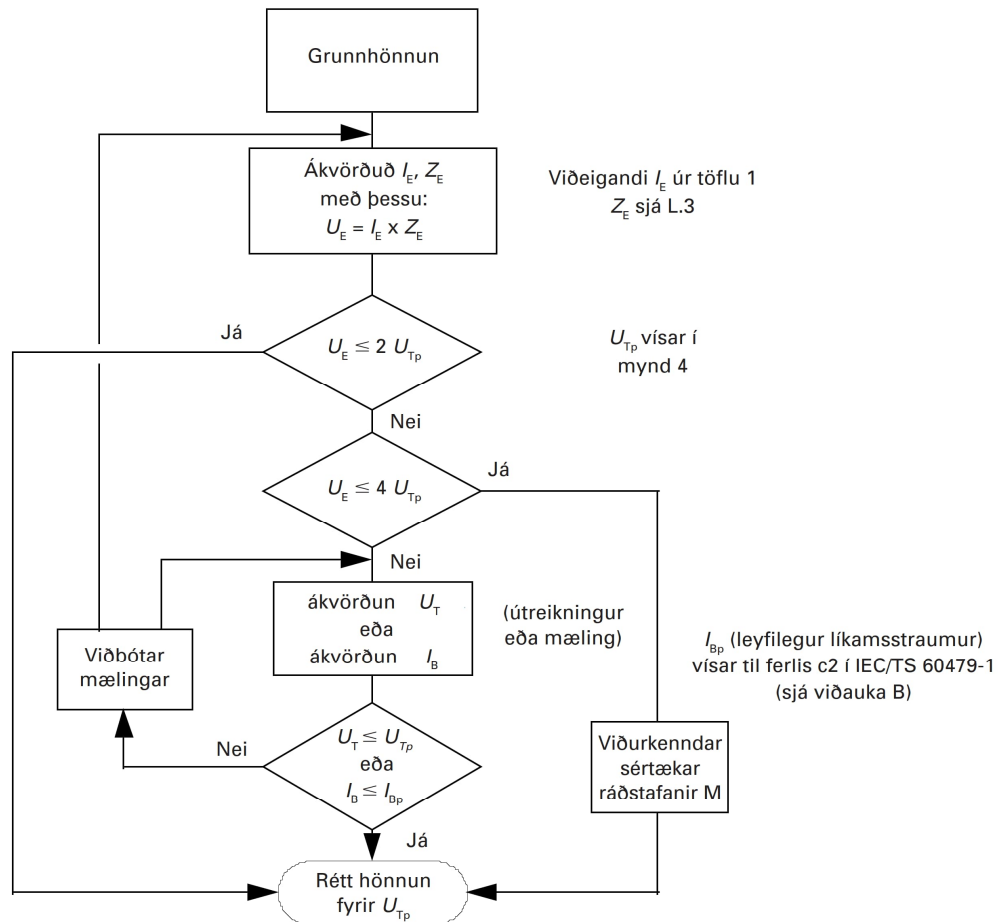
Jarðtengikerfi - Hönnun

Þeir þættir sem einna mestu máli skipta þegar kemur að hönnun jarðtengikerfa eru:

Stærð bilunarstraums
Tímalengd bilunar
Gerð jarðvegs
Tegund jarðtengikerfis



Jarðtengikerfi - Hönnun



Eldingavarnir — Staðlar



 Íslenskir staðlar	ÍST EN IEC 62305-1:2024 ● Gildistaka - 10.12.2024 Protection against lightning - Part 1: General principles 35.789 kr.
 Íslenskir staðlar	ÍST EN IEC 62305-2:2024 ● Gildistaka - 10.12.2024 Protection against lightning - Part 2: Risk management 56.224 kr.
 Íslenskir staðlar	ÍST EN IEC 62305-3:2024 ● Gildistaka - 10.12.2024 Protection against lightning - Part 3: Physical damage to structures and life hazard 60.986 kr.
 Íslenskir staðlar	ÍST EN IEC 62305-4:2024 ● Gildistaka - 10.12.2024 Protection against lightning - Part 4: Electrical and electronic systems within structures 59.002 kr.

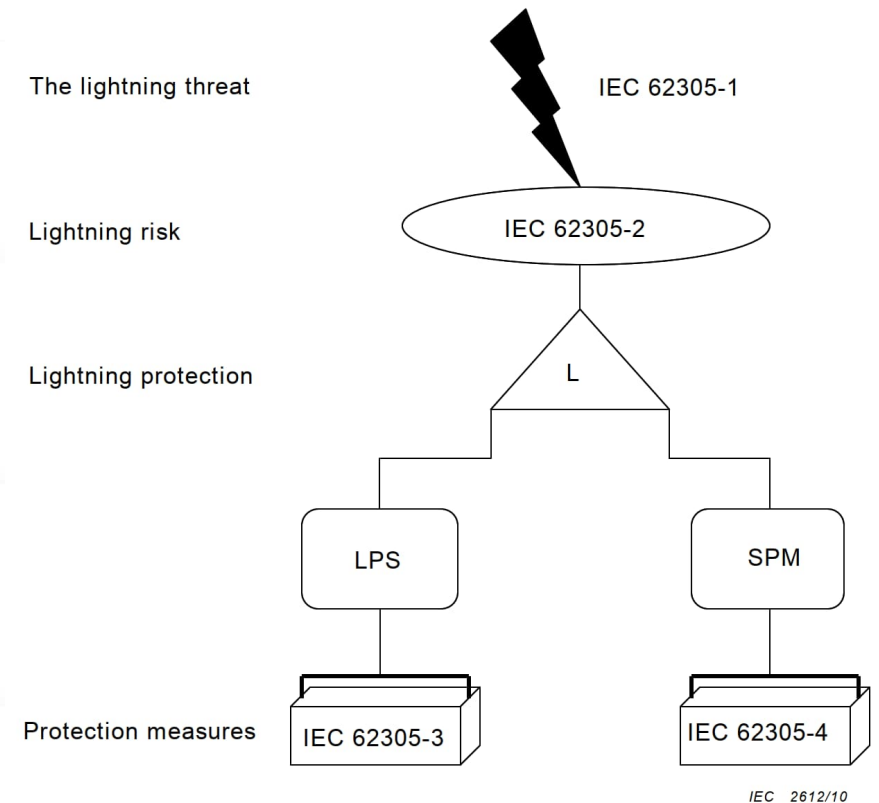
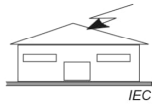
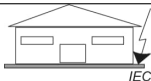
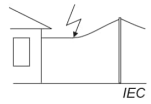
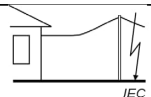


Figure 1 – Connection between the various parts of IEC 62305

Eldingavarnir — Áhættumat og áhættustjórnun (Hluti 2)



Table 1 – Sources of damage, causes of damage, types of loss and risk components according to the point of strike

Point of strike		Source of damage	Cause of damage	Type of loss	Risk component
The structure		S1	D_{1T}	L_1	R_{AT}
			D_{1D}^c	L_1	R_{AD}
			D_2	L_1, L_2	R_{B1}, R_{B2}
			D_3	L_1^a, L_2^b	R_{C1}, R_{C2}
Near the structure		S2	D_3	L_1^a, L_2^b	R_{M1}, R_{M2}
The lines connected to the structure		S3	D_{1T}	L_1	R_U
			D_2	L_1, L_2	R_{V1}, R_{V2}
			D_3	L_1^a, L_2^b	R_{W1}, R_{W2}
Near the lines connected to the structure		S4	D_3	L_1^a, L_2^b	R_{Z1}, R_{Z2}
Risk components in the last column are calculated based on the type of losses considered (see column Type of loss). ^a Generally for structures where failure of internal systems endangers human life for example in structures with risk of explosion and hospitals. ^b Generally for structures with a risk of explosion. ^c This is only for people exposed on a structure such as parking on a roof or terrace, balconies.					

Components of a lightning protection system (LPS)

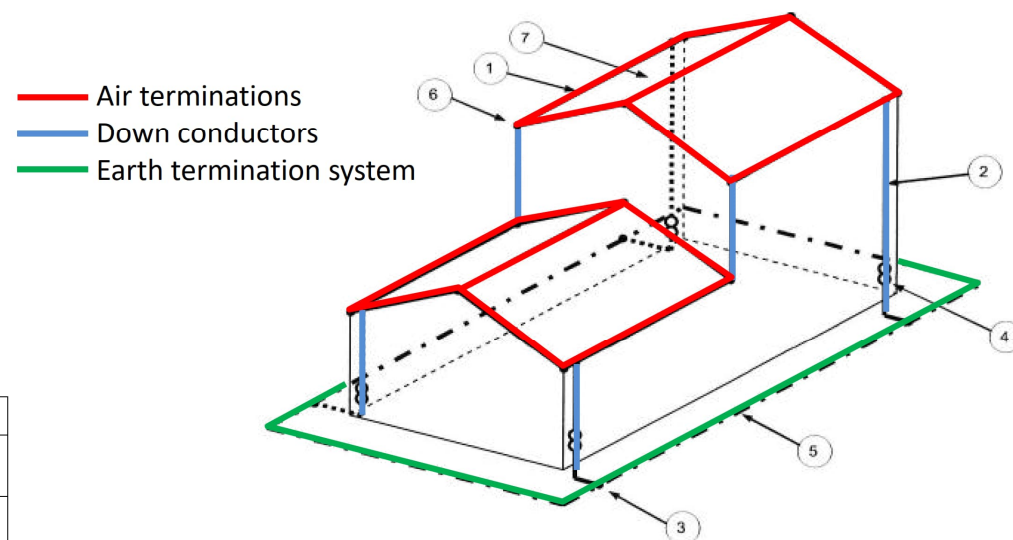
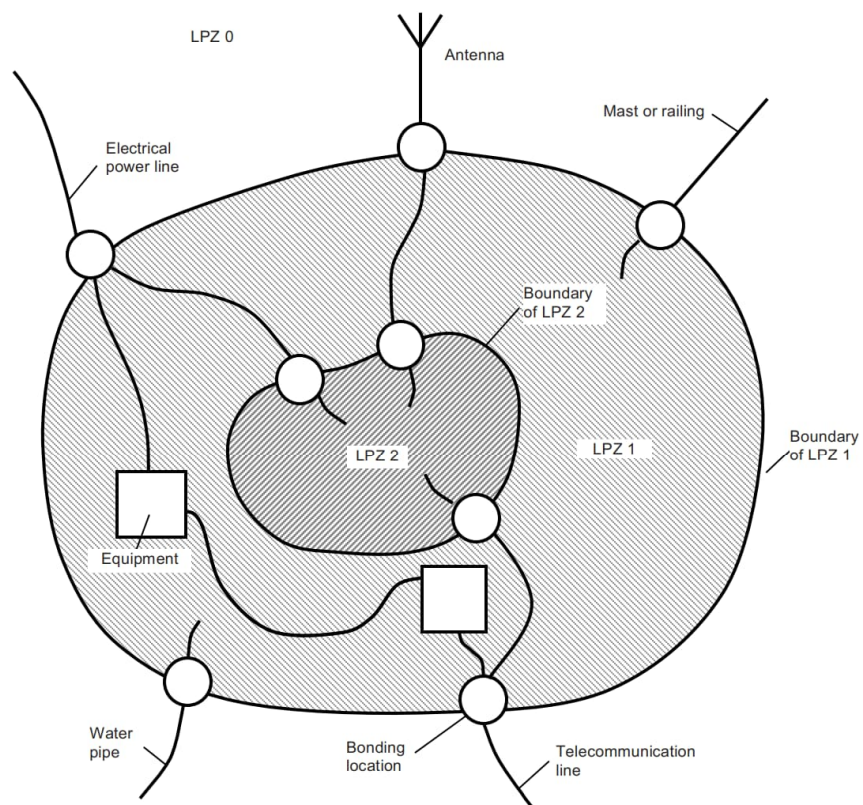


Table 2 – Maximum values of rolling sphere radius, mesh size and protection angle corresponding to the class of LPS

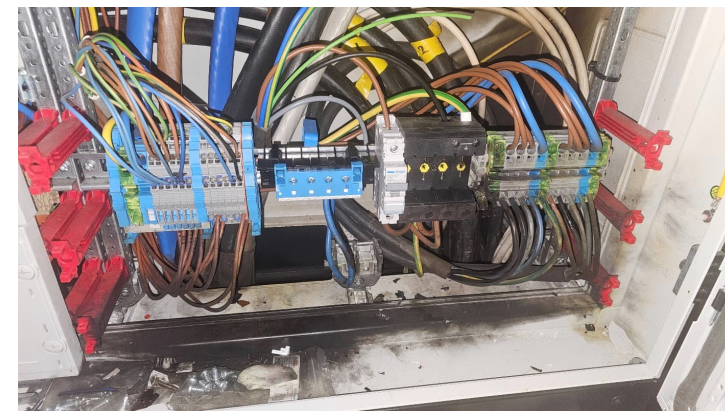
Class of LPS	Protection method		
	Rolling sphere radius r m	Mesh size w_m m	Protection angle α°
I	20	5 × 5	See Figure 1 below
II	30	10 × 10	
III	45	15 × 15	
IV	60	20 × 20	

Eldingavarnir — Verndun rafbúnaðar innan mannvirkja (Hluti 4)



○ Bonding of incoming services directly or by suitable SPD

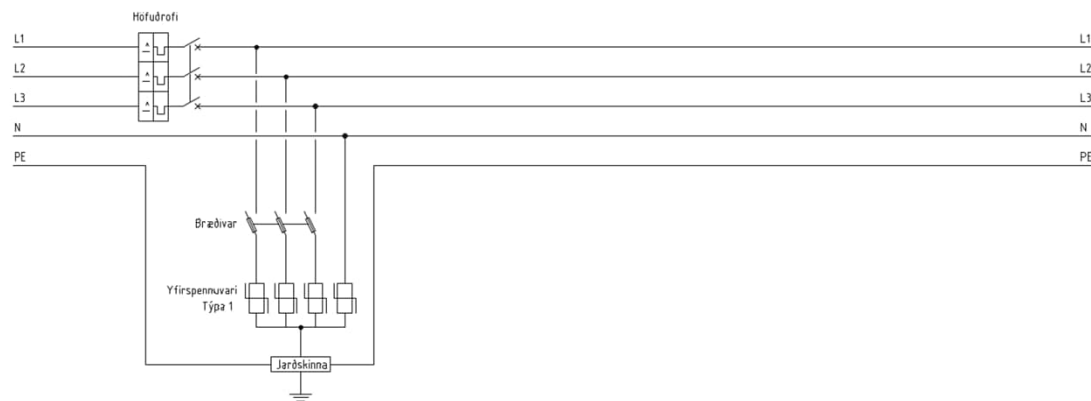
IEC 2762/10



Eldingavarnir — Verndun rafbúnaðar innan mannvirkja (Hluti 4)

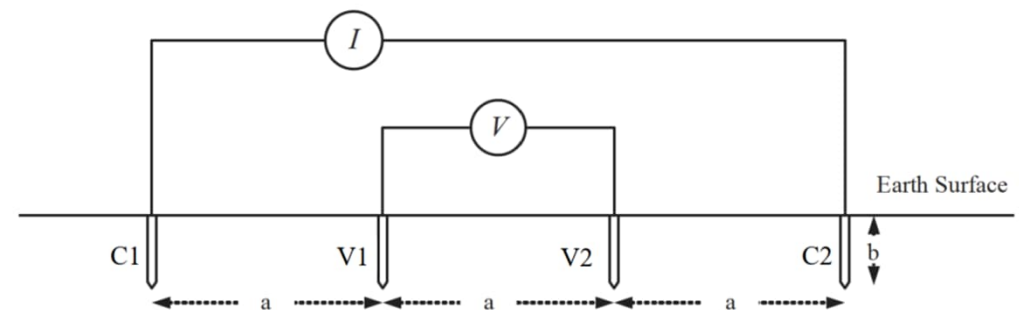
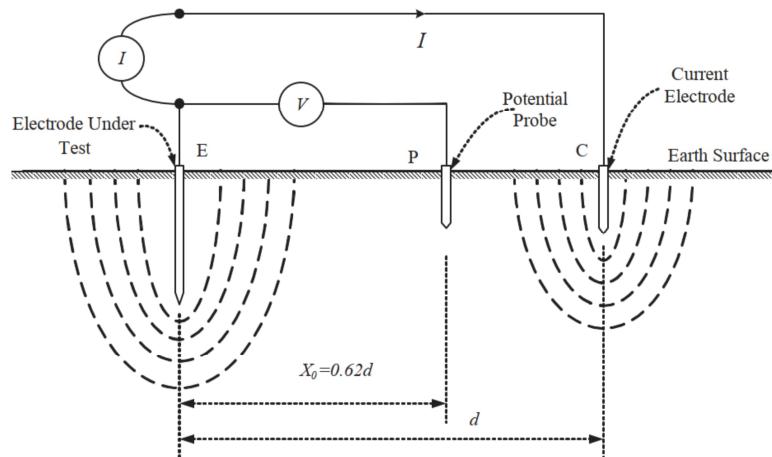


- Týpa 1
 - Fyrsta varnarstigið — tekur við beinum eldingastraumi og jafnar spennunum milli kerfa.
- Týpa 2
 - Miðstig verndar — dregur úr yfirspennu inni í dreifikerfinu og verndar búnað almennt.
- Týpa 3
 - Fínvörn — viðbótarvörn við næm tæki, t.d. tölvur og rafeindabúnað.



Fyrirbyggjandi viðhald

- Sjónskoðun
- Mælingar á milli niðurleiðara (eldingavarnakerfi)
- Mæling á jarðskautsviðnámi
- Mælingar á jarðeðlisviðnámi



Eldingar á Íslandi

Eldingapéttni — $\text{N} / \text{km}^2 / \text{ár}$

Myndin sýnir fjölda eldinga á 1000 km^2 á ári

Eldingapéttni er hæst á Íslandi um $0.02 / \text{km}^2 / \text{ár}$ og um $0.002 / \text{km}^2 / \text{ár}$ í Reykjavík.

Til samanburðar er eldingapéttni í USA víðast um $0.1-5$, en hæst í Florida um $15 / \text{km}^2 / \text{ár}$



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Takk fyrir

