



## **A CRIMINOLOGICAL EVALUATION OF INFRASTRUCTURE THEFT AND DAMAGE: THE COMBINED PRIVATE INVESTIGATIONS CASE STUDY**

### **1. INTRODUCTION**

The destructive effects of infrastructure thefts and damages, and more specifically copper theft, on the South African economy are well known with damages running into billions of Rands annually. Copper theft however, serves as a global phenomenon and the recurrent explanation is that metals have become attractive targets for theft due to the soaring price of scrap metal. This is generally attributed to global demand for metals exceeding supply.

Consequently, it is proposed that price increases have stimulated the creation of illegal markets that provide opportunities to sell stolen metals at financially rewarding prices. Life preserving assets such as assets that provide electricity, telecommunications, transport and revenue is under threat and it is expected by the nation that the governing bodies must secure national assets which ensure the necessities of daily life.

Due to the dearth of academic literature and the inherent economic nature of this phenomenon it has become evident that a very sophisticated, yet integrated approach is necessary to mitigate a multi-faceted crime threat within a wide range that mostly has high impact consequences when targeted. Moreover, it is apparent that stakeholders, know precisely how they are being plundered, but they appear to be unable to counter the threat within their current security configurations and resources (Pretorius, 2012).

Combined Private Investigations (CPI) serves as the quintessential case study pertaining to a holistic approach which secures essential infrastructure. CPI is an intelligence driven corporate investigations firm which offers a comprehensive end-to-end solution. The remainder of the paper will discuss the formidable copper theft database and the unique approach which CPI has enhanced and refined over the last 17 years.

### **2. OVERVIEW OF INFRASTRUCTURE THEFTS AND DAMAGES**

#### **2.1 NATURE AND IMPACT**

The general impression which signifies the gravity of copper theft was illustrated by Richardson (2011: 1), as follows, “The major impact is on the country's total economy. Surely that constitutes sabotage, which was a major crime the last time I checked”. It has been confirmed by various resources that South Africa loses anything between seven billion and sixteen billion Rand per annum as a result of copper cable theft (Phakathi, 2010: 1; Geldenhuis 2008: 1; Venter, 2008: 1).

According to research completed pertaining to risk factors of copper cable theft, the vast and remote expanse over which this crime occurred was continuously met with ineffective security measurements, regardless of the continual escalation of copper cable theft (Pretorius, 2012). It has been reported that the consequential damages are out of control and unprecedented levels were continuously surpassed by new negative benchmarking; the economy was being sabotaged and copper thieves were called ‘terrorists’, by members of Parliament, as they posed an intolerable threat to essential services (Ndlovu & Magwaza, 2008). The cumulative damage to the economy of this country, its organisations and individuals, is staggering (Geldenhuis, 2008: 1).

#### **2.2 MODUS OPERANDI**

Venter (2008:1) reported that the typical small-time copper thief was a subsistence criminal who was financially underprivileged. The despondent disposition of these subsistence entities was capitalised on by the organised crime elements that employed them to steal. They were, however, in the minority as gangs were responsible for most of the copper cable theft while in the scrap trade large cartels were at work (Pretorius, 2012).

Geldenhuis (2010:1) confirmed that copper thieves fell into two groups: organised crime syndicates, who tended to export their loot; and subsistence thieves who stole a couple of metres of cable at a time. Peggy Drodskie (Business Live, 2011:1)

Executive Advisor to the South African Chamber of Commerce and Industry stated, “Copper theft seems to be driven by syndicates”.

In many high-theft or hotspot areas, the same copper cables were repeatedly stolen, sometimes within days of having been replaced or repaired. This implied that local repeat offenders were involved. They knew precisely what the weaknesses and the strengths of security were, and what their calculated chances were of being caught (Le Roux, 2008:1).

Respondents from a study conducted in Gauteng by William Pretorius (2012), had consensus that copper cable thieves served in all capacities; from police officers, contractors, employees, security officers, service providers and corporate management. The higher the capacity level of the criminal was; the better the level and size of equipment used, from excavators to specialised vehicles and copper recycling equipment. In lower level groupings thieves used rudimentary tools, anything that would work of which bolt cutters, saws, poles and rubber bands for isolation and binding, were the most common.

It was further stated that copper cable thieves in general had time to plan and to survey; they knew their areas and environment in detail (Pretorius, 2012). Copper cable thieves were seldom caught on the job, as the remote environment and well-placed observation posts gave these criminals the benefit, and because they stole at night the darkness became their ally, helping them to get away quicker.

## **2.3 LEGAL FRAMEWORK**

It must be noted that on 15 December 2015 President Jacob Zuma signed into legislation the Criminal Matters Amendment Act. In respect of this Act the theft of ferrous and non-ferrous metal has now been classified as infrastructure crime. Please note that this Act has since been promulgated and came into effect as of 01 June 2016.

According to the *Government Gazette*, the Act amends the –

- Criminal Procedure Act 51 of 1977, so as to regulate bail in respect of essential infrastructure-related offences;
- Criminal Law Amendment Act 105 of 1997, so as to regulate the imposition of discretionary minimum sentences for essential infrastructure-related offences and create a new offence relating to essential infrastructure; and
- Prevention of Organised Crime Act 121 of 1998, so as to insert a new offence in schedule 1 to the Act and to provide for matters connected therewith.

The Act ensures that there are stricter conditions for the granting of bail in respect of essential infrastructure-related offences, there is also an imposition of harsher sentences to perpetrators.

Speaking on offences relating to essential infrastructure, s 3 of the Act states:

- 1) Any person who unlawfully and intentionally –
  - a) tampers with, damages or destroys essential infrastructure; or
  - b) colludes with or assists another person in the commission, performance or carrying out of an activity referred to in paragraph (a),

and who knows or ought reasonably to have known or suspected that it is essential infrastructure, is guilty of an offence and liable on conviction to a period of imprisonment not exceeding 30 years or, in the case of a corporate body as contemplated in section 332(2) of the Criminal Procedure Act, 1977, a fine not exceeding R100 million. Since the promulgation of this Act, exponential increases in convictions has been noted accompanied with increased and more harsher sentences.

## **3. GENERAL OVERVIEW**

### **3.1 COMBINED PRIVATE INVESTIGATIONS (CPI)**

Combined Private Investigations (CPI) is a South African based (51% black-owned and B-BBEE level 4 rating) Company which promotes equal opportunity. During 1998 and 2002, the theft of conductors/cables escalated and displayed a 500% increase in theft. This resulted in Eskom initiating realistic strategies to address the situation.

During 2002, Eskom (Mr. Christopher Palm, Mr. Leon van den Berg and Mr. André Bekker) approached Mr. Roy Robertson (who was the SAPS Unit Commander (addressing Cable theft from 1984-1997) in 1998 he joined Anglo American, Zambia who requested his expertise). This then led to the formation of Combined Private Investigations, or otherwise referred to as “CPI”

which was established in April 2002. CPI's focus was on the dramatic increase in conductor theft, illegal trading and export of stolen conductors, as well as other non-ferrous metals.

During 2003, Eskom appointed CPI to investigate conductor theft nationally. After appointing CPI, under the leadership of Mr. Roy Robertson, the rising trend was reduced remarkably within the first year of rendering the services. After the successes displayed by CPI and the drastic decrease of thefts within Eskom, Ekurhuleni and City of Tshwane also approached CPI by using the same method as Eskom.

### **3.2 COMBINED PRIVATE INVESTIGATIONS METHODOLOGY**

*Command, control, communication, computers, intelligence, surveillance and reconnaissance (C4ISR)* is an umbrella term encompassing a system of systems, processes, procedures and techniques to collect, analyse and disseminate information. This includes intelligence gathering, dissemination and command and control networks and systems that deliver a Common Operating Picture (COP) of a designated environment to provide situational awareness (Clark & Moon, 2002).

CPI's methodology is loosely based on the C4ISR framework discussed above however, the focus of investigations remains intelligence driven. CPI has an experienced team of forensic investigators - mainly drawn from corporate organisations, ex-police and military personnel.

In accordance with the C4ISR framework, CPI's integrated methodology serves as the basis for identification of synergistic sub-system elements and for synthesis into an integrated system. CPI manages and maintains a formidable network of informants who have successfully infiltrated syndicates, informal organisations and unscrupulous receivers of stolen material. The current network of informants and agents can be deployed at any institution to gather valuable information – these informants and agents are maintained, and ongoing recruitment is essential.

Task Team Members, who receive specialised training, are deployed and necessary technology is installed (when and where applicable). CPI's Technology simply serves as a technological aid to assist investigations and prevent and/or deter Thefts and Damages. The synergy between technological aids and CPI's refined intelligence driven operations has created an impetus for successful convictions.

CPI's in-house legal team monitors and assists with Court Cases, ensures dockets are completed with all relevant information to be presented at court, advises at bail hearings, ensures witnesses are informed in respect of court attendance, acts as watching brief over sensitive cases and/or appoint legal advisors from the private sector should the need arise and testifies on behalf of Clients as and when necessary.

To undoubtedly link evidence, CPI has acquired state of the art equipment such as a fully equipped forensic laboratory as well as highly qualified forensic experts to investigate any high-profile cases. Inclusive in the enhancement of CPI's methodology, several new technologies were brought on board to ensure that all unique specifications and needs of the clients are met and that the phenomenon can be addressed.

These technologies include the purchasing and unique equipping of the CPI Helicopter, the adding of specialised drones, the opening of a fully functional (SAIDSA approved) 24-hour National Operational Centre (NOC) as well as the addition of vehicles which have been equipped for rapid and effective armed response and early detection.

### **3.3 PRICE THEFT HYPOTHESIS**

Copper is among the world's most widely used metals, and it is used extensively in several industries, including construction, transport, and telecommunications. High global consumption rates alongside the development and industrialization of emerging economies such as China and India have seen available copper reserves strained under mounting demand (International Copper Study Group 2013). Whilst most industrialized countries have experienced year-on-year reductions in several crime types since the mid-1990's (Farrell et al. 2011; Tseloni et al. 2010; van Dijk, Tseloni, and Farrell 2012), metal theft shows a largely upward trajectory.

A common interpretation of this finding is that general increases in the price of metals experienced in the past decade have made this type of crime more attractive to thieves. This account can usefully be reformulated using a crime opportunity framework. Crime opportunity theories are concerned with the role of immediate environmental factors in crime causation. Hallmarks of crime opportunity theories include a focus on crime events (as opposed to offender disposition) and an interest in how the attributes and activities of crime targets (animate and inanimate) are associated with variations in rates of victimization (Clarke 1999; Cohen and Felson 1979). The decision-making model underpinning crime opportunity theories is the rational choice perspective (Cornish and Clarke 2008), which holds that prospective offenders make (bounded) situated decisions based on the perceived effort, risks, and rewards of committing specific crime types.

Crime is considered more likely if the anticipated rewards outweigh the expected risks and effort. The rewards from successfully committing crime can take many forms, from the accumulation of assets to psychological satisfaction. However,

despite this diversity, much acquisitive crime is considered to be motivated by financial gain. Metal prices are an example of a macroeconomic environmental factor that might influence offender decision making (Sidebottom, Ashby & Johnson, 2014). From a crime opportunity perspective, all things being equal, increases in the price of metals would be expected to make the theft of metal more attractive which, in turn, should lead to an increase in the frequency of metal theft.

From an offender perspective, there are several features that make copper an attractive target for theft. These factors can be stable or dynamic, and can relate both to the form of copper, its many functions, and to scrap metal markets more generally. For example, the distinctive colour of copper means it is easy for thieves to identify compared to other (less valuable) metals. Property marking, if present, can often be easily removed (e.g., by burning) thereby blurring the provenance of the metal. The ubiquitous use of copper means there are plentiful opportunities for theft, though clearly some are easier to exploit than others (Sidebottom, Ashby & Johnson, 2014).

In relation to scrap markets, little effort is typically required to prepare copper for resale and opportunities for disposal in the form of scrap metal dealers and pawnshops are readily available. Yet, these are all relatively stable attributes and cannot plausibly explain the changes in patterns of copper theft. Price, by contrast, is volatile, such that increased market prices are associated with corresponding increases in the price per weight available at scrap metal dealers and pawnshops (Sidebottom, Ashby & Johnson, 2014). Thus, the described upward trend in the price of copper (primary or scrap) increases the profitability of stealing copper and hence the attractiveness of copper-bearing items as targets for theft, be they railway cables, electrical wires, or water boilers.

Thus, according to the Price theft hypothesis an increase in copper cable theft is positively influenced by increases in copper price, and consequently an increase in the desirability of copper as a target for theft.

## 4. CASE STUDY STATISTICAL OVERVIEW

### 4.1 ESKOM

CPI has worked for Eskom between the period of 2002 – 2019. CPI managed to successfully apprehend a total of **4080** suspects, during the 17 years worked for Eskom.

- ✓ Within the **Free State province**, CPI successfully infiltrated 18 syndicates linked to 194 scenes. A total of 110 accused were successfully convicted to a total of 3 728 years' imprisonment. Each syndicate group was sentenced to an average of 207 years imprisonment thus, on average 1 accused was sentenced to 33.8 years imprisonment.
- ✓ Within the **North West Province**, approximately 140 scrap dealer premises were visited, and 60 individuals were successfully apprehended. Moreover, 17 suspects, who formed part of a syndicate group, were successfully convicted, and the suspects received a combined sentence of 129 years imprisonment.
- ✓ Within the **Kwa-Zulu Natal province**, CPI successfully apprehended members of 3 syndicate groups. Furthermore, CPI closed 2 Scrap Metal Dealers and successfully apprehended 32 suspects where a total of 13 cases dockets were involved.
- ✓ Within the **Western Cape Province**, between the period of 2016 and 2018, CPI successfully apprehended 76 suspects.
- ✓ Within the **Gauteng Province**, CPI recovered Eskom material worth an excess of R 8 354 000.00. Between June 2017 and June 2018, a total of 228.5m of Eskom Cables were recovered (*average: 19m per month*) and a total of 15 331 Kg of Eskom owned non-ferrous metals were recovered (*average: 1277 kg per month*). Extensive investigations at Duvha Power Station led to the apprehension of 3 suspects whereby R3.5 Million worth of material was recovered.

### 4.2 MUNICIPALITIES

**City of Tshwane** – Since involvement (*May 2007 – February 2017*) CPI managed to successfully apprehend a total of 520 suspects. Out of the 520 suspects, a total of 29 suspects have warrant of arrests issued against them and 9 suspects are currently awaiting trial (pending). The cases against the remaining 482 suspects have been finalised at court.

**City Power** – Since involvement (*March 2014 – June 2017*) CPI managed to successfully apprehend a total of 298 suspects. Out of the 298 suspects, a total of 75 suspects have warrant of arrests issued against them and 35 suspects are currently awaiting trial (pending). The cases against the remaining 188 suspects have been finalised at court.

**Ekurhuleni** – Since involvement (*April 2007– June 2018*) CPI managed to successfully apprehend a total of 1707 suspects. Out of the 1707 suspects, a total of 236 suspects have warrant of arrests issued against them and 263 suspects are currently awaiting trial (pending). The cases against the remaining 1208 suspects have been finalised at court.

**eThekwini** – Since involvement (*February 2011 – November 2016*), the total illegal connection incidents from 2011 to 2013 were 64.91% and from 2014 to 2016 the illegal connection incidents decreased to 35.09%. CPI managed to successfully apprehend a total of 171 suspects. Out of the 171 suspects, a total of 8 suspects have warrant of arrests issued against them. The cases against the remaining 117 suspects have been finalised at court.

**Midvaal Municipality** - During November 2018, CPI was requested to remove illegal connections within Sicelo Informal Settlement. During this operation, CPI successfully recovered **4 Tons** of Copper Cable along with **1 Ton** of Aluminium Cable.

### 4.3 TRANSNET FREIGHT RAIL

CPI has worked for Transnet Freight Rail between May 2010 – January 2019 and since involvement CPI managed to successfully apprehend a total of **2093** suspects, during the **9** years worked for Transnet Freight Rail

A combined total of 807 cases have been registered since involvement, and on average CPI attends to 15 cases per week.

#### Highlights to be mentioned:

- ✓ Within the **North West Province**, investigations led to the recovery of 101 960 kg from different premises of Pantsula Scrap Metals.
- ✓ **Sentrand**, which serves as TFR's hub, was a major concern and since 2015, CPI successfully apprehended 41 suspects within the Sentrand area leading to a vast decrease in incidents.
- ✓ During 2017 and 2018, 4 major syndicate groups, consisting of 31 accused's, targeting TFR in its entirety, were successfully convicted and sentenced, to a combined total of 2645 years direct imprisonment, thus on average 1 accused received 85 years direct imprisonment.

### 4.4 TELKOM

CPI has worked for Telkom from July 2017 – to date, and since involvement, CPI managed to successfully apprehend a total of 369 suspects.

CPI has managed to successfully apprehend 41 suspects and recovered more than 200 batteries - involved in VODACOM, MTN and TELKOM (Battery-Related) matters. Majority of these suspects are currently on trial.

- ✓ During 2012 and 2013, 3 major syndicate groups, consisting of 11 accused's targeting Telkom Batteries, were successfully convicted and sentenced to a combined total of 203 years imprisonment.
- ✓ During 2017 and 2018, 12 accused were successfully convicted and sentenced to a combined total of 34 Years and 6 months direct imprisonment and, the remaining suspects are currently on trial.

Millions of Rands were lost by Telkom pertaining to Clip-On Fraud (*this is when lines are illegally connected to and (mostly international) calls are being made by the perpetrators*). CPI managed to successfully apprehend 4 syndicate members (*mostly Telkom Contractors in possession of keys to open the boxes and make connections without anyone noticing*) – this served as a major breakthrough.

13 Telkom Contractors (involved in numerous Sabotage and Theft-Related incidents) were successfully apprehended by CPI – most of these contractors are still in custody and currently on trial.

Within the **Gauteng, Mpumalanga, Limpopo and North West Provinces**, the crime and incidents are maintaining a decreasing trend. Out of the 369 suspects arrested, a total of 20 suspects have warrant of arrests issued against them and 175 suspects are currently awaiting trial (pending). The cases against the remaining 174 suspects have already been finalised at court.

### 4.5 PRASA METRORAIL (WESTERN CAPE)

CPI has been deployed on PRASA Metrorail's Central Line in Western Cape since 01 March 2018 to date. During this period CPI has attended to 310 incidents, of which 227 incidents had successful apprehensions, thus a 73% chance of a successful apprehension every time CPI attends to a scene.

A combined total of 402 suspects have been successfully apprehended, CPI successfully apprehended 227 suspects and non-CPI Members apprehended 175 suspects.

CPI provided training to PRASA Members along with integral role players during June and July 2018, which led to an increase of on average 10 non-CPI arrests, every month thereafter.

A combined total of 217 cases have been registered and CPI has attended to over 1700 court appearances moreover, CPI attends an average of 40 cases per week.

Thus far, 42 cases have been finalised and accused were sentenced to a combined total of 316 years and 6 months.

## 5. COMBINED PRIVATE INVESTIGATIONS COURT PROCEEDINGS

The combined total number arrests for all entities, which includes but is not limited to (*since 2002 to date*); Anglo American, Arcelor Mittal, Cell C, City of Mbombela, **City of Tshwane**, **City Power**, Ehlanzeni, **Ekurhuleni**, Emfuleni Local Municipality, **Eskom**, **eThekweni**, Heineken Brewery, Kromberg & Schubert Cable & Wire (Pty) Ltd, Lesedi Local Municipality, Manjoh Ranch, MTN, **PRASA Metrorail (Western Cape)**, Richards Bay Minerals, **Telkom**, Tharisa Mine, **Transnet Freight Rail**, Vereeniging Refractories and Vodacom is **9361 suspects**.

### Some Court Cases to be highlighted:

SAPS and CAS Number	Sentence
Brandfort (CAS 08/12/2014)	5 accused were sentenced to a total of <b>332 years and 6 months imprisonment</b>
Senekal (CAS 46/08/2015)	11 accused were sentenced to a combined conviction of <b>1213 years imprisonment</b>
Harrismith (CAS 76/11/2016)	6 accused were found guilty and convicted to a combined sentence of <b>975 years imprisonment</b>
Kroonstad (CAS 06/11/2016) and Kroonstad (CAS 256/03/2017)	1 accused was sentenced to a combined total of <b>120 years imprisonment</b>
Allanridge (CAS 88/01/2017)	5 accused were found guilty and sentenced to a combined conviction of <b>451 years imprisonment</b>

## 6. SCRAP METAL MARKET

Scrap metal dealers act as a link between generators and users of scrap metal. Scrap often exists in very small quantities for example a car being disposed of by its owner or copper piping from a house being renovated which scrap metal dealers must aggregate.

The smallest participants in the industry are itinerant collectors, who buy scrap from any available source or simply collect dumped metal from road sides and wasteland (Sibley, 1976). Prices are typically negotiated on the spot without an existing contract, except for large purchases of scrap from industrial users of metal. The scrap-metal market has notable similarities with stolen goods markets.

Both are based largely on cash payments with prices agreed at the time of sale rather than by prior contract. Both scrap metal dealers and some types of fence (especially pawn brokers) may have little or no prior knowledge of sellers and therefore little knowledge of the provenance of the goods on offer (McIntosh, 1976). Both are also fragmented, with many small businesses offering to buy goods from an even larger number of small suppliers. The similarities between the two markets make scrap metal dealers vulnerable to exploitation by criminal groups.

Scrap metal dealers are particularly vulnerable to being offered stolen goods for two reasons. Firstly, there are many types of metal (for example bare copper wire) for which it is impossible to distinguish one batch (which might be stolen) from another (Spendlove, 1961). Secondly, unlike many stolen goods that can be sold in bars or to friends, scrap metal can often only be sold to scrap metal dealers (Posick, Rocque, & Whiteacre, 2012; Price, Sidebottom, & Tilley, 2014). Except in the (presumably unusual) circumstance of a thief being able to meltdown old scrap and resell it as new, the only alternative to selling it to a scrap metal dealer locally would be to export it directly to a scrap metal dealer in another country.

## 7. CONCLUSION

From the above it is evident that Combined Private Investigations serves as the flagship of intelligence driven operations within South Africa. Over the last 17 years, CPI has enhanced and refined our methodologies to ensure that the copper theft phenomenon is holistically redressed.

CPI has established the biggest database with specific relevance to copper cable theft and CPI is acquainted with almost every copper theft syndicate group in South Africa. Like most crimes, copper theft has become much more sophisticated over the years and various new strategies have been implemented by numerous suspects. As the crime becomes more sophisticated and violent, CPI ensures that its methodology remains effective by installing and acquiring various technologies and enhancing current methodologies.

This has enabled CPI to create various sub-synergetic systems which serve to comprehensively redress the copper theft phenomenon and any area where CPI has been deployed has experienced a decrease in incidents. CPI offers many cost-sharing benefits and it is known that CPI is the most cost-effective solution to redress any challenges experienced by our clients.

## 8. REFERENCES

- Becker, G. S. 1968. "Crime and Punishment: An Economic Approach." *The Journal of Political Economy* 76:169-217.
- BUSINESS LIVE. 2011. *Copper theft is crippling parastatals*. Business Live [Online]. Available: <http://www.businesslive.co.za/Feeds/businesstimes/article1422586.ece> (Accessed on: 20 March 2019)
- Clarke, R. V. 1999. *Hot Products: Understanding, Anticipating, and Reducing Demand for Stolen Goods*. Police Research Series Paper 112. London, England: Home Office Policing and Reducing Crime Unit.
- Cohen, L. E. and M. Felson. 1979. "Social Change and Crime Rate Trends: A Routine Activities Approach." *American Sociological Review* 44:588-608.
- Cornish, D. and R. V. Clarke, eds. 1986. *The Reasoning Criminal*. New York: Springer-Verlag.
- Cornish, D. and R. V. Clarke. 1987. "Understanding Crime Displacement: An Application of Rational Choice Theory." *Criminology* 25:933-47.
- Cornish, D. and R. V. Clarke. 2008. "The Rational Choice Perspective." Pp. 21-47 in *Environmental Criminology and Crime Analysis*, edited by R. Wortley and L. Mazzerolle. Cullompton, England: Willan.
- Farrell, G., N. Tilley, A. Tseloni, and J. Mailley. 2011. "The Crime Drop and the Security Hypothesis." *Journal of Research in Crime and Delinquency* 48:147-75.
- Farrell, G., S. Chamard, K. Clark, and K. Pease. 2000. "Towards an Economic Approach to Crime and Prevention." Pp. 122-37 in *The Economic Dimensions of Crime*, edited by N. G. Fielding, A. C. Clarke, and R. Witt. London: Macmillan Press.
- Fletcher, A. W. 1976. Review lecture: metal recycling from scrap and waste materials. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 351, 151-178
- Geldenhuys, K. 2008. Non-ferrous metal theft brings cities to their knees. *Servamus*. Available at: [http://www.telkom.co.za/general/cabletheft/metal\\_theft.html](http://www.telkom.co.za/general/cabletheft/metal_theft.html) (Accessed on: 18 March 2019)
- Geldenhuys, K. 2010. *Reasons why non-ferrous crimes are not resolved* [Online]. Telkom. Available: <http://www.telkom.co.za/general/cabletheft/Reasons.html> (Accessed on: 20 March 2019)
- Le Roux, H. 2007. *Cable theft costs SA billions a year*. *Engineering News* [Online]. Available: <http://www.engineeringnews.co.za/article/cable-theft;costs-south-africa-billions-a-year> (Accessed on: 20 March 2019)
- Le Roux, H. 2008. *Cable theft costs Telkom R836 million*. *Engineering News* [Online]. Available: <http://www.engineeringnews.co.za/article/cable-theft-costs-telkom-r863m-2008-03-03> (Accessed on: 20 March 2019)
- McIntosh, M. 1976. Thieves and fences: markets and power in professional crime. *British Journal of Criminology*, 16, 257-266.
- Ndlovu, M. & Magwaza, N. 2008. Metal theft is crippling industry. *Pretoria News*. Available at: <http://www.pretorianews.co.za/index.php?fSectionId=700&fArticleId=vn20080724062908343C380917> (Accessed on: 18 March 2019)
- Phakathi, B. 2010. Drastic new steps to halt copper cable theft. *Business Day*. Available at: <http://allafrica.com/stories/201006220473.html> (Accessed on: 18 March 2019)
- Posick, C., Rocque, M., & Whiteacre, K. 2012. Examining metal theft in context: an opportunity theory approach. *Justice Research and Policy*, 14, 79-102.
- Pretorius, W.L. 2012. *A Criminological analysis of copper cable theft in Gauteng*. Unpublished dissertation. MA in Criminology. University of South Africa, Pretoria.
- Price, V., Sidebottom, A., & Tilley, N. 2014. Understanding and preventing lead theft from churches: a script analysis. In L. Grove, & S. Thomas (Eds.), *Heritage crime: Progress, prospects and prevention* chapter 8 (pp. 128-148). London: Palgrave Macmillan.

- Richardson, S. 2011. Copper cable theft hits economy. *Times Live*. 18 August. Available at: <http://www.timeslive.co.za/ilive/2011/08/18/copper-theft-hits-economy-ilive> (Accessed on: 18 March 2019)
- Sibley, D. 1976. The location and layout of gypsy caravan sites: notions of deviancy in official policy. *Antipode*, 8, 83-87
- Sidebottom, A., J. Belur, K. Bowers, L. Tompson, and S. D. Johnson. 2014. "Theft in Price-volatile Markets: On the Relationship between Copper Price and Copper Theft." *Journal of Research in Crime and Delinquency* 48:396-418.
- Spendlove, M. J. 1961. Methods for producing secondary copper. Bureau of Mines Information Circular. Washington, DC: US Department of the Interior.
- T. Clark & T. Moon, September 2002. "Assessing the military worth of C4ISR information". *7th International Command and Control Research and technology Symposium*.
- Torkelson, E. 2010. *Who profits from Copper Theft?* [Online]. ISS. Available: [http://www.iss.co.za/iss\\_today.php?ID=1059](http://www.iss.co.za/iss_today.php?ID=1059) (Accessed on: 20 March 2019)
- Tseloni, A., J. Mailley, G. Farrell, and N. Tilley. 2010. "Exploring the International Decline in Crime Rates." *European Journal of Criminology* 7:375-94.
- Van Dijk, J., A. Tseloni, and G. Farrell. 2012. *The International Crime Drop: New Directions in Research*. Basingstoke, England: Palgrave Macmillan.
- Venter, I. 2008. How copper theft is ruining the economy and what's being done about it. *Engineering News*. Available: <http://www.engineeringnews.co.za/article/how-copper-theft-is-ruining-the-economy-and-whats-being-done-about-it-2008-08-29> (Accessed on: 18 March 2019)
- Venter, I. 2008. *How Copper theft is ruining the economy and what's being done about it*. *Engineering News* [Online]. Available: <http://www.engineeringnews.co.za/article/how-copper-theft-is-ruining-the-economy-and-whats-being-done-about-it-2008-08-29> (Accessed on: 20 March 2019)
- Webb, M. 2011. *Copper cable theft declared a high-priority crime*. Polityorg.za [Online]. Available: <http://www.polity.org.za/article/copper-cable-theft-declared-a-high-priority-crime-2011-06-23> (Accessed on: 19 March 2019)
- Zimring, C. 2004. Dirty work: how hygiene and xenophobia marginalized the American waste trades, 1870e1930. *Environmental History*, 9, 80-101.