Case Studies - Implementation of Theft Deterrent Grounding Systems at Telecom Facilities

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IN USA & GLOBALLY COPPER THEFT CONTINUES





IOME | INTERNATIONAL ~ | POLICY ~ | ANALYST ANGLE ~ | OPINION ~ | DEVICES | BIG DATA ANALYTICS | INTERNE est equipment 🗸 | Carriers 🗸 | Mobile Signal Map | NFV | 5G | DAS | 5DN | Cloud Computing | Small Cells

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Cell tower crime spree hits New England

BY JARAD MATULA ON APRIL 24, 2015

Thefts include New York, New Jersey, Rhode Island

Spring is in the air. The birds are chirping, the weather is beautiful and apparently cell towers look like trees bearing valuable fruit for those criminals ambitious enough. Three different sets of criminals have Seen on been thieving from cell towers in New England recently.

The Americans with Char First there's Paul R. Incognito, 33, and Keith E. Jousset, 33, from Hasbrouck Heights, N.J., ca AboutUs Grove police when attempting to steal equipment from an enclosed cell tower behind

WAUCHULA FOX131-The Hardee County Sheriff's Office areased three cellular solutions error a real row The next set of jabronis trying to steal from cell towers are Kenn and Jared Kuffrey, 27, of Wrentham, Mass. The pair was Kingstown, R.I. These two at least tried to cover un possible. They were wearing shirts that re-Communications. The stolen equip-

Police contacted Crown Car be there. The dama and remova

Care Force

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Move Over Copper; Cell Tower Batteries are the Hot Item Now

BY J. SHARPE SMITH -

FEATUR

HENS TOPICS

June 4. 2015 - Copper thefts at cell towers have been a common occurrence over the years. A new trend in larceny may be developing: the theft of cell tower batteries from base stations. While not being as big a problem as copper theft, stealing cell tower batteries is both needless overhead for carriers and the possible cause of downtime for cell service







CASE STUDIES - THEFT DETERRENT

- 1. INDONESIA TOWER BERSAMA, TELKOMSEL
- 2. USA AT&T & OTHERS
- **3. INDIA INDUS TOWER for VODAFONE**







TOWER BERSAMA GROUP FOR

INDONESIA

Indonesia has the largest 'young' population in the world with 165 million people under the age of 30, whereas only 8% of the population is aged over 60 years (National Bureau of statistics, August 2001).

INDONESIA DEMOGRAPHIC:

Indonesia is the 4th largest country in the world, with a population of around 250 million (World Bank, 2013).

INDONESIA COPPER THEFT PROBLEM

Even birds are stealing copper

Copper Theft Deterrent

Copper Theft Prevention

INDONESIA TELECOM COMPANIES

- Market leader Telkomsel mobile subscriber base of around 45% market share; Telkomsel launched LTE commercially in December 2014,
- PT Telkom fixed-line .
- SmartFren, after expanding its mobile subscriber base by over 40% in 2012, was continuing to grow
- PT Indosat was assigned a 4G concession in early 2015
- Indosat, battling with Axiata for

second place in the mobile market well behind Telkomsel, saw strong growth in 2014

 Axiata also launched its 4G LTE network in three cities

Source: <u>http://www.budde.com.au/Research/Indonesia-</u> <u>Major-Telecommunications-Operators-Historical.html</u>

WORKING WITH THESE CARRIERS & TOWER COMPANIES ON THEFT DETERRENT

- TELKOMSEL
- INDOSAT
- SMARTFREN
- TOWER BERSAMA
- MITRATEL

Design Philosophy

Use of single type of conductor below and above ground (Copper Bonded steel grounding System) and use of CADWELD PLUS

Theft Deterrent Factor

- Simplify Inventory Management
- Minimise bimetallic mechanical connections Uniform connection type - CADWELD PLUS

CONDUCTOR USED

ERICO CU-BOND Round Conductor cross-section

Cross-	Sectio	nal /	rea

Product Code	CBSC8	CBSC10	CBSC13	CBSC14	CBSC16	CBSC18
Conductor Cross Section in mm ²	50.27	78.52	138.07	158.90	199.84	243.27
Conductor Cross Section in in ²	0.08	0.12	0.21	0.25	0.31	0.38

INSTALLATION PHOTOS

MINDS a company Jaya

FOR AT&T and VERIZON

USA THEFT PHOTOS

USA THEFT PHOTOS

CABLE USED AT&T & VERIZON

THEFT DETERRENT COMPOSITE CABLE ABOVE GRADE ONLY

Global Part Number	Stranding	Cross Section	Resistance	Outside Diameter of Bare Conductor
CC5A04	(1) Tinned Copper, (6) Galvanized Steel		0.485 Ω/1,000 ft; 1.499 Ω/km	0.330 in (0.838 cm)
CC5A05	(3) Tinned Copper, (16) Galvanized Steel		0.457 Ω/1,000 ft; 1.591 Ω/km	0.334 in (0.848 cm)
CC5A20	(133) Tinned Copper, (21) Galvanized Steel		0.098 Ω/1,000 ft; 0.320 Ω/km	0.526 in (1.336 cm)

GROUND BAR

INDUS TOWER FOR

VODAFONE

SOUTHERN REGION OF INDIA

INDUS TOWER

- Indus Towers, as the world's largest telecom tower Company by Tenancy & Tower Count
- They Have 110559 towers in 15 circles across the country,
- Indus has the widest coverage in India and has already achieved 219686 tenancies, a first in the telecom tower industry globally.
- Indus Towers is an independently managed Company offering passive infrastructure services to all telecom operators

Search:	Search companies	Last Update: 3/18/2016
Rank*	Company ŧ	Tower Count #
1	American Tower	39,928
2	Crown Castle	39,739
3	SBA Communications	14,873
4	United States Cellular Co.	4,207
5	Vertical Bridge	3,198
6	Insite Towers	1,100

CUSTOMER DRIVING CHANGE

- Vodafone, International Carriers Putting Pressure in Tower Companies for High Quality And Performance
- Improvement Driven by Carrier and Tower
 Company

MOVED FIRST TO GALVANIZED STEEL TO AVOID THEFT AND TO LOWER COST

CORROSION

- GI STARTED CORROSION WITHIN MONTHS EVEN ABOVE GRADE
- MAJOR
 CONCERN FOR
 BELOW GRADE

MOVE TO COPPER BONDED STEEL BELOW & ABOVE GRADE

CASE STUDY

ALTERNATE GROUND BARS

ALTERNATIVE GROUND BARS

- ERICO undertook the study of the following alternative materials available for use as ground bars.
- The investigation included corrosion resistance, electrical performance and costs for the alternate materials for telecom earth bars.

Materials

C11000 Copper

Copper Plated Steel (0.2 mil)

Copper Plated Steel (0.5 mil)

Galvanized Steel (3.9 mil)

Zinc-Nickel Alloy Plated Steel

Copper-clad Alum inum

Tin-Plated Aluminum (0.02 mil)

Stainless Steel, Type 304

Aluminum

- Change of Impedance and Visual Inspection
 - Salt Mist Treatment
 - IEC 60068-2-52
 - Humid Sulfurous
 Atmosphere Treatment
 - ISO 6988:1985

Copper

Copper Clad Aluminum

Aluminum

Galvanized Steel

Stainless Steel

SUMMARY OF ALTERNATE GND BAR

- Closest performance to solid copper earth bar are <u>tin plated aluminum</u>, copper clad aluminum & <u>galvanized steel</u> with adequate coating
- **<u>Tin Plated Aluminum is considered the best</u>** alternative to copper earth bars.
- <u>Galvanized Steel is good alternative</u> provided there was adequate and smooth coating of Zinc
- Copper plated steel and galvanized steel showed similar characteristic to each other but had higher DC and AC resistance than copper and tinplated aluminum
- Zinc-Nickel Alloy Plated Steel and Stainless Steel either showed high DC or AC resistance or high corrosion and were deemed not suitable for use as earth bars.
- The aluminum bar under investigation showed that its DC and AC resistance is higher than tinned and it showed a higher inclination to corrode than tinned aluminum and tinned copper.

Choice of Carriers

- AT&T Verizon Galvanized Steel with Adequate Galvanizinng
- Verizon Glavanized steel and Barnone
- Telkomsel Indonesia Tinned Aluminium
- Indus Tower Considering Galvanized

SUMMARY

- PRACTICES IN CARRIER SPACE EMERGING
- BEST PRACTICE BASED ON FIELD & ENGINEERING EXPERIENCE AND SOME SCIENTIFIC DATA
- COPPER ALWAYS BEST BUT THEFT PRONE
- SHARE PRACTICES TO DEVELOP KNOWLEDGE AND THOUGH