



AN APPROACH TO ASSESS THE IMPACT OF COVID-19 LOCK DOWN REGULATIONS ON LAND SURVEYING PRACTICE IN SUB- SAHARA AFRICAN REGION.

ABSTRACT

The Coronavirus (Covid-19) pandemic has caused significant adverse impact on the global economy. The spread of COVID-19 is high and its impact on Africa is serious, with the continent's exposure to China. The Covid-19 infection rates in Sub-Saharan Africa (SSA) have remained modest so far. The total number of Covid-19 cases reported in Sub-Saharan Africa (SSA) is close to 200,000, with around 500

SURV. ADENIYI GBENGA:

*Department of Surveying & Geo-informatics,
Federal University of Technology, P.M.B 65, Minna,
Niger State, Nigeria.*

Introduction

Africa is beginning to feel its full impact and plans to control and manage the humanitarian challenges of the virus are underway across the continent (Medinilla, Byiers, & Apiko, 2020). Economically, the effects have already been felt, demand for Africa's raw materials and commodities in China had declined and Africa's access to industrial components and manufactured goods from the region has been hampered. This is causing further uncertainty in a continent already grappling with widespread geopolitical and economic instability (Medinilla, Byiers, & Apiko, 2020). The number of cases is reportedly slowing down in China, increasing expectations that it will eventually reach a plateau and be brought under control (Cheng, 2019). However, in early March the Organisation for Economic Co-operation and Development noted that "annual global GDP growth is projected to drop to 2.4% in 2020 as a whole, from an already weak 2.9% in 2019, with growth possibly even



fatalities as at the time of conducting this research. Virtually, all countries in SSA have already introduced containment measures. The governments of 15 Sub-Saharan Africa (SSA) countries closed their airports, ports and land borders before any coronavirus cases had been confirmed. As at the end of March 2020, 44 Sub-Saharan Africa (SSA) countries had closed their schools, banned public gatherings and put in place other social distancing measures; 11 countries declared a state of emergency. The extent to which these measures are and can be enforced in the region remains to be seen, However, OECD-like approaches to COVID-19 containment measures are not likely to prove effective for the poor and marginalized groups because of higher dependence by most households on daily income, insufficient government resources to compensate those affected by the containment measures and the difficulty of implementing social distancing in societies where social interaction is a matter of daily survival. The coronavirus pandemic has changed the landscape right across the world. Of course, the knock-on effect of the necessary shutdown is that industries of all types are thrown for a loop. Land Surveying is no different. Surveying is a job with a lot of variety. Part of that variety includes the variety of working environments – surveyors may find themselves working on a construction site one day or in the office on another. That means that a lot of surveying work environments are off-limits for the time being, surveying professionals should properly obey social distancing regulations. This paper therefore assessed the impact of covid 19 lockdown on land surveying practice in Sub-Sahara Africa and develops policy recommendations that will likely mitigate the effects of Lock down Regulations in the short and medium term and ensure the necessary continuation and reshaping of the practice.

Keywords: *Sub-Sahara Africa, Sustainable development, Covid-19 Pandemic, Lock down, Land Surveying Practice.*

being negative in the first quarter of 2020 ”, with global markets plunging in the days thereafter (Cheng, 2020).

Sustainable development is complex, multidimensional and dynamic. Sustainable development means the utilization of resources in order to



realize improvement in the economic outcomes of gears of an economy without jeopardizing access of upcoming generations. This implies intergenerational equity must be applied in all facet of economic consideration for growth to be sustainable (Ismail & Rasid, 2017). Sustainable development is the hub of global economic policy. Sustainable development focuses on inclusive or broad-based growth sustained over time. Therefore, the reason why the United Nations developed 14 goals tagged Sustainable Development Goals is not far-fetched. Africa is the second most populous continent in the world with a young population of 1.2 billion people (Siebrits, & Van de Heyde, 2019). This is because youths account for more than half of the African population. The favourable weather and large landmass make Africa the ideal destination for agricultural production. The continent has huge mineral deposits (Jayne, Yeboah, & Henry, 2017). Africa's economic growth has stabilized at 3.4 percent in 2019 and is expected to pick up to 3.9 percent in 2020 and 4.1 percent in 2021 but to remain below historical highs. Growth's fundamentals are also improving, with a gradual shift from private consumption toward investment and exports. For the first time in a decade, investment accounted for more than half the continent's growth, with private consumption accounting for less than one third. According to the Africa economic Outlook 2020 growth has been less than inclusive. Only about a third of African countries achieved inclusive growth, reducing both poverty and inequality (Africa Economic Outlook, 2020).

Covid-19 Lock down has hampered the predicted upturn and result in increased short-term uncertainty in terms of how it will affect investment opportunities in Africa, the continent's productivity and consumer demand (DeWit, Djalante, & Shaw, 2020). In early March 2020, the World Bank announced it would commit USD 12 billion in aid to developing countries to help them to deal with the impact of the virus and limit its spread. The Bank said it would prioritise the most at-risk countries (Moroz, Shrestha, & Testaverde, 2020). The World Bank also introduced a pandemic bond in 2017, which, as part of the Pandemic Emergency Finance Facility intended to provide money to help developing countries in the event of a pandemic reaching certain



thresholds and conditions. So far, these criteria have not been met and the bond has not paid out. In early March, the World Bank announced it would commit USD 12 billion in aid to developing countries to help them to deal with the impact of the virus and limit its spread. The Bank said it would prioritise the most at-risk countries (Moroz, Shrestha, & Testaverde, 2020) Uncertainty regarding the spread of covid-19 is high and its impact on Africa is expected serious, given the continent's exposure to China. So far, cases have been reported in Algeria, Cameroon, Egypt, Morocco, Nigeria, Senegal, South Africa, Togo and Tunisia. With the widespread outbreak of Covid-19 in Africa it had overwhelmed weak healthcare systems in the region. According to ratings agency, Fitch, the coronavirus lockdown had a downside risk for short term growth for sub-Saharan African growth, particularly in Ghana, Angola, Congo, Equatorial Guinea, Zambia, South Africa, Gabon and Nigeria.

However, an analysis of the scope of such packages reveals their limits: At April 2 2020, OECD countries had introduced macro-economic stimuli in the amount of 10 per cent of their GDP on average, the rates in countries such as Rwanda, Kenya, Ghana and Nigeria only [ranged from 0.6 per cent to 1.1 per cent of GDP](#). The boost to the investment environment will be welcome after the additional uncertainty of dealing with Covid-19 impacts (Gulseven, Al Harmoodi, Al Falasi, & Alshomali, 2020). Covid-19 is not only claiming lives, but also changing them by exposing the world's resilience and adaptability. Since the early days of 2020, our lives and work have been transformed in different ways over the course of few short weeks. Sports fans are turning to video games and concerts, museums and zoos are increasingly live streamed. The most important meetings of the world are being convened via multiple IT applications with zero cost and carbon emissions; trainings are being conducted using e-learning and remote teaching; schools have gone online; quarantined lovers are distance-dating; robots are delivering Big Macs and drive-thru virus testing has become commonplace. The place of multidisciplinary approaches is here hinged on the assessment of the land surveying profession amidst covid-19 pandemic.



Sub-Saharan African Potentials.

Sub-Saharan Africa comprised of the 48 countries geographically located below the Sahara Desert and distinguished from the Northern African countries that are part of the Arab World (Ondari-Okemwa, 2007). This beautiful region that makes up the bulk of the African continent consists of deserts, Sahel, savanna, swamps, rainforests, plateaus, mountains, rivers and lakes and enormous diversity in flora and fauna that has shaped human evolution in our geological past. Today, the region has a combined population of close to 1 billion (the lowest population density of all the major continents) with hundreds of ethnic groups and close to 1,000 languages (Spinage, 2012). The socio-political, economic, and human development landscape of this region is very diverse with considerable variability within countries. Agriculture is still a major occupation for most people in the region but since 1940, occupations have diversified with considerable migration to rapidly-changing urban areas. The average human lifespan for the region as a whole is only 58 years and several countries in Sub-Saharan Africa struggle to make progress on health and economic indicators. This region has 40 percent of its population who live in extreme poverty with a rate of undernourishment of 23 percent (Diamond, 2015). Sub Saharan Africa has a young population that can provide manpower in her quest for growth in the millennium era. Sub Saharan Africa has a wealth of resources sufficient to drive the economic growth and social development. The resources include land, minerals, biological diversity, wildlife, forests, fisheries and water (Ajibefun, 2015).

Agriculture is the mainstay of the Sub Saharan Africa economy accounting for 65 percent of labour, employment and 34 percent of the GDP. Oil, minerals and agricultural commodities account for 80 percent of Sub Saharan Africa's export (Mutenyo, 2011). The bulk of food production in Sub Saharan Africa is carried out by smallholder farmers with about 70 percent being women. Irrigation alone could raise agricultural productivity by 50 percent. It is estimated that for every increment in farm yield there has been 7 percent poverty reduction in Sub Saharan Africa. Agriculture accounts for about 24 percent of Sub Saharan Africa's annual growth. Therefore, investment in basic



infrastructure (water, electricity, and road), farm-level infrastructure irrigation storage facilities) and access to credit and extension services and farmers' driven policies is the way to go. The World Bank estimates that agriculture and agribusiness together could attract a whopping USD 1 trillion presence in Africa's regional economy in the next 15 years (Ojo, & Oluwatayo, 2016). This implies agricultural development is critical to the achievement of Sub Saharan African growth.

Beneath the soils and water bodies in Africa lies more than sixty (60) metals that are needed for industrialization and urbanization (Mining Industry Prospects in Africa, 2012). The US Geological Survey places Africa as the largest or second largest reserve worldwide for Bauxite (main source of aluminium), Cobalt (for making alloys and batteries), Gold, Diamonds, manganese (anticorrosive element in steel), phosphate rock (used in fertilizers), platinum group metals, soda ash (used in making glass), The KPMG report on Africa continue to emphasize that, out of the 54 African nations, 46 of them have minerals of commercial importance. Most of these minerals found are used in the automobile and real estate industries which have been expanding over the years as a result of global demand in infrastructure and modernization. However, Africa currently provides 8% of the global mineral production as a result of obstacles being faced in the mining sector (Mining Industry Prospects in Africa, 2012). Another reason that makes Africans optimistic about the future in the mining sector is the evidence that, demand of mineral commodities is in the early stages of a super cycle. The International Study Group Report in 2011 explains the early stages of super cycle is a rise in demand for mineral commodities as a result of urbanization and industrialization of major economies like China, India and Brazil (Minerals and Africa's Development, 2011). As Investors all over the world are searching for brighter opportunities, Africa, its vast mineral potentials offers an attractive environment for mining investments. The continent will be able to fully benefit from the sector if it starts to refine some of the minerals since almost all the minerals are exported in their raw form. Therefore, investors determined to make good returns can venture into mineral refining in



Africa and have a good rapport with various governments since most of the nations are politically stable and investor friendly.

Electricity is a necessity to power every economy's growth and development. The continent is already endowed with both renewable and non renewable energy sources like abundance of sunshine, large water bodies, strong tidal waves, oil and uranium deposits to provide energy. Individual households also need electricity to cook study and do certain basic economic activities like selling frozen fish. The International Renewable Energy Agency reports that the average per capita electricity consumption in Sub- Sahara Africa, excluding South Africa is 153 kWh/year (IRENA, 2012).

The Rail sector is also an opened door for investment opportunities in Africa. This according to research is the least developed transport sector in Africa (AFDB, Infrastructure Deficit And Opportunities in Africa, 2010). Most of the railways in the continent were developed by the colonial rulers for transporting raw commodities from the rural to the urban areas and have not undergone renovation. A 2010 report by the AFDB on railways indicates that, in 2007 Africa had 69000 km of railway line and only 55000 were operational. Most of the developed railway line is in the Southern and Northern parts of Africa (AFDB, Infrastructure Deficit and Opportunities in Africa, 2010). However, there have been new railway investments like the Addis Ababa Light Rail in Ethiopia in 2015.

Sustainable Development

Sustainable Development paradigm investigates the nature of development from the environmental, economic and social perspectives Sustainable development (SD) was propounded as an alternative development strategy for improving the living conditions of the human population without degrading the quality of the environment (Moldavska, & Welo, 2019). The concept came into being following the realization that economic development and environment are closely linked (Solow, 2019).

According to Ojo, & Oluwatayo, (2016) Sustainable development is the development path along which the maximization of human wellbeing



and which will not compromise perpetual use by future generations. Therefore, Sustainable Development is a paradigm shift from the economic growth hinged on depletion of resources and environmental degradation. A school of thought opine that three approaches to sustainable development exist-social, ecological and economic dimensions. This emphasizes social justice, economic prosperity and environmental protection. Another option is a dualistic approach that is based on the relationship between nature and humanity. Meanwhile, the most cited definition of Sustainable development is provided in the 1987 Brundtland Commission's Report. It defines sustainable development as the kind of development which satisfies the current needs without endangering the future generations to satisfy their own. Whether dualistic approach or the three pillars of sustainable development are taken into consideration, there is a common denominator.

The central message of sustainable development is economic, environmental and social sustainability achievable through rational management of physical, natural and human capital (Holden, Linnerud, & Banister, 2017). Sustainable development may be described as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs (Archibugi, 2019). It is a vector of development characteristics that should be non-decreasing over time and embraces wider concerns of quality of life. Therefore, to promote Sustainable development (SD), we must at least endeavor to maintain the existing level of the natural capital stock.

In other words, the pursuit of development activities implies a non-negative change in the stock of natural resources and the quality of the environment over time. It requires maintaining essential ecological processes and life support systems, preserving genetic diversity, and ensuring a sustainable utilization of species and ecosystems (Boon, 2016). The findings of the World Commission on Environment and Development (WCED) entitled *Our Common Future* (1987) and known as the Brundtland Report actually popularized the concept. Sustainable development (SD) aims to build a more prosperous, just and secure



future and to sustain and expand the environmental resource base. The concretization of the objectives of SD therefore requires new forms of natural resource management systems and international co-operation. It is also important that individuals, organizations, and nation-states properly understand the concept and pledge their commitment to translating it into reality (Boon, 2016).

The Sustainable Development Goals (SDGs) is a global agenda, adopted by countries in 2015, with a vision of ending poverty, protecting the planet and ensuring that all people enjoy peace and prosperity (MacNaughton, & Koutsoumpas, 2017). The goals and targets are universal, meaning they apply to all countries around the world, not just poor countries (Le Blanc, 2015). The 17 SDGs adopted by the UN General Assembly in September 2015 are an unprecedented opportunity for countries and citizens of the world to forge pathways to improve the lives of all people everywhere and to combat climate change by 2030 (MacNaughton, & Koutsoumpas, 2017). Through the pledge to Leave No One Behind, countries have committed to fast-track progress for those furthest behind first. That is why the SDGs are designed to bring the world to several life-changing ‘zeros’, including zero poverty, hunger, AIDS and discrimination against women and girls. Everyone is needed to reach these ambitious targets. The creativity, knowhow, technology and financial resources from all of society is necessary to achieve the SDGs in every context (Kostoska, & Kocarev, 2019).

The main features of sustainable development are: 1) it respects and cares for all kinds of life forms. 2) It improves the quality of the human life. 3) It minimizes the depletion of natural resources. One way to measure progress is to focus on the “5 Ps” that shape the SDGs: People, Planet, Prosperity, Peace, and Partnerships. The 5 Ps highlight how the SDGs are an intertwined framework instead of a group of goals (Reid, 2013). According to the Overseas Development Institute, as we project progress of Sub-Saharan Africa towards the SDG Agenda of 2030, several key points are worth noting. For several of the SDG goals and targets, low starting points and inequality that exists between countries and within countries makes reaching these goals difficult by 2030 (Addison, Pikkarainen, Rönkkö, & Tarp, 2019).



Concept of Land Surveying

Most scientists do not spend all their working hours inside air conditioned rooms but in most cases depend on information and data gathered in the field to enable them do their work successfully (Becerik-Gerber, Jazizadeh & Calis, 2012). Surveying is one of those courses whose practitioners depend on data gathered either by themselves or their agents to enable them take vital decisions that will make the society function properly. Surveying is the process of determining the relative position of natural and man-made features on or under the earth's surface, the presentation of this information either graphically in the form of plans or numerically in the form of tables, and the setting out of measurements on the earth's surface. It usually involves measurement, calculations, the production of plans, and the determination of specific locations (Lemmens, 2011). The surveyor may be called on to determine heights and distances; to set out buildings, bridges and roadways; to determine areas and volumes and to draw plans at a predetermined scale (Lemmens, 2011).

Objective of Surveying

The main object of surveying is the gathering of data and the preparation of plans, maps and charts of a specific area with such data. From ancient times man had been interested in demarcating and recording property boundaries hence early surveying efforts were directed towards that direction. In contemporary times, modern life is made possible by the efforts of surveyors and the plans, maps and charts they help to create. For an example, the first step for the execution of most projects, is surveying. Hence, before the construction of roads, building, railways, etc, the surveyor makes detailed measurements in the field and prepares the detailed plans and charts that help the engineers to layout the alignments of such projects. It should be noted that since surveying developed from ancient times the science, methods and instruments of surveying have been greatly influenced by the level of technological development of any era. Because of the importance of surveying to modern man, the training of engineers, environmentalists (planners,



Architects, Geographers, etc) is not complete without instructions on various aspects of surveying.

Primary Divisions of Surveying

According to Sholomitskii, & Lagutina, (2019). The curvature of the surface of the earth, based on its being close to ellipsoid in shape forms the basis to surveying being divided into

(a) Plane Surveying

Plane surveying is survey in a small extent hence the earth's surface is assumed to be a plane and the curvature of the earth is ignored (Lanza, & Meloni, 2006). As only small areas are involved, the lines connecting any 2 points on the surface of the earth are treated on straight lines and the angles between them as plane angles. Plane surveying involves areas that are up to 260 square km to determine the relative position of individual features at a sufficiently large scale. Surveys for engineering projects falls under plane surveying. Knowledge of plane geometry and trigonometry are necessary for plane surveying.

(b) Geodetic Surveying

Geodetic surveying takes place in a national scale which takes into consideration the curvature of the earth (Johnson, 2014). It requires higher levels of accuracy in linear and angular observations than plane surveys hence used to provide widely spaced control points for subsequent detailed plane surveys. Geodetic surveys extend over large areas of 1000km² and above hence lines connecting any two points are treated as arcs and not straight lines and the angles as spherical angles.

The Surveying Process

The following sequence of steps is commonly followed when carrying out a survey:

(i) Reconnaissance

During the reconnaissance phase, the surveyor will obtain an overall picture of the area that the project will be conducted in. They will select where the control points will be located, the accuracy required for the control, and which survey instruments will be required for the project.

(ii) Measurement and Marking

During the measurement and marking phase, the surveyor will perform all the observations in the field required to accurately determine the



control points, as well as placing and observing to any temporary points such as wooden pegs. They would also perform any calculations from the observations, such as angular and linear misclose and area and volume calculations.

(iii) Plan Preparation

During the plan preparation phase, the calculations that were performed from the field observations would be further enhanced and used to produce the final plans for the project

Impact of Lockdown on land Surveying Profession

The Covid-19 pandemic has changed the practice of land surveying. Land Surveyors are now interacting with those outside partners with technological advances and modified communication conduits (Hartley, & Vu, 2020). Many of these methods existed well before this situation, but the rapid advancement of the pandemic forced many companies and employees into adapting very quickly. Land Surveyors are no different; the Covid 19 lockdown had brought about these changes that have affected the surveying profession

- **Project communication:** The biggest challenge facing most land surveyors in dealing with the pandemic atmosphere has been communication (Wilner, 2016). Whether it is with employees, clients, government agencies or other consultants, communication has been affected mostly because of the elimination of face-to-face opportunities. Technology has allowed remote communication for many years, but not many of land surveyors have taken advantage of it because of the convenience of in-person interaction. Who does not want to leave the office to meet with a client, shake their hand and close the deal. Or will have the client come to your office and go over the intricacies of a complex survey. Video conferencing has been in place for many years, but mostly in large companies and only implemented it in a dedicated conference room. Not many employees were previously afforded a webcam, microphone and speakers along with the necessary software; all of these components are now standard issue. For many, programs like Zoom, Skype and



Microsoft Teams is now a critical communication tool for timely and efficient sharing of information.

- **Data collection:** Not many of the surveyor's field activities are affected because of social distancing requirements, but the covid 19 Lockdown has forced our profession to be compliant with the new rules in case we are in proximity with others (Brodeur, Gray, Islam, & Bhuiyan, 2020). Newer technology, using both terrestrial and aerial platforms are now being utilized by more surveyors for their data collection needs. Field personnel are also benefiting from technology within our devices. Apps like FaceTime and programs like Microsoft Teams provide a gateway to video chatting so teammates can discuss projects in real time. Shared pictures, computer screens and face-to-face interaction provides an avenue to more effective communication and enhancing relationships between team members. The pandemic has forced many surveyors to adapt and learn several new apps and programs to connect in new ways; however, this pandemic has also affected how we go about our field operations, too.
- **Using photogrammetry tools:** Photogrammetry, lidar and laser-scanning systems are being purchased and implemented for everyday use and not just "special" projects with larger budgets. Not only are surveyors finding it keeps them further away from other people, it also allows for more efficient data collection and representation of existing conditions (Groves, 2004).
- **Flying Unmanned Aerial Vehicles.** UAVs continue to grow in popularity and like the other technology discussed above, many firms are investing in becoming remote pilots and implementing aerial photography and lidar into their workflow. Previously, most surveyors (and the general public) used Google Earth, Bing and other resources for aerial imagery to gain a better perspective on their project sites. Vendors are coming out with aerial products with more recent flights at a higher resolution, but do not offer the ability to extract reliable topographic data easily. In-house UAVs provide more flexibility and control over the information



needed, and many are using their downtime to become familiar with aerial products.



Photo: GPS World

- **Dipping toes into remote sensing.** Another sector of surveying equipment seeing increased use during the covid 19 Lockdown are new total stations with remote-sensing capability. Many surveyors may not have the need for a standalone laser or lidar scanner, so several manufacturers have introduced a total station that provides limited remote sensing for everyday use. While the built-in scanner is not nearly as robust as a traditional remote-sensing unit, it provides enough capability and accuracy for most users. This intermediate step of remote sensing helps a firm decide how much scanning they will produce and if an investment in a full function unit is right for them.
- **Upgrading GNSS receivers.** Amid Covid 19 lockdown. Land Surveyors are now upgrading their GNSS receivers to take advantage of more constellations, integration with IMUs and increased computing power of the latest data collectors Gakne, P. V. (2018). Improving the accuracy of GNSS receivers in urban canyons using an upward-facing camera. Some surveyors who are not as economically affected during this pandemic are taking advantage of great deals on new equipment and using this time to increase their capability and efficiency. As more satellite vehicles become available, the ability to gain accurate *and* precise



locations is better than ever, so staying ahead of technology is still important in these times. We will continue to see more gains with L5 and L1C signals from the new GPS Block III satellites within the next few years, so staying current now is very important.

- **More connected than ever, yet still so alone:** The Covid-19 pandemic lockdown of 2020 (let us hope that is all it encumbers) will be forever etched in our memories as frightening and unbelievable. More than 100 years has passed since the last pandemic of this proportion has overwhelmed our population. Land Surveyors were forced to adapt very quickly to a new norm of working remotely and independently of our co-workers and teammates. It has thus hurt our productivity and profitability initially. Employees forced to learn new ways of doing their work and communicating by other means.

The surveying profession is rapidly trying to adapt. Like the rest of the world, the surveying profession will not be the same coming out of the restrictions placed because of the covid 19 lockdown. Land Surveyors are a tough bunch, so the social distancing and adaptation required surviving the covid-19 pandemic of 2020 is not easy by any stretch but it has been handled with grace and professionalism (O'Rourke, 2020).

Conclusion and Recommendation

The coronavirus pandemic has changed the landscape right across the world. Of course, the knock-on effect of the necessary shutdown is that industries of all types are thrown for a loop. Surveying is no different. Land Surveying is a job with a lot of variety. Part of that variety includes the variety of working environments. Surveyors may find themselves working on a construction site one day or in the office on another. That means that a lot of surveying work environments are off-limits for the time being, surveying professionals should properly obey social distancing regulations. Surveying continues to be essential to the economy, the construction sector and the property sector, so the work continues. Better still, surveying firms across the nation are implementing safe work practices in line with the government's



regulations. While it is not the case for every surveyor, covid-19 Lockdown has seen many with a little more work time on their hands. This has proved a prime opportunity for up skilling and making use of digital and online technology. It is worth noted that surveying businesses should continuing using webinars and online conferencing to keep their staff connected, and to train them up for the future. Land Surveyors should look for outlets to learn more during quarantine. The surveying industry should be well-prepared to withstand the difficulties this pandemic throws at it. As restrictions as relaxed in the weeks or months to come, we'll be seeing more and more surveyors return to the work they love so much. In addition to webinars and learning experiences, Land surveyors should turn to technologies to work safely from home, ensuring that communication is maintained during a time of great difficulty. Staggering shifts is another way that land surveyors should deal with these changed conditions. By dividing staff into two groups – an A group and a B group it is easy to ensure that surveying staff in an office environment can continue to observe 1.5m distancing from their colleagues. It also means that if someone in one group gets sick, those in the second group is more likely to avoid contracting any illness. For workers that may need to visit the office, it's also reassuring to know that the management team is thinking ahead and taking every precaution. Out in the field, it is easier to avoid close interactions. Some surveyors can work by themselves; where feasible, that is taking place. Conclusively, Land Surveyors should practice social distancing to the greatest extent possible. All communication should be limited to phone or rescheduled to limit the number of staff meeting with project managers.

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