

MEDICAL FEATURES OF LIGHTNING INJURIES

NORBERTO NAVARRETE. MD, MSc.

Emergency Physician. Clinical Epidemiology.
Burns Intensive Care Unit. Simon Bolivar Hospital.
PREVER-IDIMEC Research Group.

PREVER

Programa de Registro y Evaluación
de Lesiones por Electricidad y Rayos


Secretaría de Salud
Subred Norte E.S.E.
Unidad de Servicios de Salud Simón Bolívar

IDIMEC

- Introducción
- Trauma and Prevention
- Mechanism of lightning injury (LI)
- Medical features
- Lightning deaths in Colombia
- First Aid

Traumatic injuries \approx lightning injuries: Are preventable.

Goal: Reduce the incidence of injury and death

Development and implementation of prevention programs

Trauma Definition.

The exposure to some source of energy (mechanical, electrical, thermal, radiation or chemical) in an intensity exceeding the tolerance level of the host.

⚡ Lightning injuries ≈ traumatic injuries !!

It's not High-Voltage injury.

TABLE 5-1 Lightning Injuries Compared with High-Voltage Electrical Injuries

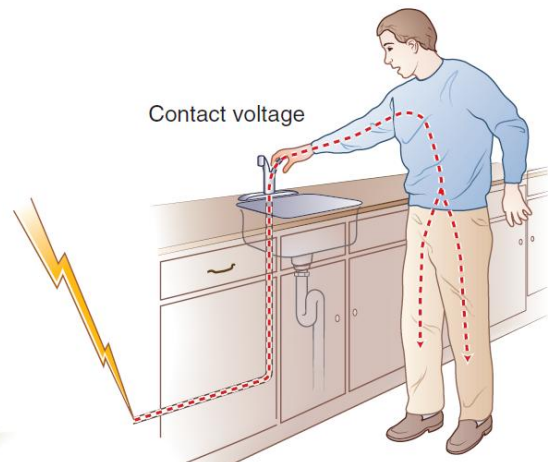
Factor	Lightning	High Voltage
Energy level	30 million volts (V), 50,000 amperes (A)	Usually much lower*
Time of exposure	Brief, instantaneous	Seconds
Pathway	Flashover, orifice	Deep, internal
Burns	Superficial, minor	Deep, major injury
Renal	Rare myoglobinuria or hemoglobinuria	Myoglobinuric renal failure common
Fasciotomy	Rarely if ever necessary	Common, early, and extensive
Blunt injury	Explosive thunder effect	Falls, being thrown



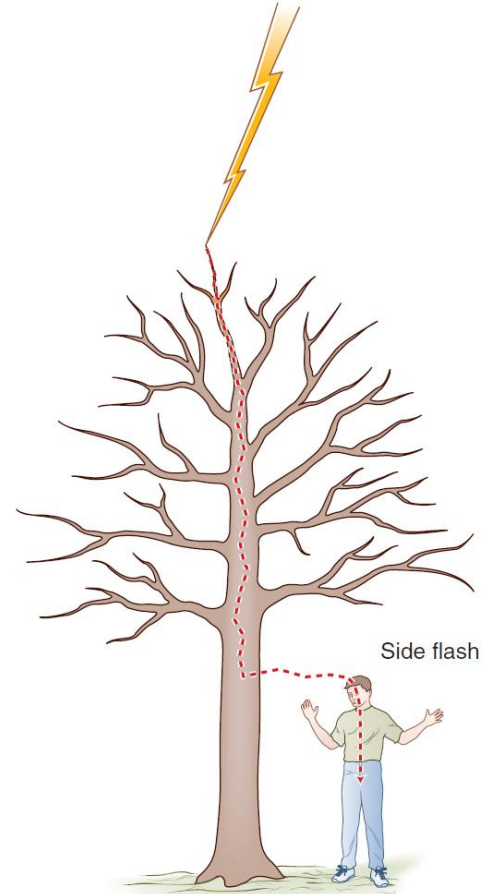
Mechanisms of LI.



A Direct strike



B



C

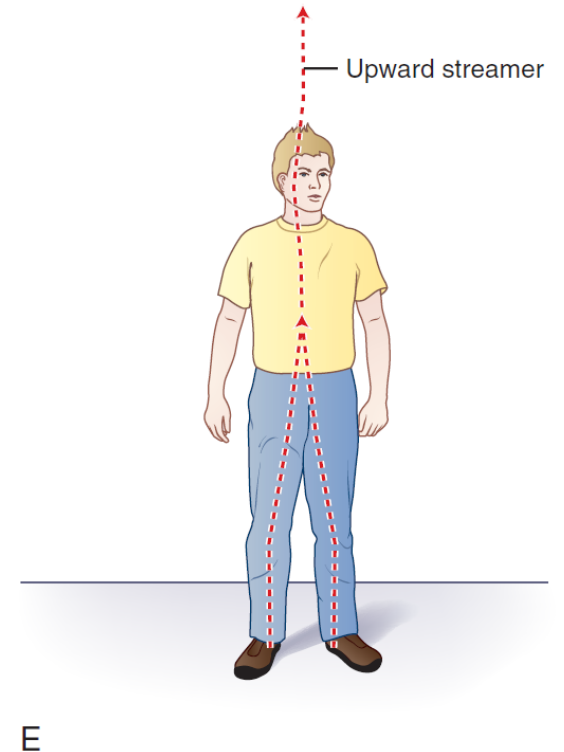
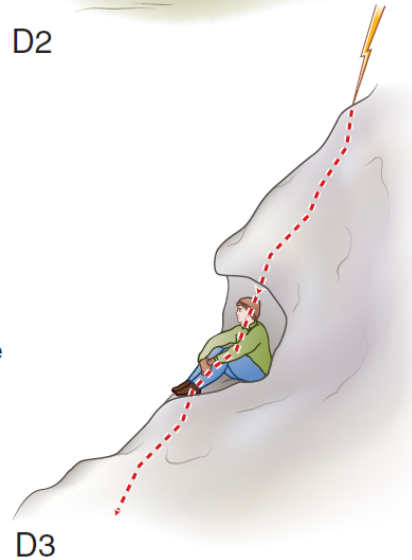
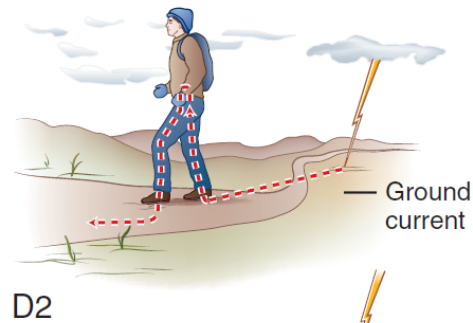
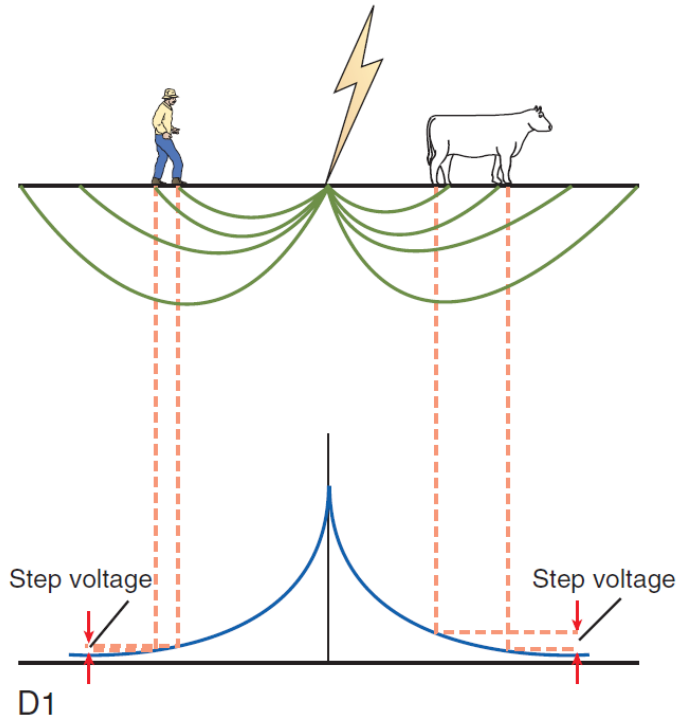
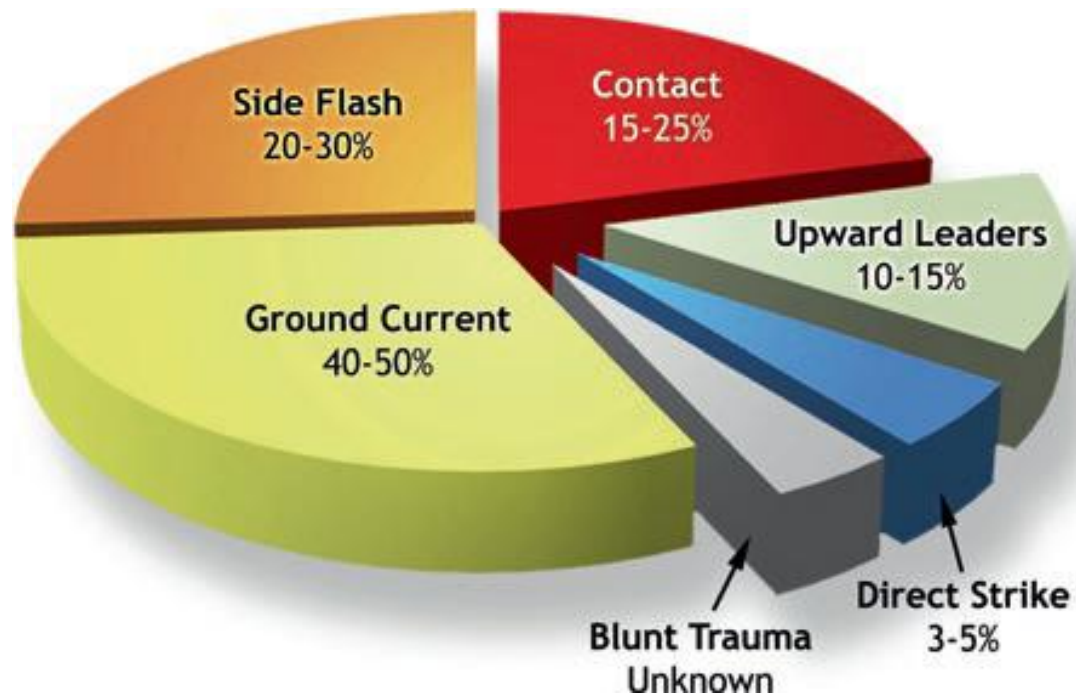
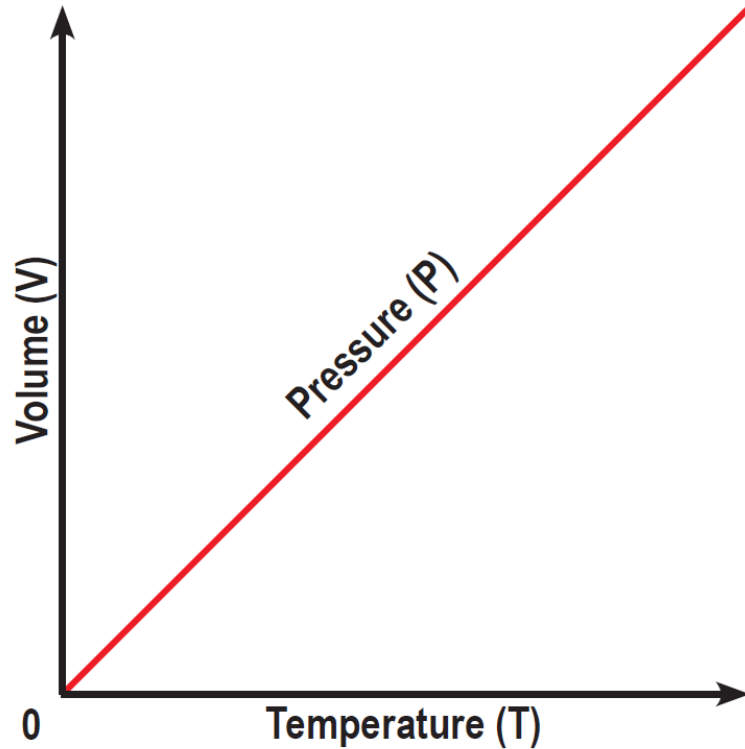


FIGURE 5-24 Mechanisms of lightning injury. **A**, Direct. **B**, Contact. **C**, Side splash/flash. **D1**, Ground current through the earth. **D2**, Ground arcing. **D3**, Ground arcing cave. **E**, Upward streamer.

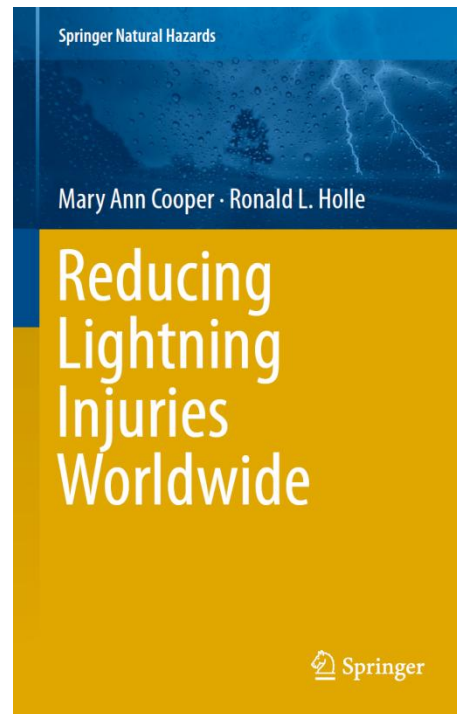
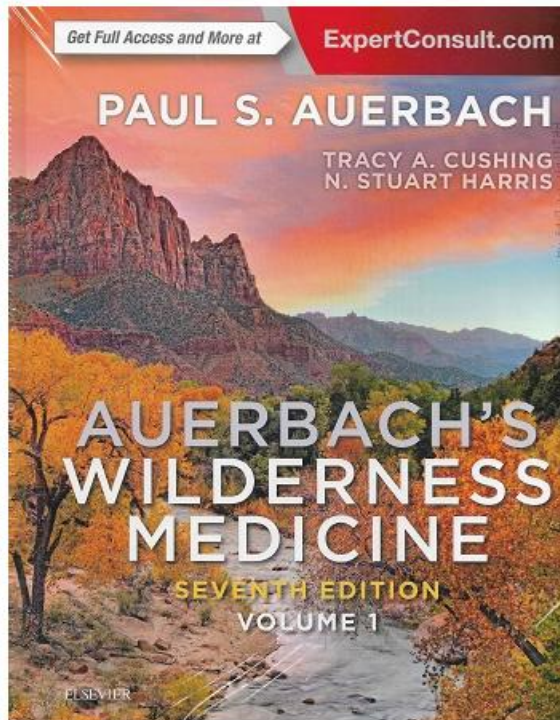
Trauma Definition.



Non-electric mechanism.



Medical features.



Los efectos del rayo

Efectos del impacto del rayo en el cuerpo humano

Pérdida de la conciencia, amnesia temporal o total

Paro cardíaco

Pérdida de la capacidad de sentir frío

Quemaduras severas

El rayo busca salida por las extremidades del cuerpo

Efectos en el cuerpo humano a menos de 120m del lugar de impacto

Lesiones en la retina

Rotura del tímpano

Lesiones pulmonares y óseas

Quemaduras en la piel

La probabilidad de que te caiga un rayo en un año es de 1 en 700.000

La probabilidad de que te caiga un rayo en toda tu vida es de 1 en 3 mil

Más del 80% de las personas sobreviven al impacto de un rayo



Lám

Los rayos, las auroras de lo de televisión materia que n gaseoso. Ese e

Cuando caen r entre las nubes que hacen que vuelvan muy bu electricidad: se



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TABLE 126-4 Complications Associated with Lightning Injuries

System	Injury
Cardiovascular	Dysrhythmias (asystole, ventricular fibrillation/tachycardia, premature ventricular contractions), electrocardiographic changes, myocardial

Lightning Injuries: Prognostic Signs for Death

Mary Ann Cooper, MD
Omaha, Nebraska

	chorioretinitis, retinal detachment, hyphema
Otologic	Tympanic membrane rupture, temporary or permanent deafness, tinnitus, ataxia, vertigo, nystagmus
Renal	Myoglobinuria, hemoglobinuria, renal failure (rare)
Obstetric	Fetal death, placental abruption
Miscellaneous	Secondary blunt trauma, compartment syndrome, disseminated intravascular coagulation

Table 2
LIGHTNING INJURIES

	No. Patients	%
Loss of consciousness	54/61	72
Cardiopulmonary arrest	17/58	30
Cardiopulmonary resuscitation	12/17	70

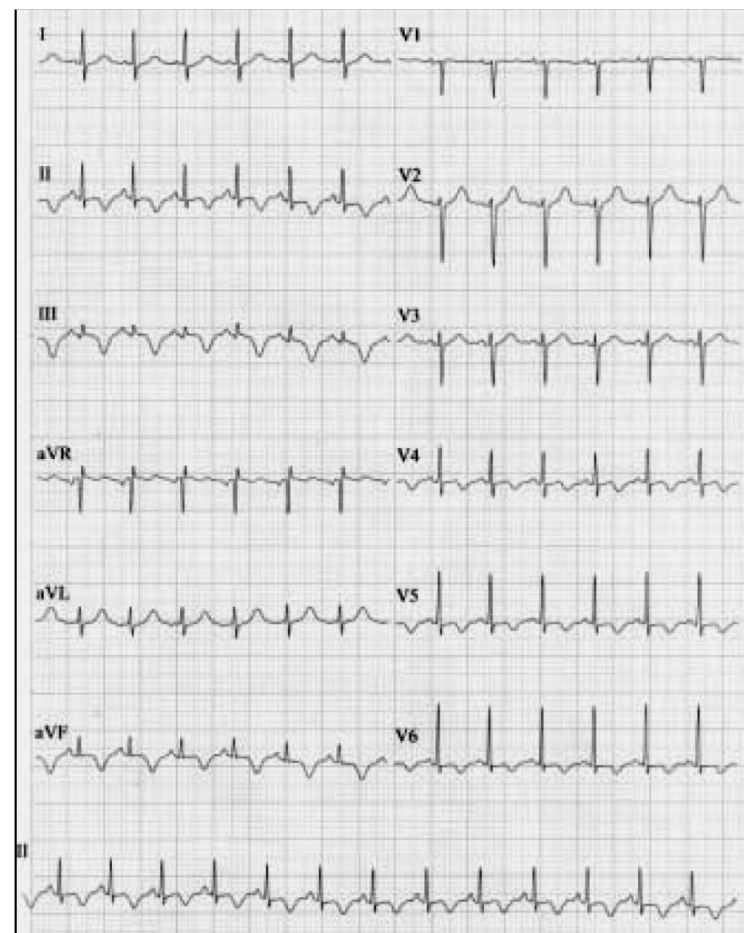


Table 3.5 Pulmonary injuries

	Immediate uncommon	Immediate very rare
Blunt injury	X	
Contusion	X	
Hemoptysis		X
Pneumomediastinum		X
Pulmonary edema	X	
Pulmonary hemorrhage		X

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Neurological injuries.

<i>Grupo</i>	<i>Caracteristicas</i>	<i>Ejemplos</i>
Grupo 1	Sintomas Inmediatos y transitorios.	Perdida de la conciencia, amnesia, confusión, keraunoparálisis, debilidad, dolor de cabeza
Grupo 2	Sintomas Inmediatos y prolongados / permanentes	Hemorragia intracraneal, Infarto cerebral, Encefalopatía hipóxico-isquémica, síndromes cerebelares
Grupo 3	Síndromes neurológicos posiblemente tardíos	Desórdenes del Movimiento
Grupo 4	Trauma secundario, relacionado a caídas o explosión.	Ruptura timpánica, trauma relacionado a caídas o explosión.



Keraunoparalysis and burning thatch: A proposed explanation for severe lightning injuries reported in developing countries

Daniel E. Villamil^{a,*}, Norberto Navarrete^b, Mary Ann Cooper^c

Table 3
NEUROLOGICAL SIGNS IN
LIGHTNING INJURY

Neurological Signs	No. Patients	%
Paralysis	20/29	69
Leg paralysis	20/29	69
Arm paralysis	11/29	30
Loss of consciousness	54/61	72
Confusion/ Amnesia	24/28	86



Table 4
LIGHTNING BURNS

Burns	No.	%
Location of burns		
Head	24/54	44
Trunk	36/54	66
Arm	16/54	30
Leg	30/54	55
Multiple burns	34/54	63
Single burns	14/54	26
No burns	6/54	11
Not reported	12/66	18





Severe Rhabdomyolysis Without Renal Injury Associated With Lightning Strike

Norberto Navarrete Aldana, MD



Most common medical effects.

- Chronic pain syndromes
- **Post-concussive syndrome**
Inability to multi-task, remember, learning disabilities
- Family / work difficulties
- Re-integration / re-entry into employment

TABLE 5-3 Learning Deficits in Lightning Survivor

Findings	%
Memory and Learning Deficits	
Globally	19
Visual	35
Visuospatial	38
Auditory	62
Other Deficits	
Verbal learning	54
Verbal fluency	46
Concentration	46
Attention	42
Executive function	38
Reduced executive speed	62

Lightning deaths in Colombia.

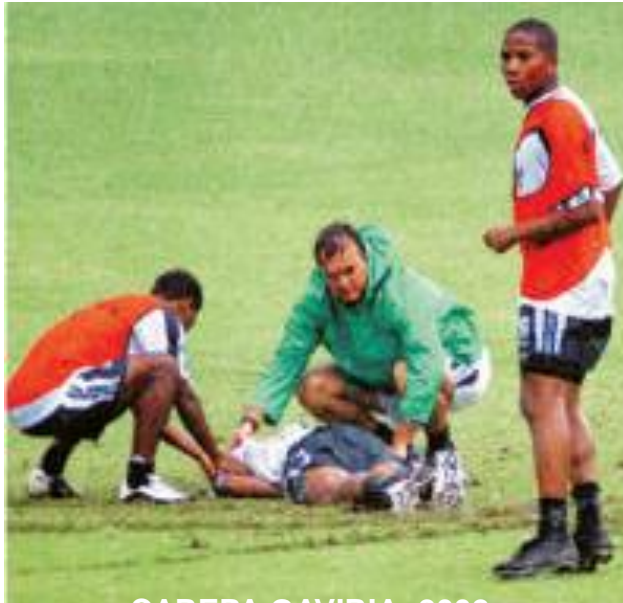
SITE OF DEATH	FREQUENCY	%
Hospital or Clínicas	35	4.6%
Township or village health centers	5	0.6%
Home	268	35.4%
Working place	152	20.1%
Public road	98	12.9%
Others	175	23.1%
Unknown	24	3.2%
TOTAL	757	100%

Antioquia:	172
Cauca	71
Santander	55
Bolivar	45
Boyaca	41



In 757 deaths by lightning,
592 people (78.2%) die **without** medical
attention.





Cardiac arrest: Asystole.

- . CPR
- . Respiratory arrest.
- . 2nd cardiac arrest from hypoxia.

Modified triage

Caution with the pupils!!



Adult OHCA Chain of Survival



ii Prevention !!



When Thunder Roars, Go Indoors!

STOP all activities.

Seek shelter in a substantial building or hard-topped vehicle.

Wait 30 minutes after the storm to resume activities.

 www.lightningsafety.noaa.gov 

“Un rayo me quitó a mi mujer y a dos de mis hijos”

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Enviar |

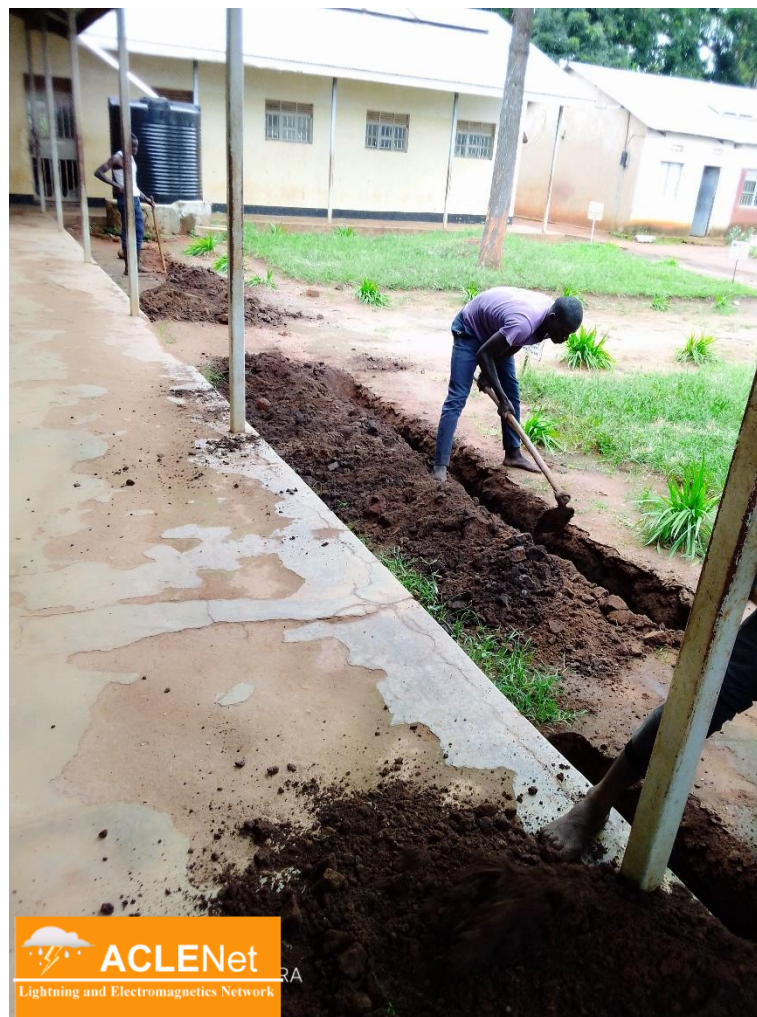
Regístrate para comentar |

Anterior



Eduardo García

La descarga eléctrica ingresó por la palma e incendió el pequeño rancho.



Academic project



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nnavarrete.md@gmail.com