



**UNIVERSITI PUTRA MALAYSIA**

***REDUCTION OF BIRD PEST IN ELECTRICAL POWER  
SUBSTATIONS USING SONIC DEVICES***

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**REDUCTION OF BIRD PEST IN ELECTRICAL POWER  
SUBSTATIONS USING SONIC DEVICES**

**By**

**ALI FAIK TAWFIQ AL-SWEEDY**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia  
in Fulfilment of the Requirement for the Degree of Master of Science**

**July 2010**

## DEDICATION

**This Thesis is dedicated to my mother for her constant support, love and guidance during all moments in my life.**

Abstract of thesis presented to the Senate of University Putra Malaysia in fulfillment  
of the requirement for the degree of Master of Science

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**Chairman: Professor Ir. Norman Mariun, PhD**

**Faculty : Engineering**

Birds such as crows, starling flock, feral pigeon and house sparrows are the major problem that cause damage particularly in switchracks, transformers, capacitors and transmission towers that apply to electrical stations and substations. It makes an ideal place for birds to protect themselves and enjoy their food away from peril.

Fortunately, modern technology offers electronic bird repeller device such as sonic and ultrasonic and many other preventive measures that can be used to decrease outages due to birds' intrusion with the electrical stations and substations.

Identifying and implementing preventive measures can greatly decrease customer interruptions; therefore, improve customer satisfaction and utility revenues.

This thesis presents the method on how to decrease the birds' intrusion and discusses the utility application of some devices available in the industry that has produced positive results. This study discusses the birds' intrusion and its damages cause at the substations and electric transmission lines (distribution system). It also analyzes the TNB (Tenaga Nasional Berhad) System Faults Data during the year 1993 to 1999, where most of the faults were attributed to unknown causes, which is found to be mostly due to birds. These electrical faults were mostly the results of short circuits on air isolated medium voltage bus bar system, which in this thesis referred to as "flashover".

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi sebahagian daripada keperluan untuk ijazah Master Sains

**PENGURANGAN PEROSAK BURUNG DI PENCAWANG ELEKTRIK  
MENGUNAKAN ALAT SONIK**

Oleh

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Burung seperti gagak, pipit, merbuk dan layang-layang merupakan masalah utama yang menyebabkan kerosakan terutamanya kepada suisrak and tiang transmisi yang membekal kepada pencawang. Suisrak dan tiang transmisi merupakan tempat sesuai untuk burung melindungi diri dan menikmati makanan jauh dari bahaya.

Namun begitu, nasib baik teknologi moden menawarkan alat elektronik penghalau burung seperti sonik serta ultrasonic memberi cara lain digunakan untuk mengurangkan hentitugas disebabkan pencerobohan burung di dalam stesen dan pecawang elektrik. Dengan mengenal dan melaksanakan langkah berjaga jaga boleh mengurangkan gangguan kepada pelanggan dan menambahkan kepuasan pelanggan serta menambahkan keuntungan utiliti.

Tesis ini membentangkan cara untuk mengurangkan gangguan burung dan penggunaan utiliti untuk beberapa alatan yang ada dalam industri yang telah memberi kesan positif. Cadangan kajian ini membincangkan gangguan burung dan kesan kesan kerosakan kepada pencawang dan talian transmisi elektrik (system pengagihan). Ia juga menganalisa Data Sistem Gangguan TNB pada tahun 1993 hingga ke 1999, dimana kebanyakan kerosakan berpunca daripada sebab yang tidak diketahui, terutamanya disebabkan oleh burung. Kerosakan elektrik ini lazimnya adalah disebabkan litar pintas pada pemisah udara voltan sederhana system bus bar; dirujuk sebagai 'flashover'.

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*In the name of ALLAH, Most Gracious, Most Merciful*

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Last but not least, I would like to say many thanks to all the staff at Electric and Electronic Engineering Department and School of Graduate Studies, Universiti Putra Malaysia, may ALLAH S.W.T. bless you all for your kindness.



I certify that an Examination Committee has met on date of viva to conduct the final examination of Ali Faik Tawfiq Al-Sweedy on his Master of Science thesis entitled "Reduction of Bird Pest in Electrical Power Substations Using Sonic Devices" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree.

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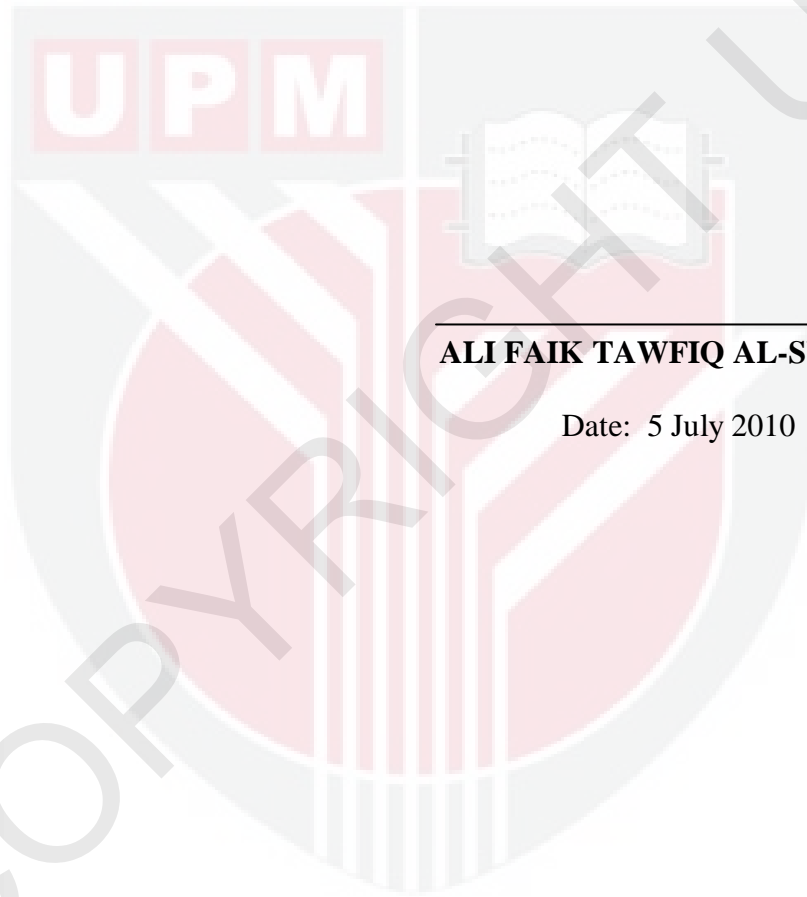
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## DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently submitted for any other degree at Universiti Putra Malaysia or other institutions.



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**ALI FAIK TAWFIQ AL-SWEEDY**

Date: 5 July 2010

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