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## Ethical Aspects and Legal Liabilities of Drainage Defects in Construction

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### Abstract

Unethical practices that lead to defects in the construction industry are widespread and widely discussed globally. Drainage defects are expensive issues that hinder the free flow of water and increase the harms to structures, people and the environment. This raises the legal liabilities that construction players face for each project they embark on. The aim of this article is to enhance understanding of ethical issues, particularly those related to the construction of an open drainage system and its relationship to legal liabilities. The data was collected mainly from a naturalistic on-site observation, unstructured interviews and documents analysis. They were analysed using thematic analysis. The findings indicate how the contractor has been recognised as presenting a risk of behaving illegally and can be liable for damages or at risk of legal charges. Missing elements and improper construction of the drainage system had caused drainage failure, which ultimately had adverse financial consequences for both contractor and client. The study also shed light on the notions of ethical blindness and unethical pro-organisations, which will be useful in future empirical studies. Moreover, a greater emphasis on joint Fraud Triangle and Teleology may yield insightful results that are relevant to the attention and behaviour of various parties at the sites, including the client and the contractor, because client behaviour can put pressure on

contractors to behave fraudulently and client cost-cutting can provide a rationalisation for the contractor. The study promotes the significance of ethical values in the construction industry and its players in order to protect the stakeholders from dealing with the aftereffects, financially or legally. More research focusing on the combined fraud and teleology theoretical conditions of defects may yield intriguing discoveries that explain for various parties' attentions and behaviours at the sites.

**Keywords:** Defects, Drainage, Ethics, Fraud, Liability and Negligence.

## Introduction

Drainage is critical in preventing flooding, structural damage (Christopher & McGuffey, 1997; Malano & Hofwegen, 1999) and soil erosion (Fausey, 2004). Defects in wastewater drainage are regarded by maintenance managers as critical requiring urgent rectification (Olanrewaju et al., 2010). In the urban built environment, Kian (2004) identifies drainage issues including plumbing faults and water penetration beneath stone cladding as among the most common building defects reported to the Singapore Building and Construction Authority (BCA), while Fwa (1987); Tiza *et al* (2016) reviewed research on the impacts of poor drainage on public roads, while Herzon & Helenius (2008); Taffs (2001) examined the ecological impact of proper implementation of agricultural drainage schemes in rural areas. Despite its importance, drainage systems are often found to have been given low priority in construction work, leading to a growing number of defects (see: Abdul-Rahman *et al.*, 2014).

Construction defects may have a variety of causes. Waziri (2016) identifies use of defective materials, poor supervision of the workforce and poor building specifications as the three most important causes of defective construction work giving rise to increased maintenance. Buys & Roux (2013), identify “inadequate artisan skills,” “unqualified contractors” and “lack of quality management during construction” as the three most important causes of defects in house construction Josephson & Hammarlund (1999) identified lack of motivation among contractor personnel as the greatest factor in construction defects, with time and cost pressures being among the related causes Jingmond & Ågren (2015) identified organisational failures in project management as the key enabling factors in allowing construction defects to arise. These motivational and organisational failures are linked to business ethics, insofar as they result from corruption or systematic negligence. Corruption may increase the likelihood of unqualified or negligent building contractors being awarded contracts or to client-side managers colluding to conceal defects (Mukumbwa & Muya, 2013), while systematic negligence may lead to inappropriate workforce motivations to complete projects with minimal work and minimal cost instead of ensuring that building standards and contract specifications are met (Deng et al., 2014). Such unethical practices can contribute to further costs during construction and after handover, for instance, the need for defect rectifications and unnecessary maintenance works (Kian, 2004; Waziri, 2016), as well as to the risk of death or injury (Ambraseys & Bilham, 2011; Deng et al., 2014) and damage to eco-systems (Taffs, 2001; Bosshard, 2005; Herzon & Helenius, 2008). As a result, construction defects can lead to lengthy litigation (Bell, 1960; VanDemark & Clevenger, 2020) against both employers and employees (Craig & Barnes, 2007).

Nevertheless, most studies on construction defects have focused on the effects of poor construction in the development of patent and latent types of defects and the frequencies of their occurrence at buildings, rather than on the human behavioural causes of poor construction. The aim of this article is to enhance understanding of the ethical issues

which cause poor construction practice and on the consequent legal liabilities, specifically in relation to the construction of open drainage systems.

The rest of this article is structured as follows: the next section reviews the literature on ethics and legal responsibilities in construction; followed by the methodology for the case study; the case study results and discussion, a review of the theoretical framework for understanding fraud and unethical behaviour in the construction industry; and then by the conclusions on the study.

### **Ethics, Law, Defects and Legal Liabilities**

Brown & Loosemore (2015) found that culture and economics are key drivers of corruption in construction and that working within an industrial culture where other actors are corrupt makes survival impossible without engaging in corrupt practices. However, they also found that an environment of decision-making with an excessive emphasis on cost-cutting undermined quality and quality control.

The construction businesses indisputably face a variety of unethical behavioural problems in their attempts to improve profitability. Predominantly, ethics refers to the rightness and wrongfulness of a conduct. In opposed to descriptive ethics, there is no clear explanation as what is right or wrong in normative ethics as the issues revolve around this area appear to be multi-faceted. The study area of it is complex and controversial. In this instance, law intersect with ethics as shown in the Venn Diagram (Figure 1) to govern the behaviour of people and businesses is helpful to help figure out how the universal understanding should be.

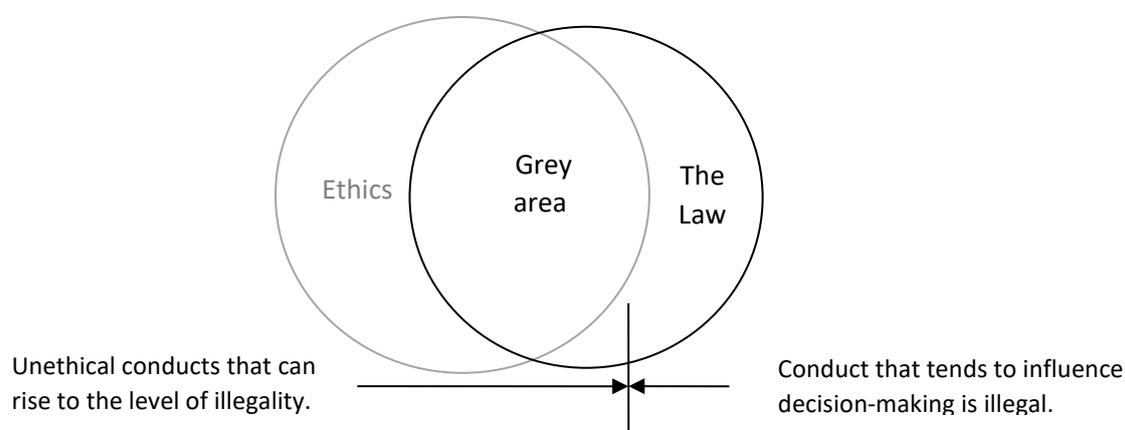


Figure 1. Venn diagram of the intersect between ethical values and law (Crane et al., 2019; Latif, 2014)

The right side of the diagram is often straightforward and illustrates crucial issues in the construction industry, such as corruption. The left side of the diagram, on the contrary, is more complicated especially when cultures and values in a specific context interfere with clarity. For example, giving gifts in practicing culture, known as 'guanxi' in China, 'yongo' in South Korea and 'wasta' in Egypt/ Jordan to establish relationship seems amiable to the people of a society - can be considered as petty corruption, bribery or other illegal behaviour in other countries (Provis, 2008; Zhang et al., 2021). Similarly, organisations that are invited to submit a bid but respond with higher bids to show their commitment to the client in order to avoid being denied for future bid opportunities, can be categorised as cover pricing, and violate competition law (Hughes et al., 2015). Furthermore, mistakes in tasks such poor

quality documents, inadequate construction technique and dishonesty lead to defects that can be elevated to the level of illegality (Vee and Skitmore, 2003). As a result, these areas become uncertain.

Construction defects are typically charged with tortious and contract liabilities such as negligence, strict liability and breach of contract or warranty (French, 2011). In some cases, fraud may be charged for the defects (DeFlaminis et al., 2014). Negligence happens when there is a failure to exercise the care by parties involved in the construction activities. The duty of care may be extended to anyone who could be affected by the defects (Winfield et al., 1994). Breach of contract is typically violation of the contractual obligations and non-adherence to requirements or valid instructions (see: Schenck and Goss 2015). Damages to the breach of contract are not meant to penalize the defendant but to compensate the complainant (Glover, 2008). Breach of warranty is similar to breach of contract but often includes time for the lifecycle of an element or when the courts concluded that some implied warranties that implicitly guarantees exist for a building (Winfield et al., 1994). Fraud can either violate civil or criminal law depending on the situation and parties involved. In common law jurisdictions, fraud arises under civil law, is tort. Fraud in this case expresses that the contractor/developer has purposely misrepresented the building standard, had no intention, as promised, to obey the design plans and requirements. Fraud includes a contractor/developer making a false statement knowingly it was incorrect with the intent of deceiving and causing harm to the client (Carson, 2003). Gunduz & Önder (2013) examine the effects of business ethics on likelihood of fraud against building contractors. However, their focus here is on direct financial loss, rather than on the effects on construction quality. Negligence misrepresentation occurs when the contractor promises something to the client but then fails to deliver on that promise (Gergen, 2013). Strict liability, which also falls under law of tort, occurs when the defendant demonstrates that the contractor/ developer was complicit in the construction of buildings and that there is a defect which has caused in losses (Carson, 2003). According to VanDemark & Clevenger (2020), the parties involved in drainage defects disputes based on contracts often include the client, contractor and designers.

Workmanship defects occur during the construction stage and frequently pertains to the responsibilities of the contractors because they are the executor, providing services to produce a structure. Generally, the contractor agreed that a project would be completed according to the specifications outlined in the contract document. The amount non-conformance works or defects and their severity would determine as whether the agreement is largely met. Apart from the contractor, other construction players also often violate ethical rules. Maniam (2004) examined the decision of the High Court and Court of Appeal on the Highland Towers Block 1 collapse and affirmed that the construction players were liable for the structural failure were due to a lack of professional ethics, integrity and unethical behaviour. As a result, they were legally alleged. The Architect for Highland Towers development who was only a draftsman, has breached the duty of care to the plaintiffs to take reasonable care and diligence in designing adequate drainage, rubble walls and undertaking proper supervision. The Engineer, who was the brother of the Architect was negligent mainly for poor structural design. Apart from the two construction players, other defendants who were found guilty were the developer, the Municipal Council of Ampang Jaya, a landowner behind the towers and another landowner who worked at a higher land near the tower as well as his project manager. Maniam (2004, p.21) added that - *Seventy-three owners and occupiers of the Blocks 2 and 3 apartments brought an action against 10 defendants in negligence, nuisance, strict liability under the rule in Rylands v. Fletcher and*

*breach of statutory duty*. Surprisingly, the contractor was not found to be legally viable and not included in the list of the ten defendants. This shows that contractors are not always wrong, but they are mostly blamed for construction defects

On the other hand, it is acknowledged that contractors are opportunistic and very likely to break the rules for financial gain (Bowen et al., 2007; CIOB, 2006; Zou, 2006). With such goal in mind, contractors often behave unethically, especially when procuring public projects (Agyekum et al., 2021; Muriithi, 2020). Nevertheless, the goal in undertaking a construction project is not the problem, rather the actions taken in achieving it can be wrong. A classic ethical theory known as consequentialism explains that the outcomes/ goals justify the actions that people often take, even it means the rules and laws have to be set aside (Hinman, 2016; Trevino & Nelson, 2021) and harmful to others (Kamm, 2000). As explained by Palazzo *et al* (2012), ethical blindness is a context-bound phenomenon where there is a tendency that people deviate from moral values even with individuals of high degree of integrity. Ethical blindness construct allows better understanding of the mechanism that underpins unethical behaviour, yet there have been few analytical and observational research (Aleksic, 2017), especially in the context of the construction industry. Ethical blindness at construction sites worth further investigation in future study to understand how construction workers make sense of their working environment to make decisions and how this relates to ethical dilemmas, if any. A force that goes consecutively with blindness is the unethical pro-organisation behaviour where individuals have the sense of belonging and rationalisation to support the contractor, which ties well with previous studies (see: Murphy and Free 2015, Umphress *et al.* 2010, Wang and Li 2019). Consequently, the likelihood of unethical activity is raised. At this stage of understanding, further analyses on motivation of site workers are needed to prevent blind obedience and devotion to organisations and superiors, in the efforts of reducing defects. As Hosain (2019) asserted, the unethical pro-organisation behaviour research is relatively a new concept which is less explored at the organisational level.

Brunk (2012) demonstrates the link between motivation, actions and the outcomes based on theoretical understanding in explaining the phenomenon of un/ethical behaviour as Figure 2. Actions that based on motivations/ rules denotes deontology as opposed to teleology that based on the goals/ outcomes. Either way, both types of actions can result in defects. This can lead to legal actions such as negligence and fraud.

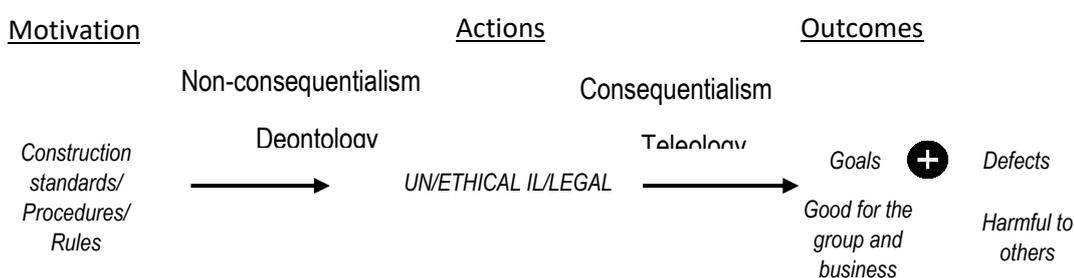


Figure 2. Theoretical framework (after Brunk, 2012)

There is a lack of empirical study on what contractors do that can result in defective works. There is a need to move empirical research forward from categorising the types of defects to identifying unethical behaviour that can reduce the sustainability of construction products (Gorta, 2016). As Mills (2012) points out, a more essential question requires immediate attention is how the processes allow unethical behaviour to persist. In relation to this, Olken,

(2009) examined the financial and purchasing records to identify unethical behaviour at a project site and found that contractors used low quality and insufficient quantities of materials to increase their profit margin. Whilst it is well known that clients may bring construction defects to justice in order to fix the situation or to obtain compensation for damages, drainage deficiencies during the construction stage and their relationship to work ethics and legal claims are not widely discussed. A proper drainage system and network are undoubtedly crucial in ensuring the smooth running of economic and social activities. Given the extent to which such defects exist in the available situations, a better understanding of the issues will help in educating construction players in order to reduce their exposure to legal liabilities (VanDemark & Clevenger, 2020).

### **Drainage System Defects**

Rainfall occurs throughout the year in tropical weather countries and it can be heavy during the rainy season. Drainage is defined as any artificial or natural means that discharge surface water or groundwater from soils and rocks (Cedergren, 1997). It includes an open system, a close system or even the combination of the two. Open drainage is a method of removing excess water from the surface (Gupta, 2019), whereas underground drainage is a system installed to discharge water from the subsurface (Grass et al., 1975). Many floods and damages have occurred as a result of defective, inadequate, inefficient and clogged drainage system (see: Alagesh, 2019, Edward and Menon, 2017; Isa 2014; Luby *et al.*, 2008; Thye, 2017). When drainage systems fail to function properly, problems such as water ponding and high moisture content in the vicinity of buildings or infrastructures can arise. It complicates the consequences when soil settlement and structural distress occur. High water contents can cause foundation movement, sick building syndrome, metal element corrosion and failures. For example, Fwa (1987) explained that water accumulation due to improper drainage within a pavement structure can cause the wearing surface to swell and upward bleed of water, resulting in damages such as surface cracks, potholes and bituminous materials disintegration. Similarly, Tiza *et al* (2016) reviewed research on the impacts of poor drainage on road pavement and concluded that the failure resulted in a variety of consequences, including mosquito-borne illnesses. In relation to building, VanDemark *et al.* (2019) stated that improper drainage design, which does not ensure that runoff is directed away from the building and backfill area, can have a severe impact on the stability of soils and foundations. When a ground is weakened due to poor drainage, the overall structure may crack, lean or fail.

Kazmi *et al* (2017) conducted a probabilistic analysis and discovered that poor drainage was one of the major reasons why Highland Towers failed and collapsed killing 48 people. The causes of project defects vary, but they can be divided into three categories: design-related, maintenance-related and workmanship-related. While the former causes are often highlighted, this study focuses on the workmanship defects that occur during the construction stage of a drainage system. A workmanship defect in this study is described as work that does not meet specifications as detailed in the contract and drawings or other related schedules, and the management of it. Josephson (1998) collected and analysed 2,879 defects and found that 730 of them were the result of poor workmanship. The most common causes of workmanship defects include incorrect work, faulty materials and machine handling, insufficient cleaning and a lack of safety measures and communication with site management. He added that defects during the construction stage are also related to production management, accounting for 805 cases in total. This includes errors in planning,

defective task scheduling, deficiencies in materials administration, incorrect setting out and inappropriate choices of methods. Lee *et al* (2016) added that incorrect planning, work interference, a lack of supervisory skills and skilled workers, noncompliance and task elimination all contributed to defects during the construction stage. VanDemark & Clevenger (2020) analysed 43 construction defect cases or disputes that occurred between 2012 and 2019 and found that the most frequently detected deficiencies at the site were associated with improper management of surface water runoff or alleged destruction caused by it. While the causes have been identified, the underlying mechanism relating to ethics has received less attention. The above-mentioned causes of workmanship defects, when combined, can be the result of a simple ethical lapse.

### **Methodology**

The research methods for this study were designed to answer the questions of how drainage works are built and what problems arise during the process. A qualitative empirical approach was used to collect data through live experience and unstructured interviews in order to describe drainage construction methods and to elicit explanations for how activities were carried out. The open drainage system designed for Phase 1 of the case study project is the sole focus of this study.

The case study selected was a mixed-use residential and commercial development. The total area of the project was approximately 100 acres, with several phases of development. Each phase consisted of various types of construction works and took roughly two years to complete. Due to the sensitivity of some data, site and project details are kept to a minimum.

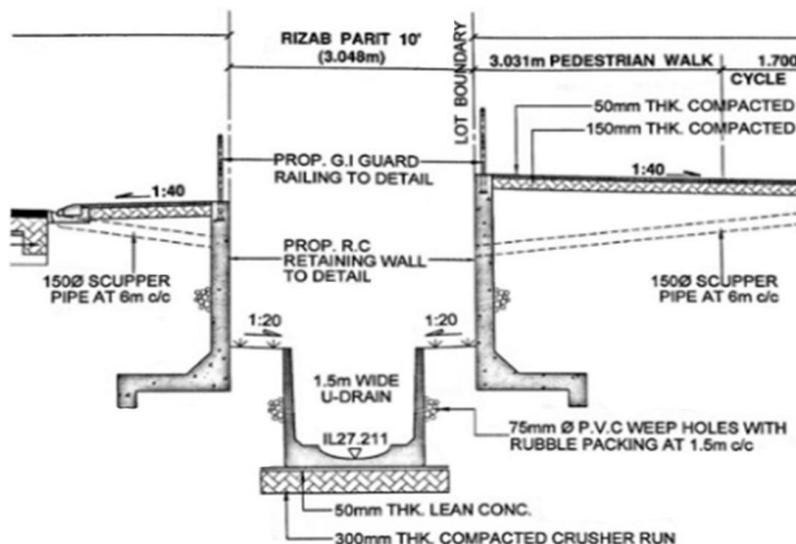
In order to collect rich information in a normal setting, a non-participatory observation was conducted at the selected construction site from 5<sup>th</sup> August 2019 to 20<sup>th</sup> December 2019 with the consent of the contractor. The contractor for this project has been anonymised and is referred to as Gamma in this article. Gamma is the in-house contractor for the whole development, which means they were registered as both the contractor and the developer. Data was not collected on a daily basis throughout the period, but only when consent was granted and the drainage works were in progress.

The construction drawings were used to refer to parts of the drainage system construction that were not observed. Observed data included the methods used to construct various parts of the drainage system, the types of drain used, and the location of the drainage system constructed. This article focuses specifically on the major drainage construction issues. In addition to the observations, unstructured interviews were conducted. When clarification on the drainage works was required, non-prearranged questions were posed to the labourers on the job at the time, as well as the site supervisor and engineer. The questions were open-ended, informal and free flowing. Data, including interviews, were recorded in the observation diary using written notes. Apple iPhone 11 was also used to collect photos and video recordings. Most of the documents were obtained from the assistant project manager. The documents collected included construction drawings, operating procedures, a monthly progress report and photographs taken by Gamma representatives. Some of the documents were delivered via email, while others were delivered by hand. A few documents could not be obtained because they were classified as confidential. Using thematic analysis, documents were analysed and matched with data collected through observation and interviews.

## Findings and Discussions

### Brief Description of the Drainage System at the Site

The water from the roadside drain flows through a series of culverts to the detention pond inlet. A subsurface drain connects the detention pond outlet to the monsoon drain, which is a precast reinforce U-drain. The monsoon drain transports a large volume of water, potentially under high pressure, to the nearest river. As shown in Figure 3, a precast reinforced U-drain with side walls was designed for the monsoon drain.



**Figure 3. The section of a monsoon drain (courtesy of Gamma)**

### Defect Example 1

#### Incomplete Task

As per the drawings and specifications (for example, in the section shown in Figure 4), rubble packing should be used to prevent blockage in the drain by restricting the entry of dirt or soil into the P.V.C. weep hole pipes. However, it was found that the rubble packing for roadside drains (as well as almost all other types of drains) was not included during the construction process. Moreover, the contractor had intentionally eliminated the concrete layer that was designed to support both the half-round pre-cast drains and the side walls. The concrete layer is a levelled base surface that is used to prevent direct contact of the drains and their walls with the soil and to provide lateral support, especially in areas where compaction is not an option. This layer offers greater strength and better resistance to erosion (Lijun & Xinwu, 2012).

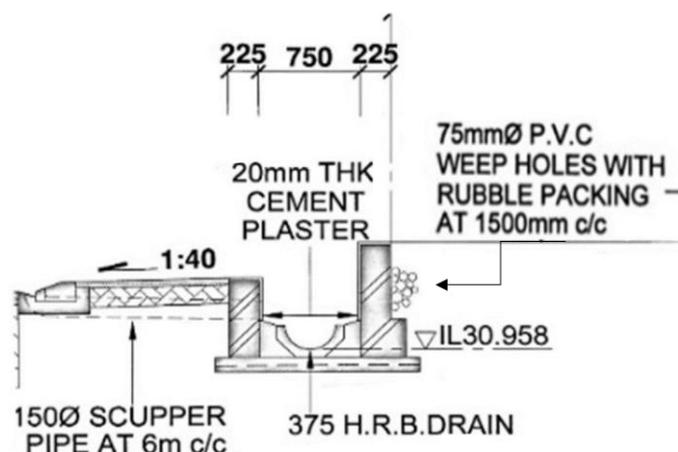


Figure 4. The section of a roadside drain (courtesy of Gamma)

#### *Consequent Defect*

Missing rubble packing and the concrete layer, in combination, were likely causes of a roadside drain failure during the construction as shown in Figure 5.



**Figure 5. Workers rectifying a defect in the roadside drain.**

One possible explanation for the defect is that the weep holes were unable to function properly due to the missing rubble packing, resulting in rainwater retention in the soil. When rainwater mixed with the soil, it became over-saturated, which is particularly likely in cohesive soils, as explained by (Day, 1994). Excess moisture increased the hydrostatic pressure on the brick wall structure, which was already weak due to the lack of a concrete support base. This corroborates with VanDemark *et al* (2019) who highlighted that improper drainage could have an impact on ground stability. The drainage wall then cracked and sank before collapsing. This finding demonstrates the findings of Lee *et al* (2016) that task elimination contributes to defects.

#### *Underlying Cause*

According to site workers, lack of money has caused the contractor to reduce and eliminate the use of some drainage materials. The reason for the lack of money, however, was not clear. It is possible that the contract price was adequate but the contractor's site management was poor, that money was diverted to another project or that spending was reduced to increase profit.

## Defect Example 2

### Incomplete Task

The operating procedure for constructing the monsoon drain required 300mm of thick compacted crusher run to be laid down, followed by a 50mm layer of lean concrete (Figure 3) to be poured on top of the compacted crusher run, spread with a squeegee and finished with a darby float. None of the steps after the crusher run layer were completed at the site. In addition, the lean concrete layer was missing.

### *Consequent Defect*

Lean concrete was required to create a uniform level to keep the PR U-drain out of direct contact with the ground, preventing drain movement caused by ground movement.

### *Underlying Cause*

Once again, site workers affirmed that the elimination of the lean concrete was made to cut the overall cost of construction. They believed that the elimination was not a mistake, but rather was required due to a lack of money. The site personnel were aware that they did not adhere to the specifications and there was no indication that they believed they faced an ethical choice between cutting costs and adhering to the specifications. This exemplified ethical blindness among site workers.

Notably, the issue of missing elements is no longer centred on whether or not it is unethical. The contractor was accountable for their decisions in completing the work and our findings demonstrated that they knowingly took advantage of the situation. This corresponds to the fact that the contractor was aware that they did not adhere the specifications and there was no indication of ethical dilemma in doing so. In accordance with the legal system, even if no documentation was available, the contractor was required to follow the current standard operation of construction for good practise. This is largely attributable to their fiduciary duty to perform work with care and diligence especially when the client relied on their ethics, skills, experience and knowledge. The data suggests that the contractor violated a fiduciary duty by failing to act reasonably in the best interests of the developer/ client for their own benefit. Another novel finding is that by eliminating and concealing elements of drainage, the contractor has shown to commit fiduciary fraud as specified by (Carson, 2003). Typically, a fraudulent act accusation can result in a voidable contract between the contractor and the developer/client. However, the breach of contract is less applicable to the contractor in this case because they were acting as both the developer and the contractor for the development, and thus, the organisation has its own internal agreement and flexibility regarding project quality and costs. While this strategy is advantageous in terms of project control because it involves little client interference, it implies a loophole that allows a system to be built in an environment where such an entity can abuse its power. Issues concerning how an in-house strategy is more vulnerable to unethical practises than an out-sourcing strategy remain elusive.

The elements of drainage system are often given less priority in terms of quality which corroborates the findings by (Abdul-Rahman et. al., 2014). The ease with which inadequate materials can be concealed during construction (Riemer, 1976) helped them to indulge in fraudulent activities. Although no defects related to the monsoon drain were discovered during the construction stage, the roadside drain failure scenario raised a red flag. Many concealed defects can only be discovered during the maintenance phase or many years later

(Chong & Low, 2005). In definition, concealed or untraceable defects during inspection by non-experts are known as latent, whereas those that can be discovered easily are called patent (Barnard, 2012; Sivanthan et al., 2020). Whilst contractors/ developers are legally liable for patent defects, the contract does not include explicit clauses for latent deficiencies. Moreover, some latent defects may never be discovered. This reduces the durability of the structures over years (Kian, 2001; Qazweeni & Daoud, 1991). In addition, the concealed defects can result in new defects over time (Chong & Low, 2005). What arises from the above scenarios are often-asked questions: Who is responsible for a residential area's drainage system if there are any latent or new defects? What if the monsoon drain defect struck after project completion and handing over or even years after the defect liability period? Who must bear the costs and risks to properties and life? These issues are critical to protect homebuyers, local governments and other stakeholders.

This case study was a residential project; thus, homebuyers were only responsible for maintaining the perimeter drainage within the house compound and were eligible to make claims for any defects as outlined in the Sales and Purchase Agreement. It is worth noting that they have no privity of contract in the agreement relating to the public drainage system and do not gain rights or become liable to responsibilities arising from a contract of which they are not bound. Once the overall development is completed, the project will be handled over to the Local Council. The Local Council is in charge of the public drainage system, along with the Department of Irrigation and Drainage. The receiving Local Council is normally shielded from the use of their resources to address major defects. The Local Council (referred herewith as LC1) where the project of this study was undertaken explained that there is no specific agreement for infrastructures when a project is handled over. A compilation of documents for obtaining a Completion and Compliance Certificate (CCC) that includes the developer's and consultant's responsibilities, on the other hand, legally binds the parties. The documents include forms G1-G22, in which developer verified to the adherence to the Universal-Building-by-Law where applicable as well as that the works were inspected, well-constructed and safe for occupation. Form G17 specifies the requirements for road and drainage inspections by the Engineering Department of the Local Council or the Department of Irrigation and Drainage. Although formal procedures and inspections are in place, the concealed defects like the missing elements are difficult to detect. It would be more difficult to justify because new defects may emerged as Chong & Low (2005) argued.

It was also stated explained that if failures or major defects occur after the development being handled over, the LC1 will appoint a forensic team to identify the causes. If the defects occurred at any time, due to the mistake of the developer, then the developer as well as its consultants will be liable to carry out rectification works. This finding reinforces the idea that the developer as well as its consultants are accountable for the completed structure throughout a lifetime of the development. Conversely, in the worst-case scenarios, if the drainage structure fails or causes failures in other parties' structures (as in the Highland Towers case explained by Maniam, 2004) after project handling over and issuance of CCC, many other construction players such as the contractor/ developer, the LC1 and construction site supervisor or project manager can be brought into justice. In line with the Highland Towers case, the discussion leads to the idea that the Local Council is not always shielded and there is no exception for them to be held liable. Construction organisations as well as their workers shall not absolve for their accountability towards the end-users. These players shall be fully responsible for the design and most importantly the supervision and inspection work at the site. If proven, the fraudulent concealment cause of action is a justifiable principle.

Damages claims or proper remedies are based on the losses and can be filed at any time, within six years of the date of discovery. After six years, the time will be barred for civil actions. As Winfield *et al.* (1994) emphasised, the claim for damages is extended to the end-users or anyone who could be harmed by the failure including residents or the third party i.e. public. In the end, drainage system defects, stakeholders, their ethical disregard and legal cases are all worth discussing in order to ensure effective protection against disasters and floods.

### Defect Example 3

#### Poor Supervision?

The findings demonstrated that the contractor's supervision was poor when the labours constructed the wrong type of drainage that did not comply with the as-built construction drawings. Instead of installing culvert pipes for subsurface drainage, the labours built a half round drainage system as shown in Figure 6. To reconstruct the drainage, the wrong drain walls had to be demolished with a backhoe and the area had to be cleared to allow for the installation of subsurface drains and backfilling.



**Figure 6. Workers and site workers were discussing about the wrong type of drain built**

The aforementioned defect required the contractor to purchase new materials as well as pay for manpower and machinery. In other words, the contractor must bear the full cost of the defect, which was not anticipated and was not included in the contract price. Previous research has shown that rectification work for defects is very expensive and has a significant impact on the contractor's financial condition and performance (e.g.: Love 2002, Mills *et al.*, 2009). Limited resources, especially money, can make it more difficult for the contractor to adhere to the specifications and as-built drawings. The contractor may have struggled to recover the additional costs due to the number and size of defects. By this viewpoint, the pressure could lead to unethical and illegal decisions, such as the missing elements described earlier. According to Paton-Cole & Aibinu (2021), contractors are unlikely to rectify defects because it reduces their profit as the expenses rise.

In addition, Riemer (1976) highlighted that contractors deal with defects in four ways: (1) re-do, (2) patch-up to a reasonably sound standard, (3) cover-up or (4) completely ignore. He added that the decision to choose any of the options is based on whether the defects are critical to safety or visible, the number of resources required for rectification works and the number of people who are aware of them. Based on the contractor's consequentialism behaviour and the fact that Gamma had eliminated a few elements as in the as-built drawings, there was a possibility that the above defect would have been covered up if it had been

possible. However, the rectification was required in this case because the defect was obvious and not sealable. There could have been more defects at the site that were patched, covered up or completely ignored, but they are unknown due to the stud's scope and data collection limitation.

In practise, when the contractor rectifies the defective work, they are considered to have fulfilled their obligation. However, this issue may form the basis of a dispute to prove the contractor's negligence. Mistakes on the job site that appear harmless and more like poor performance can lead to illegal charges. Although O'Farrell (2009) pointed out that not all defects or carelessness on the part of site workers lead to negligence liability, it is also true that negligence is more than a moral principle (Posner, 1972). To provide clarity, The Office of Civilian Human Resources (2013) highlighted that: *"If the employee is attempting to perform his/her job to the best of his/her ability and just can't do the work, it is more than likely a performance-related problem. If the employee can do the work, but just won't because he/she chooses not to, it is more than likely a conduct problem..."*.

It was found that the labours and their leader failed to construct what was expected. However, to read and build as detailed out in the drawings were not within the capacity of site laborers. They were not trained in translating drawings into real products. Hence, it was unlikely that they would be considered neglectful, instead they were incompetent which resulted in poor work performance. That is why skilled and reliable workers are required to supervise, track and organise site works.. Previous research has established that incompetence and lacked accountability of site workers have led to defective works (Ahzahar *et al.*, 2011; Jingmond & Ågren, 2015; Josephson & Hammarlund, 1999). The site workers for this case study/ project were recruited due to their professional background and/or experience. Gamma claimed that their workers went for competency trainings such as Quality Assessment System for Building Construction (QLASSIC) and Certified Construction Site Supervisor organised by CIDB Holdings Sdn. Bhd. Following this, the site workers were responsible to keep their duty of care at the site. They had the ability to do it right the first time and avoid poor work performance. One popular explanation for the wrong type of drain constructed is that it may be caused by poor supervision. For this reason, the site workers may be considered negligent, especially if the defect affects other stakeholders on the site. They were also vulnerable to other illegal conducts such as concealing defects in order to meet the planned work schedule and budget. Not only the site supervisors or project managers, but also the consultants may be legally liable because they were supposed to closely supervise the works to control the quality and avoid any defects on the site (Maniam, 2004; White & Mitkus, 2018). The discussion over this grey area is somewhat complicated. It was unclear what was impeding good supervision on the site. It was unclear who was to be held responsible for the mistake in constructing the wrong type of drain. The site was huge, with a lot of work going on at the same time. Based on the organisational chart, Gamma had a project manager, an assistant project manager, a site engineer, a senior site supervisor and a supervisor. The structure and job specifications of site organisation were critical in demonstrating the span of control each of them had, allowing for effective and efficient management. The tasks at the site varied and changed every day. Previous research pointed out that job descriptions tend to be broad and ambiguous, exposing employees vulnerable to undue stress and resulting in a drop in competency, professional integrity and accountability (Ashour, 2004; Beardwell & Holden, 1997). When the site workers have carried out their duty to their utmost, they did not neglect their duty but found it difficult to perform their tasks.

Following that, Gamma can also be held liable as highlighted by Talib (2016): *The tortious liability done by the workers will be vicariously transferred to the master. The master is to be held liable for employing a negligent employee, for failure to control the employee, that since the master derives benefit from the employee's work, he should be made liable for any tortious conduct of the employee in the performance of his work and lastly because the master is in a better financial standing to compensate the third party.* Given the foregoing, both site workers and Gamma may be held liable for legal claims if the wrong type of drain was not rectified; or if it was rectified but to a lower standard than a good practise in exercising care and diligence; or if it was covered up – any of which could cause harm to any stakeholders at any time. It is interesting to determine the reasons for defects and the extent to which they are rectified to gain a better understanding of negligent and fraudulent behaviour.

### **Revisiting the Theoretical Framework**

Fraud occurred during the construction of a drainage system is the key finding of this study. However, the concealment does not represent daily frauds, which can occur during various operations on construction sites. This study exposes the possibility of fraud since the missing components were hidden beneath the ground. The fraudulent behaviour in this case study was not unintended. Certain conditions must be met in order for this to occur. In 1953, a prominent criminologist, Donald R. Cressey proposed three conditions that increase the risk of fraud namely the motivation, opportunity and rationalisation, which later became known as the Fraud Triangle (Dellaportas, 2013). The three Fraud Triangle conditions are consistent with the consequentialism theory used in this study. Figure 7 depicts an extended framework that illustrates the idea of the substantial overlap in both theories.

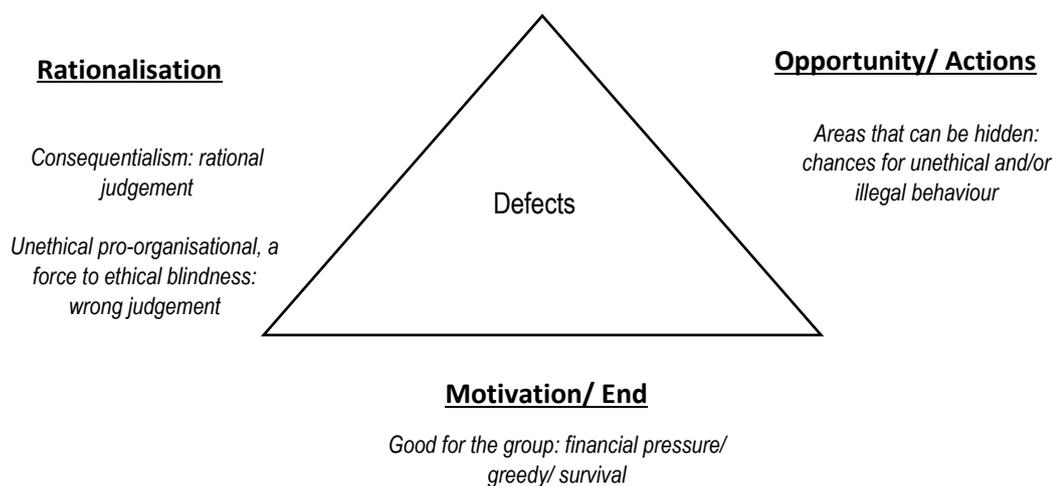


Figure 7: The integrated fraud and teleology theoretical conditions of defects

The illustration of ethical theories by Brunk (2012) adapted as in Figure 2 highlights that motivation relates to principles and rules, which leads to action to achieve the outcome. Whereas consequentialism starts when motivations are bypassed and the actions lead to outcome. The findings of this study demonstrate that the scenario is more complicated than what has been represented in Figure 2. In this case, the motivations are not just the rules, but also the end/goal. This is consistent with Hinman (2016); Trevino & Nelson (2021) who argues that consequentialism motivates actions and provides rationale even when rules and regulations have to be set aside.

And that the end will not be achieved if there are defects that result in rectification works, disputes and legal actions. The scenario of construction defects is not a straightforward process as depicted by Brunk. In fact, defects are iterative process. The issues revolving around ethics and law are often blurry and complex.. Motivations compel mindset to commit fraud. Motivations include the financial difficulties that bring businesses under pressure as well as greediness for more profit (O'Leary, 2006; Randles & Price, 2009). Moreover, motivation can also include the survival of businesses in a competitive industry especially when they bid for lower amounts and overlook uncertainties (Hughes et al., 2015). While the motivation remains unclear for the case study, it provides the basis for rationalising unethical and illegal behaviour. It should be emphasised that committing fraud does not make it legitimate to claim that the project money was inadequate. There was no evidence of guilty or ethical dilemmas when the site workers were aware of and/ or involved in the elimination of drainage system elements. This could explain the ethical blindness of site workers, which arose presumably from their rationalisation for the benefit of the contractor/ developer. This reflects unethical pro-organisational behaviour, in which site workers worked not for personal gain but for the benefit of the organisation or members for whom they work for. This is consistent with Murphy & Free (2015) who argued that individuals respond to the context, also known as 'instrumental climate', rather than self-greediness as many articles on fraud claimed.

Fraud can only take place when there is an opportunity that allow actions to occur. Contractors based on their experience, often have a clear area where they can compromise quality. For drainage defects or any other type of workmanship defect, opportunity is the area in the construction activities that involves elements that can be concealed and difficult to detect. For example, piling that can be buried underground, poor brick-wall laying covered with plaster and wrong grading of concrete finished with tiles. This makes opportunity the most crucial aspect of the construction phase where the contractor/ the developer has a complete control over their resources in completing the work. Their principles, quality control, aim, organisational measures and other managerial factors all play a role in determining whether or not a practise is ethical or unethical. This is consistent with the claims of Ashour (2004); Trevino & Youngblood (1990) that opportunity for such conduct exists because it is influenced by the organisations themselves through formal and informal measures. Careful regulation ensures that almost every aspect of the organisation operates in unison toward a shared motivation, while maintaining the quality of construction products. In addition to that, the fact that the work is not being fully overseen by external parties or consultants allows contractors to cheat. Hence, research on construction defects should focus on identifying opportunities that enable decisions to fraud and mitigating the perceived risks.

A greater emphasis on collaborative Fraud Triangle and Teleology research may yield insightful results relevant to the attention and behaviour of various parties at the sites. When considering pressure and rationalisation, it is also important to consider client behaviour, as an overemphasis on cost and the establishment of unrealistic expectations during the tender evaluation stage may put pressure on bidders to present unrealistically low-cost estimates with the intent to meet those estimates in reality by not performing the work required. It may also lead to the rationalisation that such behaviour was expected by a client communicating unrealistic cost expectations. The study promotes the significance of ethical value in the construction industry and its players in order to protect stakeholders from dealing with the aftereffects, financially or legally.

## Conclusions

Open drainage systems create channels for vast volumes of water to flow from the suburban area to the closest river, which helps to prevent flooding. It is necessary to ensure that the drainage scheme is built on ethical standards to prevent the possibility of failure, flooding loss and injuries to end-users after completion of construction projects. In this way, drainage projects are similar to other major engineering projects. Negligence and outright fraud in the misreporting of materials used and work performed may have both economic and health consequences.

The focus of this article is to trace the ethical causes of workmanship defects and the resulting legal liabilities. Unethical practices in the construction of the open drainage have resulted in unbalanced settlements and damaged side walls, with elements of the planned construction missing from the work actually done, poor supervision, concealment of defective or missing elements in construction and insufficient safety protocols. These unethical behaviour can constitute civil wrongs, such as negligence and breach of contract, and criminal offences, such as fraud, on the part of individuals and corporations. Unethical contractor behaviour is often motivated by economic gain and could, after years of taking responsibility for the drainage system, caused financial damage to end-users, local authorities, the public and the contractors themselves.

As the argument is made based on a case study with limited access, there may be other types of latent and patent defects during the construction of drainage system, which are not covered in this article. Our results plead for more attention on real-world evidence analysis to explain how and why defects occur to define areas of opportunity based on Figure 7. It is fruitful to link how organisational measures effect the behaviour of site workers in ensuring fewer defective works during the construction stage. This can provide rich data to the construction players and researchers as knowledge to improve the quality of product and image of the industry. Although the protection against fraud is not absolute, as construction players recognise the theoretical conditions of defects, the fraudulent activity that negatively impacts organisations and people can be more efficiently prevented. This study offers obvious finding emerged and some insight into ethical blindness and unethical pro-organisations. Construction projects include a broad variety of trades, parties and activities. Site workers can regularly be motivated to fraud and unethical behaviour to meet the goals. Further research could usefully examine more closely the links between defects and legal actions. A greater focus on the collaborative fraud and teleology theoretical conditions of defects could produce interesting findings that account more for attentions and actions of different parties at the sites. Drainage system may be one of the external works that receive less attention, however, the impact of each element in the construction shall not be underestimated that allows quality to be compromised.

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