

Dedication

To my great parents: Ekhlas Omer Ali Taha and Abd elhameed Eltoom
who are behind any success in my life.

To my honest husband Mohammed Omer and my lovely kids
Fatima and Omer.

To my sisters:Eslam, Ehsan, Tawheed and brothers: Mohamed, Yousif
and Mostafa for their support and encouragement throughout my life.

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ACRONYMS AND ABBREVIATIONS

CB	circuit breaker
RCD	residual-current device
RCCB	residual current circuit breaker
GFCI	ground fault circuit interrupter
RCBO	residual current operated circuit-breaker with integral over-current protection
ECG	Electro Cardio Grame
CT Scan	Computed Tomography Scan
SELV	separated/safety extra-low voltage
LIM	line-isolation monitor
UPS	Uninterruptable power supply
BESS	Battery Electric Storage System
EPSS	Emergency power supply system
NEC	National Electrical Code
GFCIs	Ground-fault circuit interrupts
ADS	Automatic Disconnection of Supply

Abstract

The importance of this study being discussed offer one of the most important electrical safety requirements (electrical grounding) in health care facilities, where the lack of grounding system in these important facilities leads to damage and electrical hazards (damages in medical devices lead to a wrong diagnosis or treatment, burns, Electric shocks to the patient and the device's user).

The purpose of this study is to evaluate the application of the grounding system in hospitals and find out the reasons for the absence of such regulations on these important facilities and then search for solutions to these reasons. Sixteen hospitals have been surveyed (Three in Khartoum state and thirteen hospitals in different states), using a checklist designed by the researcher as a first stage and then the results were analyzed using the statistical program SPSS. In the second stage, the researcher conducted field visits to do a visual scan for seven hospitals to determine the current status of the application of grounding systems. The third and final stage is to search for an alternative metal to pure copper used in the wedge grounding in attempt to reduce the cost of the grounding system.

The results showed that most of the hospitals that have been surveyed either had not contain a grounding system, or the grounding system does not function because it's old or due to not knowing it's place , in some cases the system exists and is enabled but doesn't meet all the need for the hospital .also the researcher has reached to the possibility of using steel metal after painted electrochemically with copper instead of using pure copper earthing system, which led to reduce the cost of rod from 800 pound to 50 pound.

المستخلص

تاتي اهمية هذه الدراسة كونها تناقش توفر احد اهم متطلبات السلامة الكهربائية (التاريسن الكهربائي) في مراافق الرعاية الصحية ، حيث ان عدم توفر نظام التاريسن في هذه المراافق الهامة يقود الى اضرار واطخار كهربائية (اضرار في الاجهزه الطبيه تقود الي التشخيص او العلاج الخاطئ ، حروق ، صعقات كهربائية للمريض ومستخدم الجهاز).

الغرض من هذه الدراسة هو تقييم تطبيق نظام التاريسن في المستشفيات ومعرفة اسباب غياب تلك الانظمة عن هذه المراافق الهامة ومن ثم البحث عن حلول لهذه الاسباب. وقد تم مسح عدد ١٦ مستشفى (٣ من ولاية الخرطوم و ١٣ من ولايات مختلفه) وذلك باستخدام قائمة تدقيق مصممة من قبل الباحث كمرحلة اولى ثم تحليل النتائج باستخدام البرنامج الاحصائي SPSS ، في المرحلة الثانية قام الباحث بزيارات ميدانية لقيام بفحص مرئي لعدد ٧ مستشفيات للوقوف على الوضع الراهن لتطبيق نظم التاريسن ، المرحلة الثالثة والاخيرة وهي البحث عن معدن بديل للنحاس الصافي المستخدم في وتد التاريسن وذلك في محاوله لتقليل تكلفة نظام التاريسن. اوضحت النتائج ان معظم المستشفيات التي تم مسحها وزيارتها إما انها لا تحتوي علي نظام للتاريسن او ان نظام التاريسن لا يعمل نتيجه لقدمه او نتيجه لعدم معرفة مكان وجوده وفي بعض الحالات فإن النظام موجود ومفعل لكنه لايفي كل حاجة المستشفى. كما تم التوصل الي امكانية استخدام معدن الإستيل بعد طلائه كهروكيميايا بالنحاس بدلا عن استخدام النحاس الصافي في نظام التاريسن مما ادي لتقليل تكلفة القصيب من ٨٠٠ جنيه الي ٥٠ جنيه.

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