Issue **10** - Jan - Feb 2022

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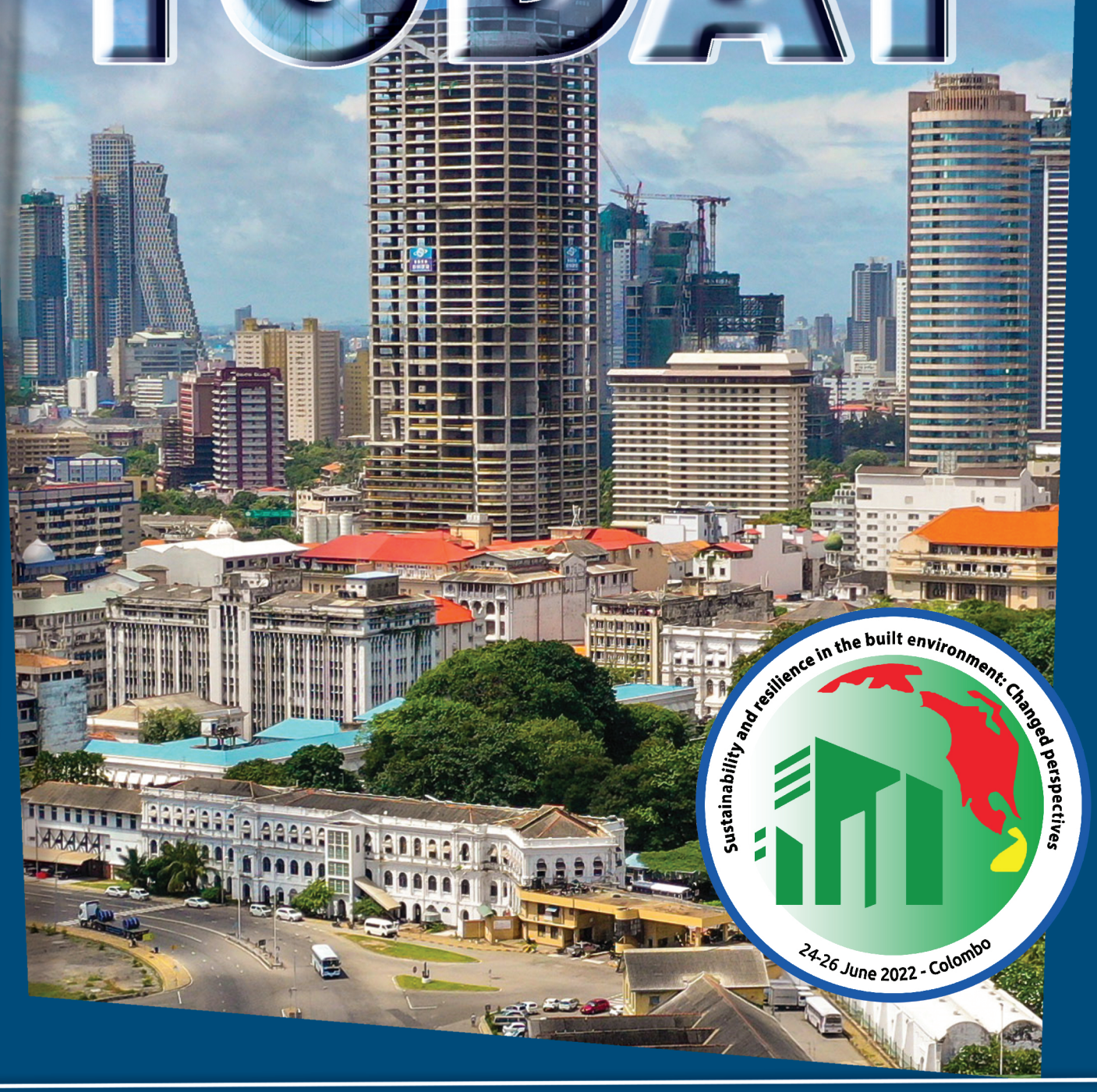
SRI LANKA CONSTRUCTION TODAY



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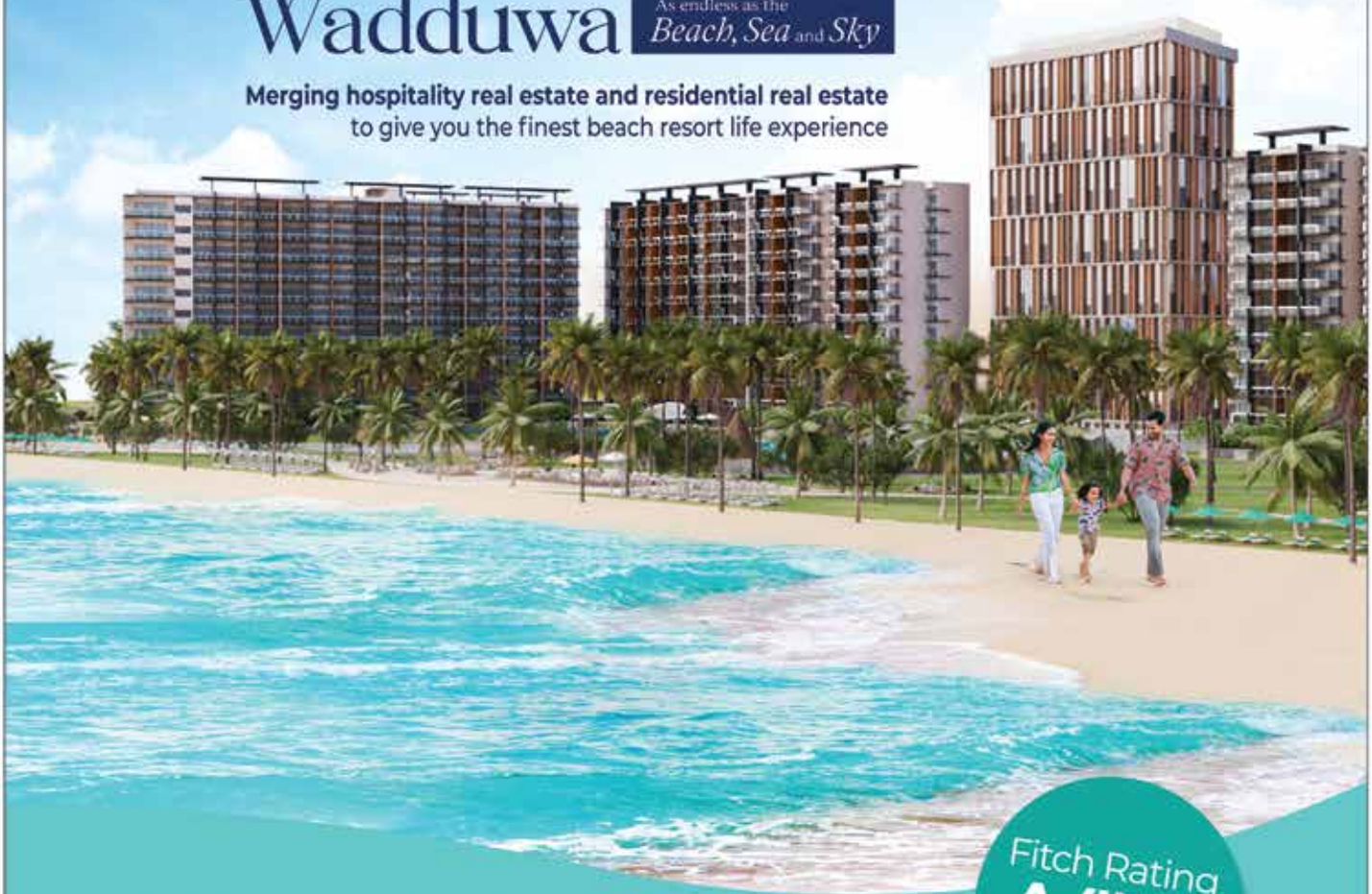

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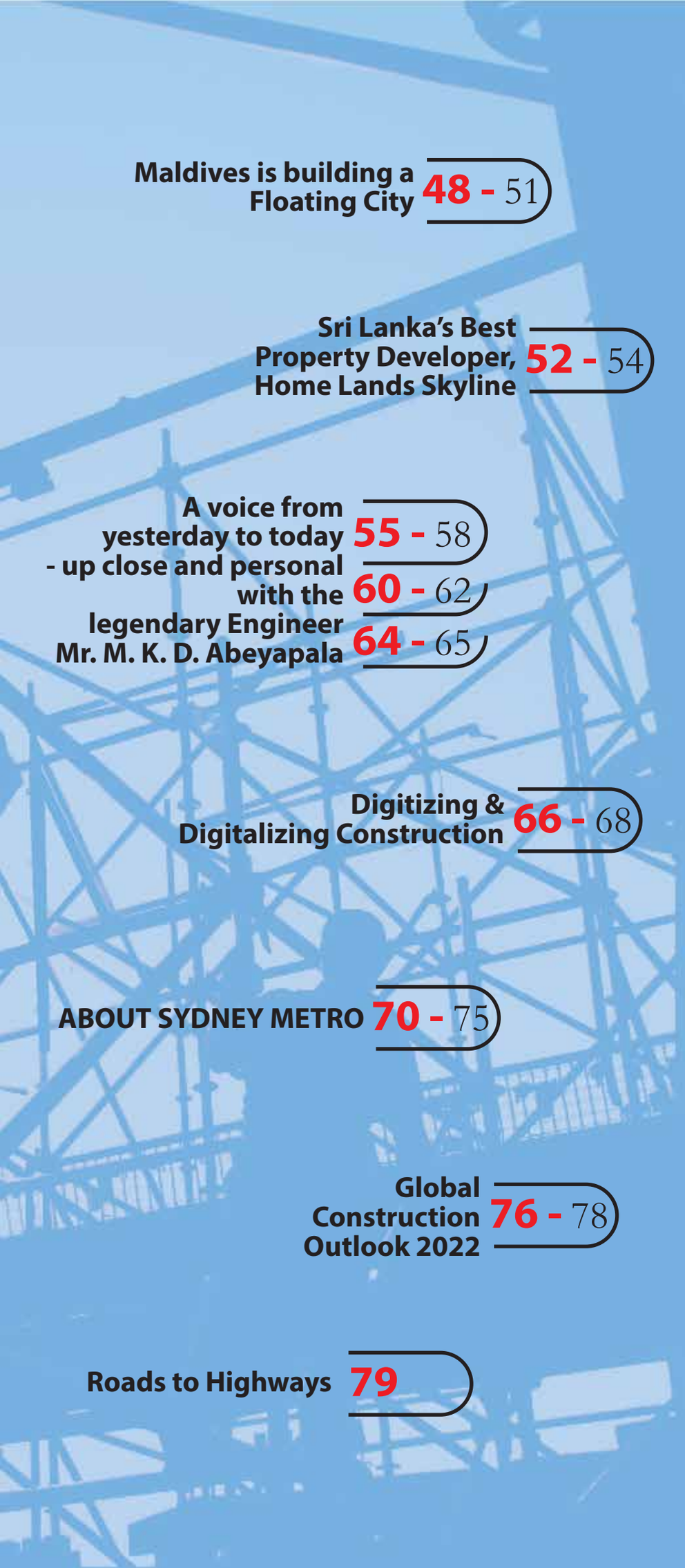

SRI LANKA CONSTRUCTION TODAY

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Editor's Note

Any industry is finding significant efficiencies and cost savings as a result of digitalization. But, a research reports outlined fears for the future, identifying million jobs are at risk by 2025.

One of the biggest threats to construction is the risk that the next generation of talent doesn't view this industry as an attractive destination of choice. Given the construction industry has experienced a trend of young people lacking the motivation to enter the industry; this revolution may offer a mixed blessing

This is a valuable idea and opportunity for all industries to prepare for tomorrows economy, and the training and education of tomorrow's youngsters.

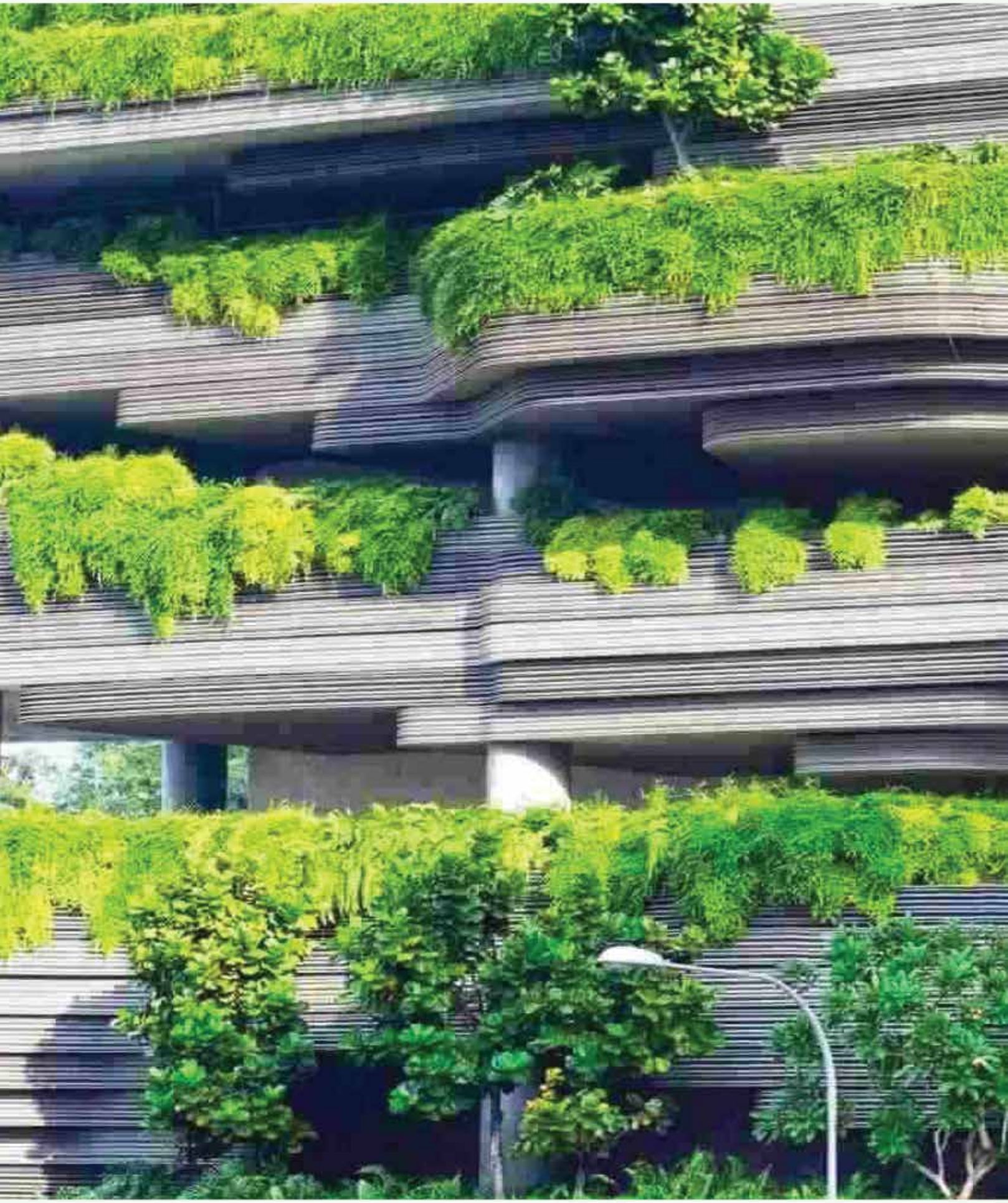
It is predicted by the global researchers that the type of jobs that will be in demand in the near future will be in technical management. Whilst the predictions show net change in employment declining in construction, technical management is the premise that the entire industry revolves around. With such research recommendations, we should as an industry see benefit from the changing economy and employment structure.

Therefore, it is necessary to train the next generation of construction workers by using digital learning tools.

Technology offers new possibilities when it comes to construction training. It can allow young people to try a range of activities in different situations without the health and safety implications. It can also allow construction workers to experiment and practice without the costs and risks if it goes wrong.

There is a great need to change the way we promote construction careers, as well as how the training is provided to construction trainees. The construction jobs of the future are much more varied and different compared to the traditional careers in the construction sector.

Furthermore, to inform and inspire the next generation of construction workers, we need to educate young people, their parents and teachers about the vastly varied jobs that will be available due to the development in digitalized technology.



Dr. Ashan Senel Asmone

Green building

rating tools and the new world

Green buildings, which are also considered as sustainable buildings are multi-faceted construction projects which seeks to minimize the adverse socio-economic impacts of building construction and its associated use of virgin resources and waste generation. Green building concept, to this end, seeks to achieve gains beyond mere energy efficiency or preserving water. In principle, green buildings can not only reduce the usage of such resources, but can be used to even revitalize the environment in which the building is located at (e.g., think aspects of brownfield redevelopment, reduction of stormwater runoff, improved community connectivity), towards positively impacting the building users and their health and wellness.

Various facets of the building product delivery process can be scrutinized for their impacts on the environment and the community, viz. sustainable site selection, environmental-friendly construction management, sustainable and safe material selection criteria, use of renewable energy, water efficiency, waste and toxicity reduction, improving indoor environmental quality, and sustainable development. To gauge the extent of effectiveness of all these different facets, green building rating tools are commonly adopted. Throughout the globe, different countries have extensively studied green building construction and have developed such green building rating tools suitable for their localities to promote the sustain able development of their construction industry.

However, even with the benefits of green building greatly publicized, adoption of green building concepts in construction projects fall short of industry expectations. As showcased in a recent study in our neighbouring despite the benefits India,

associated with green buildings, they are implemented only for 5% of the Indian construction industries

[1]. Green building rating tools can therefore be used to measure the greenness of building projects and to promote the optimum use of natural resources and environmental-friendly construction practices. As one needs to be able to measure something before they are able to manage something. In this light, it is also important to note that green building rating tools that are used in projects must be suitable for the context of the project (e.g., a green building in the tropics needs to be measured

under a green building rating scheme developed for tropical buildings). Green building rating systems developed in first world countries (e.g., such as BREEAM and LEED) are used in developing countries in Latin America, Asia, and Africa for number of years. However, proper frameworks

are required to anchor the sustainability priorities of such global rating tools to different contexts across the globe

[2]. Green buildings aim to amplify the positives and eliminate the negative aspects of construction using concepts of sustainable construction and innovative designs such that resources are utilised to cater the needs of the present generation without compromising the needs of those of the future generations. This is especially true in the era of global resource scarcity owing to economic and supply chain disruptions caused by a global pandemic and climate disasters.

Researchers identify the importance of green building rating tools to facilitate sustainable development in the resource intensive construction sector amidst these global concerns. As a recent study observes, the way the global economy is currently being operated, global decarbonization efforts addressing the root causes of carbon emissions to minimize global warming are falling short of the goals of the Paris agreement by almost 45%

[3]. The authors therein discuss the influence of green building rating tools on contributing more towards such decarbonization efforts as well as the need for introducing further facets to measure (i.e., sustainability criteria) to be included in the existing green building rating tools.

On the other hand, the global COVID-19 pandemic has created monumental global changes affecting various aspects of daily lives and livelihoods. Amidst such, green building rating tools must also adapt to this new, post-pandemic world. Significant potential modifications may be required in green rating tools to ensure their effectiveness for commercial, institutional, residential,and educational buildings as many day-to-day operational aspects were subjected to major changes during the pandemic period. At present, researchers across the globe are contributing to this knowledge space. With researchers finding and proposing suitable sustainability indicators under pandemic conditions

[4]. In another study, it was found that green-rated facilities which have green interior design concepts are focusing on human health and comfort aspects, and therefore are significantly better at managing their indoor air quality, regular disinfection, and maintaining health protocols, thus resulting in more effective management of COVID-19 spread

[5]. These benefits are on top of the other benefits for the facility users such as saving energy and resources, reducing operational costs, and minimising carbon footprint.
What comes next to green building construction is exciting and would extend the scope of green construction as we understand them today. With the advent of new technologies

such as the use of natural and biodegradable materials, green insulation, cool roofs, smart appliances, and renewable energy systems. Amidst rising concerns for environment as climate change accelerates, the rate and scope for future green building innovations are also picking up the pace. With innovation and use of local resources cost and accessibility as a barrier to adoption are expected to reduce in this new world. Green building rating tools shall also be periodically researched and revised to keep up with these rapid changes in the environment, technology, and other global and local influences.

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What could the 2022 Budget have done better for the Construction Industry?

Dr Rohan Karunaratne
President - Ceylon Institute of Builders

The Government aimed to increase the Construction Industry's GDP Contribution to roughly 8-10%, initially. However, in practice, the 2022 Budget implies a significant reduction in construction turnover (inferred to be around 300b). This brings down our GDP contribution to about 6%.

Being one of the largest employment providers in Sri Lanka, and a key contributor in various supply chain, from manufacturing and raw material purposing to labour, The Construction Industry, requires adequate work to

uphold the livelihood of Sri Lankan people and ensure the continuance of all these supply chains and systems.
Be that as it may, we should mention that the 2022 Budget gives a nod to our requests.

Most Importantly however, we note that few of the greatest issues in our construction budget remain:

- First, is the fact that government procurement of office buildings has been halted for the next 2 years. At the minimum, we request the government to promote funded-projects and provide incentives to the private sector for private projects, to fill this gap.

- Secondly, construction material (and labor) prices are skyrocketing at an abnormal rate. For this, we have pleaded for the inclusion of price escalation clauses adopted to all projects unconditionally.

- This second issue could also be counteracted by the government promoting the local manufacturing of construction materials, which would reduce dependence on imports.

We see that the Budget has allocated substantial funds to push forward local manufacturing of materials. However, simply pumping money into this issue is not sufficient. To effectively support this venture, transparency and practical support is necessary. The allocation of lands would largely help facilitate local manufacturing. Similarly the government should prompt banks to support the funding of local manufacturing ventures for reasonable interest rates.

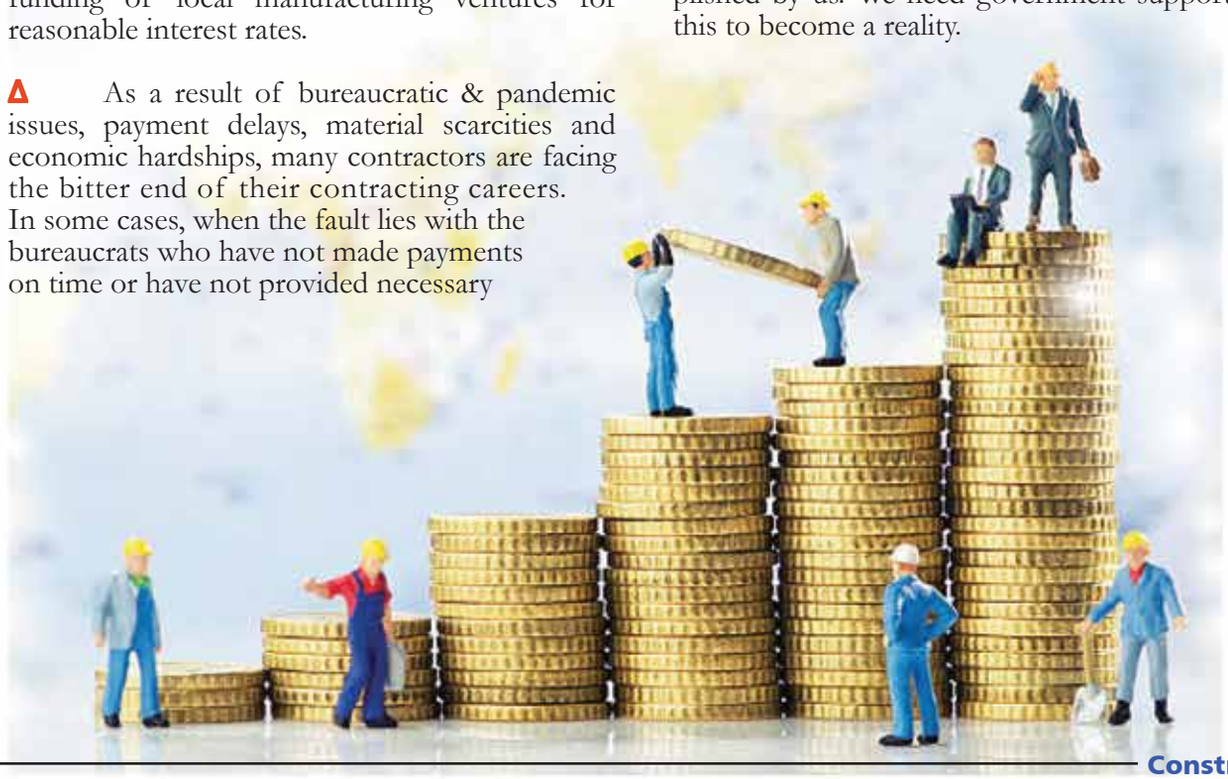
- As a result of bureaucratic & pandemic issues, payment delays, material scarcities and economic hardships, many contractors are facing the bitter end of their contracting careers. In some cases, when the fault lies with the bureaucrats who have not made payments on time or have not provided necessary information/instructions for the contractors to continue work, these same officials proceed to cut LD, claim bonds, etc and push the contractors to the edge of their demise. If the contractor loses, so do the hundreds of thousands of people they employ, the numerous supply chains they support and the economies they stabilize.
We request the government to bail out these contractors and allow them to survive. This government has supported the industry from the first day it came to power and settled bills form previous administrations. We hope that Government doesn't lose hope of the Construction Industry after all they have done to help us thus far.

- Transparency of the procurement system in Construction- The industry hopes for a transparent and just procurement system for construction, to rid ourselves of disputes and unregulated procurement.

- Requirement for Centers, managed by institutes/chambers, which focus on adopting (training, purchasing, etc) novel technologies, specifically BIM Modelling.

- Sustainable and green development- Unfortunately, Construction is one of the main industries in Sri Lanka that is one of the most environmentally damaging. Therefore prompt application of green & sustainable guidelines is needed, to protect the industry and nation's future.

- Development bank/fund- this has been repeatedly requested and has not yet been accomplished by us. We need government support for this to become a reality.



5 steps
to effectively run a construction site

As a site manager, you always need to maintain a seamless communication flow with your project manager to ensure that all problems are recorded and addressed as soon as they occur.

A site manager is one of the central gears of every construction project. You are busy from the time you arrive at work in the morning until you leave at the end of the day, often fighting fires and frantically calling subcontractors or the project manager to get or relay information. Let alone the time spent trying to ensure that all issues are fully documented, nobody arrives on-site in vain and that material orders don't get delayed, misplaced or even worse damaged.

No two days are the same, but one thing is certain. You shouldn't have to continuouslyreinvent the way you communicate with your project manager about your site tours and the things you see in the field.

How many times have you sent an important email or message back to the office without receiving a reply? And what effect did that lack of response have on the progress of your project?

It's no surprise, then, that many site managers constantly feel overwhelmed and stressed because they try to balance different dependencies, resolve constraints and at the same time align around milestones both with their project manager and the subcontractors that are participating in the project. As a result, they often end up buried under a mountain of work that doesn't truly add value to their projects.

To help you avoid ending up in this spiral and gain back your peace of mind, here are five tips you should always keep in mind when you run a construction site:

1. Align with your project manager using a single source of truth

As a site manager, you always need to maintain a seamless communication flow with your project manager to ensure that all problems are recorded and addressed as soon as they occur.

WhatsApp notifications, emails, and whiteboard notes can generate more confusion than solutions when it comes to keeping you connected, because they are not designed to support such complex and time-sensitive processes. As a result, miscommunication, loss of important information and delayed responses are always around the corner.

This is why it can bring a lot of value if you upload your project plan to the cloud using construction-specific software. All information is recorded and kept in one place so that all sides have full visibility on site and can see what happened historically. At the same time, you can send updates, ask questions or escalate problems as you walk around the site, simply using your smartphone.

2. Stop keeping things in your head and record everything

You have to document everything no matter what. This is the safest way to keep your project and yourself protected from commercial claims. We know well how tough it can be to keep an eye on every single detail on site. It is no coincidence, after all, that site tours are in most cases a stressful task.

If you are not equipped with the right tools, you have to walk around the field, detect a problem and then make sure to document it in detail once you are back at your desk. But sometimes, there are simply too many issues you need to report on. Or for one or the other reason your site tour might be interrupted, leaving you wondering whether you have actually seen and remembered to record everything.

Needless to say that this can subsequently make your communication with the project manager confusing and frustrating. This is one more reason why mobile field reporting is so important. It enables you to submit updates or critical questions as soon as you stumble upon them just by using your smartphone. This can help you eliminate a lot of your admin and mental burden.

By documenting everything on a single source of truth you also ensure that your project manager can raise or respond to claims very quickly. You will no longer have to spend weeks or even months to find that one email or photo that proves you are not the one to blame for a schedule delay. Everything will be accessible in the cloud and you will be able to access it with a quick search.

3. Make site preparation your number one priority

When it comes to preparation, many stakeholders tend to focus only on external events such as bad weather.

However, preparation should not start and finish there. Most of the problems that emerge on site can be solved through better anticipation and preparation around orders, delivery, choices, drawings and planning of the available workforce.

Usually, we see that problems arise if work on site has not been thought through with relevant parties or preparation work has been carried out too late, leading to last-minute work and mistakes.

Itt could be that there is an interruption of site activities because prefab elements arrive on site too late. If that's the case, you need to gather all the involved parties (engineers, suppliers, etc.) and together find the root cause and solution to the problem so that it won't happen again. This is how you can ensure a proactive approach in terms of project preparation and constraint resolution so that unforeseen events aren't synonymous with disaster. And this is why, as a site manager, you need to be in full sync with your project manager and the different subcontractors at all times.

4. Involve subcontractors early on

Site execution isn't a race of individuals but a team sport where a system view and active engagement from all team members is required to ensure that the agreements are adhered to.
That is why you should always try to involve subcontractors early on when planning their tasks. In that way, you can define their needs and get a good understanding of what to order and when. Such an approach can save you from a lot of stress when it comes to site preparation and material deliveries.
Furthermore, it will help you increase accountability as you will plan all upcoming activities together. At this point, you should ideally record the responsibilities and commitments of each side in a live, shared space in the cloud so that you can avoid the blame game and always know what's done and what isn't and deal with evolving challenges.

5. Use tools that are made for construction teams

Many site managers tend to believe that the tools they are using are fit for purpose and made to collaborate with the different stakeholders. In many cases, the truth is completely different.
Popular solutions like WhatsApp, email, and Excel are great, versatile tools, but they are not built for construction teams. They can't help you complete your site tour faster, communicate effectively with your project manager in real time around the scheduled tasks, or document everything while on site in a way that can be easily matched with the schedule. And here is why:

- They don't provide a shareable, "live" view of what's happening on site .
- The data shared through them lacks the connection to the daily schedule. This makes it hard for people to see where things are overall and what tasks are progressing, what's coming next, and who has ownership of what.
- Information is dispersed across many different platforms, which hinders efficient reporting.
- They don't enable collaboration between internal and external stakeholders, which makes your effort to connect with the project manager or the subcontractors much more challenging.
- They don't allow you to create your site diary as you go. Instead, you have to keep all information in your head until you are back at your desk. Trying to remember and document everything precisely after the fact generates both additional admin work and stress.
- They don't provide detailed reports on the performance of subcontractors on site.

Improve teamwork and get peace of mind!

- It quickly becomes clear that using the wrong tools can really impact the way you manage sitem activities on a daily basis.

Your teams have no real-time insight into what's coming next and there is no clarity on who's accountable for what, leading to poor decisions, costly interruptions and many sleepless nights for you in your efforts to run the site as efficiently as possible.

Courtesy : LetsBuild

Elon Musk Thinks Every Child Should Learn About These 50 Cognitive Biases

1. Fundamental Attribution Error.
When someone else is late, it's because they're lazy. When you're late, it was the traffic.

2. Self-Serving Bias.
Attributing all your successes to skill or effect and all your screw ups to bad luck or a bad situation.

3. In-Group Favoritism.
We tend to favor those in our in-group versus those who are different from us.

4. Bandwagon Effect.
Everyone likes to jump on a trendy bandwagon.

5. Groupthink.
Also just what it sounds like. Going along with the group to avoid conflict. The downfall of many a large organization.

6. Halo Effect.
Assuming a person has other positive traits because you observed they have one. Just because someone is confident or beautiful doesn't mean they are also smart or kind, for example.

7. Moral Luck.
Assuming winners are morally superior.

8. False Consensus.
Thinking most people agree with you even when that's not the case.

9. Curse of Knowledge.
Assuming everyone else knows what you know once you've learned something.

10. Spotlight Effect.
Overestimating how much other people are thinking about you.

11. Availability Heuristic.
Why we worry more about rare airplane crashes than objectively much deadlier road accidents. People make judgments based on how easy it is to call an example to mind (and plane crashes are memorable).

12. Defensive Attribution.
Getting more upset at someone who commits a crime we feel we could have fallen victim to ourselves.

13. Just-World Hypothesis.
The tendency to believe the world is just, so any observed injustice was really deserved.

14. Naive Realism.
Thinking we have a better grasp of reality than everyone else.

15. Naive Cynicism.
Thinking everyone else is just selfishly out for themselves.

16. Forer Effect (aka Barnum Effect).
The bias behind the appeal of astrology. We see vague statements as applying specifically to us even when they apply to most everybody.

17. Dunning Kruger Effect.
One of my personal favorites. This principle states that the less competent you are, the more confident you're likely to be because you're too incompetent to understand exactly how bad you are. The opposite is also true -- those with greater skills are often plagued with doubt.

18. Anchoring.
The way in which the first piece of information we hear tends to influence the terms or framing of an entire discussion.

19. Automation Bias.
Over relying on automated systems like GPS or autocorrect.

20. Google Effect (aka Digital Amnesia).
You're more likely to forget it if you can just Google it.

21. Reactance.
Doing the opposite of what you're told when you feel bullied or backed into a corner. Very topical.

22. Confirmation Bias.
We tend to look for and be more easily convinced by information that confirms our existing beliefs. A big one in politics.

23. Backfire Effect.
Repeatedly mentioning a false belief to disprove it sometimes ends up just making people believe it more.

24. Third-Person Effect.
The belief that others are more affected by a common phenomenon than you are.

25. Belief Bias.
Judging an argument not on its own merits but by how plausible we think its conclusion is.

26. Availability Cascade.
The more people believe (and talk about) something the more likely we are to think it's true.

27. Declinism.
Romanticizing the past and thinking we live in an age of decline.

28. Status Quo Bias.
People tend to like things to stay the same, even if change would be beneficial.

29. Sunk Cost Fallacy (AKA Escalation of Commitment).
Throwing good money (or effort) after bad to avoid facing up to a loss.

30. Gambler's Fallacy.
Thinking future probabilities are affected by past events. In sports, the hot hand.

31. Zero-Risk Bias.
We prefer to reduce small risks to zero rather than reduce risks by a larger amount that doesn't get them to zero.

32. Framing Effect.
Drawing different conclusions from the same information depending on how it's framed.

33. Stereotyping.
Just what it sounds like -- having general beliefs about entire groups of people (and applying them to individuals whether you know them or not).

34. Outgroup Homogeneity Bias.
Seeing the diversity within the groups to which you belong but imagining people in groups to which you don't belong are all alike.

35. Authority Bias.
Putting too much stock in authority figures.

36. Placebo Effect.
This isn't strictly a cognitive bias according to Musk's graphic, but still useful to know. If you think something will work, you're likely to experience a small positive effect whether it really does or not.

37. Survivorship Bias.
We remember the winners and forget about the many, invisible losers. Big in startups.

38. Tachypsychia.
How exhaustion, drugs, or trauma mess with our sense of time.

39. Law of Triviality (AKA Bike-Shedding).
Giving excessive weight to trivial issues while ignoring more important ones.

40. Zeigarnik Effect.
Uncompleted tasks haunt our brains until we finish them.

41. Ikea Effect.
We tend to overvalue things we had a hand in creating. (In my experience not true of Billy bookcases, but still ...)

42. Ben Franklin Effect.
We tend to think more positively about people once we've done a favor for them.

43. Bystander Effect.
Again, not strictly a cognitive bias, but important. Describes how people are less likely to take responsibility to act if they're in a crowd.

44. Suggestibility.
Seen most often in children, this is when we mistake an idea or question someone else said for your own memory.

45. False Memory.
Mistaking something you imagined for a memory.

46. Cryptomnesia.
The opposite of the one above. Thinking a true memory is something you imagined.

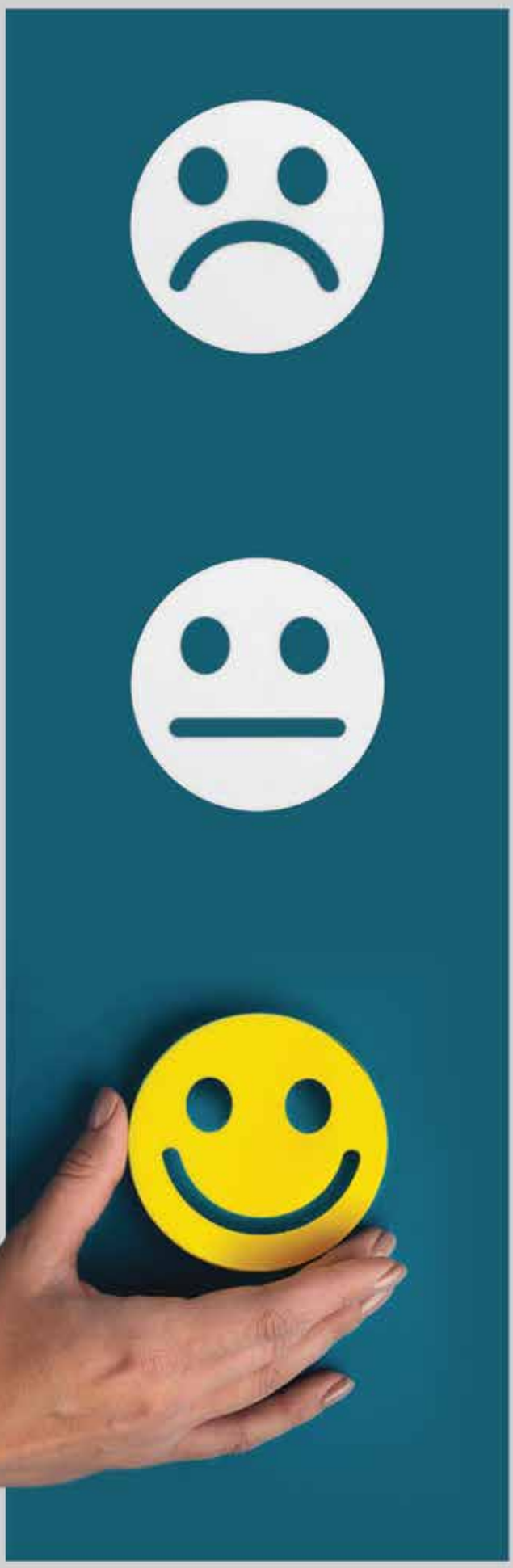
47. Clustering Illusion.
The tendency to "see" patterns in random data.

48. Pessimism Bias.
Always seeing the glass as half empty.

49. Optimism Bias.
Always seeing the glass as half full.

50. Blind Spot Bias.
The bias that makes us think we don't have as many biases as other people. You do.

Courtesy : INC.COM
Graphic for the article : https://www.visualcapitalist.com/50-cognitive-biases-in-the-modern-world/



Snagging construction works

Introduction

Snagging does not have an agreed meaning, and is not a contractual term. It is a slang expression widely used in the construction industry to define the process of inspection necessary to compile a list of minor defects or omissions in building works for the contractor to rectify.

Most common use of the term

Generally snagging refers to a process that takes place a fortnight or so prior to practical completion when an area is considered complete by a contractor and is offered ready for inspection.

A snagging list (occasionally referred to as a punch list) is prepared and issued by the appropriate certifying authority, typically this will be the architect, contract administrator or employer's agent. The faults that are identified should be rectified prior to a certificate of practical completion being issued.

Punch list.

A punch list (also known as a snagging list) is a document that is prepared close to the end of a construction project and issued by the appropriate certifying authority (typically, the architect, contract administrator or employer's agent). It lists any faults that are identified or works that do not conform to the specifications, which should be rectified prior to a certificate of practical completion being issued.

Generally, snagging refers to a process that takes place a fortnight or so prior to practical completion when an area is considered complete by a contractor and is offered ready for inspection. It is a slang expression widely used in the construction industry to define the process of inspection necessary to compile a list of minor defects or omissions (snages) in building works for the contractor to rectify.

This differs from a work-to-complete list which is compiled by a contractor and issued to each subcontractor and their crews at, or near, completion - a list of the remaining items and any defective work that subcontractors are required to complete before leaving the site.

Work-to-complete list.

A work-to-complete list is a list compiled by a contractor and issued to each subcontractor and their crews at, or near, completion. It is a list of the remaining items and any defective work that subcontractors required to complete before leaving the site.

The work-to-complete list, enables the contractor to formalise remaining work and ensure that subcontractors properly complete their contractual requirements before final payment is made and they move on to the next job. It can prove difficult to get subcontractors to return to a project once they have left.

The work-to-complete list is similar to the 'snagging list' or 'punch list', which is a list of faults identified by the appropriate certifying authority (typically the architect, contract administrator, or employer's agent) which must be rectified before a certificate of practical completion can be issued.

Many contractors will wait for the snagging list to be prepared before issuing their work-to-complete list. However, the earlier the subcontractors receive the list of remaining items, t
the sooner the problems are likely to be resolved. The list should be clear, and very specific so there is no ambiguity about what needs to be done and where.

The process of inspection and going through a punch list is usually performed close to the end, if not right at the end, of construction so that the work as a whole can be reviewed and checked. The list of items to be completed or corrected is compiled by the contractor and submitted to the employer's agent or designer (usually the architect or engineer). Lists tend to be organised either by room or by trade.

Following this, the work is inspected by the agent (sometimes along with the contractor, subcontractor, owner, and any other relevant stakeholders) to determine whether the items on the list have been resolved. Traditionally, the list would be worked through and a hole punched in the margin to indicate that the particular item of work had been completed, hence the term 'punch list'. Today, digital software is capable of producing virtual punch lists with applications that can be operated via mobile devices as well as more complex web and desktop varieties.

Typical examples of punch list items include: repairing broken windows, replacing missing roof tiles, repainting chipped paintwork, filling cracks, and so on.

Once the list of items has been completed according to the specifications in the contract, or a mutually agreed resolution has been decided upon for certain items, practical completion can be certified.

Following practical completion, there is generally a defects liability period, during which the contractor may be recalled to rectify defects which appear. This is not a chance to correct snagging items apparent at practical completion, If there are defects apparent before practical completion, then these should be rectified before a certificate of practical completion is issued.

Inspection should not take place without a proper 'builder's clean', the removal of any

protective material and the operation of full, permanent lighting. On large projects the inspection process may need to be carried out in sections as areas are progressively completed and closed off, even if this does not entail contractual sectional completion or handover to the client.

Snagging in such circumstances might begin months before overall project completion. It may also mean that some areas are physically complete but without the building services having been tested or commissioned as they are not operational. This should be noted on the snagging sheet. The closed-off areas are then subject to a rigorous locked-access regime to prevent deterioration and will require final inspection just prior to handover to the client.

The contract drawings and specifications, British Standards, and Building Regulations set a standard for the works, however common sense and experience should also be used in exercising judgment. For instance, a hand-applied finish will never match machined products, and a scratch on the back of the CEO's office door is more serious than a similar scratch in the interior of a plant room. Two sets of eyes are better than one and it takes roughly an hour per 100 sq. m to thoroughly inspect an area while compiling a list.

It is important to ensure that meticulous dated records are kept and receipts of acknowledgement are filed. Defects can often become the subject of litigation long after completion and occupants can cause damage after handover. Sometimes photographic evidence can be a useful record, and software is now available to help identify and track defects.

Practical completion

Certifying practical completion is a very important milestone and has the effect of:

Δ Releasing half of the retention (an amount retained from payments due to the contractor to ensure that they complete the works).

Δ Ending the contractor's liability for liquidated damages (damages that become payable to the client in the event that there is a breach of contract by the contractor - generally by failing to complete the works by the completion date).

Δ Signifying the beginning of the defects liability period.

It is important to note that the defects liability period, which follows certification of practical completion, is not a chance to correct problems apparent at practical completion, it is the period during which the contractor may be recalled to rectify defects which appear. If there are defects apparent before practical completion, then these should be rectified before a certificate of practical completion is issued.

The RIBA Plan of Work 2013 suggests that: 'Practical Completion is a contractual term used in the Building Contract to signify the date on which a project is handed over to the client. The date triggers a number of contractual mechanisms.'

Practical completion is referred to as 'substantial completion' on some forms of contract, particularly in the United States.

The contract administrator certifies practical completion when all the works described in the contract have been carried out. Certifying practical completion has the effect of:

Δ Releasing half of the retention (an amount retained from payments due to the contractor to ensure they complete the works).

Δ Ending the contractor's liability for liquidated damages (damages that become payable to the client in the event that there is a breach of contract by the contractor - generally by failing to complete the works by the completion date).

Δ Signifying the beginning of the defects liability period.

Documentation that should be issued to the client on certification of practical completion might include:

Δ A draft building owner's manual.

Δ A building user's guide.

Δ The health and safety file.

Δ The building log book.

Δ A construction stage report.

Once the certificate of practical completion has been issued, the client takes possession of the works for occupation.

There is no absolute definition of practical completion and case law is very complex. There is some debate about when practical completion can be certified and whether it can be certified where there are very minor (de minimis) items 'not affecting beneficial occupancy' that remain incomplete.

A schedule of defects is issued by the contract administrator at the end of defects liability period. It identifies defects (aspects of the works that are not in accordance with the contract) that have become apparent during the defects liability period.

The contract administrator and the contractor then agree a reasonable period within which the contractor will rectify the defects identified on the schedule. Once the contract administrator is satisfied that the defects have been rectified, they issue a certificate of making good defects which has the effect of allowing the final certificate to be issued, releasing any remaining retention.

It is important to note that the defects liability period is not a chance to correct problems apparent at practical completion, it is a period during which the contractor may be recalled to rectify defects which appear. If there are defects apparent before practical completion, then these should be rectified before a certificate of practical completion is issued. See the article on practical completion for more information.

It is important to note however, that the defects liability period, which follows certification of practical completion, is not a chance to correct problems apparent at practical completion, it is the period during which the contractor may be recalled to rectify defects which appear following practical completion. If there are defects apparent before practical completion, then these should be rectified before a certificate of practical completion is issued.

This can put the contract administrator in a difficult position, as both the contractor and the client may be keen to issue the certificate (so the building can be handed over), and yet defects (more than a de minimis) are still apparent in the works. Issuing the certificate could render the contract administrator liable for problems that this causes, for example in the calculation of liquidated damages, the position in relation to performance bonds and the release of retention when it is not certain that the works will be completed.

If the contract administrator is put under pressure to certify practical completion even though the works are not complete, they might consider informing the client in writing of the potential problems of doing so, obtaining written consent from the client to certify practical completion and obtaining agreement from the contractor that they will complete the works and rectify any defects. If the contract administrator is not confident about the potential problems, they may advise the client to seek legal advice.

On construction management contracts, a separate certificate of practical completion must be issued for each trade contract. Once all trade contracts (or all trade contracts for a particular section of the works) have been issued, the construction manager issues a certificate or project completion (or sectional completion). The same is true on management contracts, where each works contract must be certified individually.

Practical completion is not a term recognised in some recently developed contracts such as PPC 2000 and other partnering contracts which simply refer to 'completion'. This can put the contract administrator in a difficult position as to when the project becomes 'useable' by the client.

If practical completion is not certified by the most recently agreed completion date, then the contractor may be liable to pay liquidated and ascertained damages to the client. These are pre-determined damages set at the time that the contract is entered into, based on a calculation of the actual loss that the client is likely to incur if the contractor fails to meet the completion date. Some contracts require that a certificate of non-completion is issued as a pre-requisite to deducting liquidated and ascertained damages.

NB: Sectional completion refers to a provision within construction contracts allowing different completion dates for different sections of the works. This is common on large projects that are completed in sections, allowing the client to take possession of the completed parts whilst construction continues on others. Sectional completion differs from partial possession in that it is pre-planned and defined in the contract documents.

Snagging can also be used to refer to other inspection and rectification processes:

Δ The preparation by the contract administrator of a schedule of minor (de minimis) outstanding items that remain on certification of practical completion. It should be noted that generally there is no provision in the contract for this.

Δ A schedule of significant (non de minimis) items appended to the certificate of practical completion. Again there is generally no provision in the contract for this, but it can be agreed by the parties to the contract if, for example, it is in the interests of the client to occupy the building even though significant outstanding items remain. There may also be circumstances, such as concern with business disruption, when a client settles for accepting a defect in return for discounting payment of the final account.

Δ A schedule of defects that have appeared during the defects liability period, issued by the contract administrator at the end of defects liability period. Such a schedule of defects is generally provided for by the contract.

Δ Inspection of sub-contractor works by the main contractor.

Δ Inspection by an independent surveyor acting on behalf of a purchaser.

What Is Renewable Energy?

Renewable energy is energy that has been derived from earth's natural resources that are not finite or exhaustible, such as wind and sunlight. Renewable energy is an alternative to the traditional energy that relies on fossil fuels, and it tends to be much less harmful to the environment.

7 Types of Renewable Energy

1.Solar

Solar energy is derived by capturing radiant energy from sunlight and converting it into heat, electricity, or hot water. Photovoltaic (PV) systems can convert direct sunlight into electricity through the use of solar cells.

Benefits

One of the benefits of solar energy is that sunlight is functionally endless. With the technology to harvest it, there is a limitless supply of solar energy, meaning it could render fossil fuels obsolete. Relying on solar energy rather than fossil fuels also helps us improve public health and environmental conditions. In the long term, solar energy could also eliminate energy costs, and in the short term, reduce your energy bills. Many federal local, state, and federal governments also incentivize the investment in solar energy by providing rebates or tax credits.

Current Limitations

Although solar energy will save you money in the long run, it tends to be a significant upfront cost and is an unrealistic expenses for most households. For personal homes, homeowners also need to have the ample sunlight and space to arrange their solar panels, which limits who can realistically adopt this technology at the individual level.

2. Wind

Wind farms capture the energy of wind flow by using turbines and converting it into electricity. There are several forms of systems used to convert wind energy and each vary. Commercial grade wind-powered generating systems can power many different organizations, while single-wind turbines are used to help supplement pre-existing energy organizations. Another form is utility-scale wind farms, which are purchased by contract or wholesale. Technically, wind energy is a form of solar energy. The phenomenon we call "wind" is caused by the differences in temperature in the atmosphere combined with the rotation of Earth and the geography of the planet.

Benefits

Wind energy is a clean energy source, which means that it doesn't pollute the air like other forms of energy. Wind energy doesn't produce carbon dioxide, or release any harmful products that can cause environmental degradation or negatively affect human health like smog, acid rain, or other heat-trapping gases. Investment in wind energy technology can also open up new avenues for jobs and job training, as the turbines on farms need to be serviced and maintained to keep running.

Current Limitations

Since wind farms tend to be built in rural or remote areas, they are usually far from bustling cities where the electricity is needed most. Wind energy must be transported via transition lines, leading to higher costs. Although wind turbines produce very little pollution, some cities oppose them since they dominate skylines and generate noise. Wind turbines also threaten local wildlife like birds, which are sometimes killed by striking the arms of the turbine while flying.

3. Hydroelectric

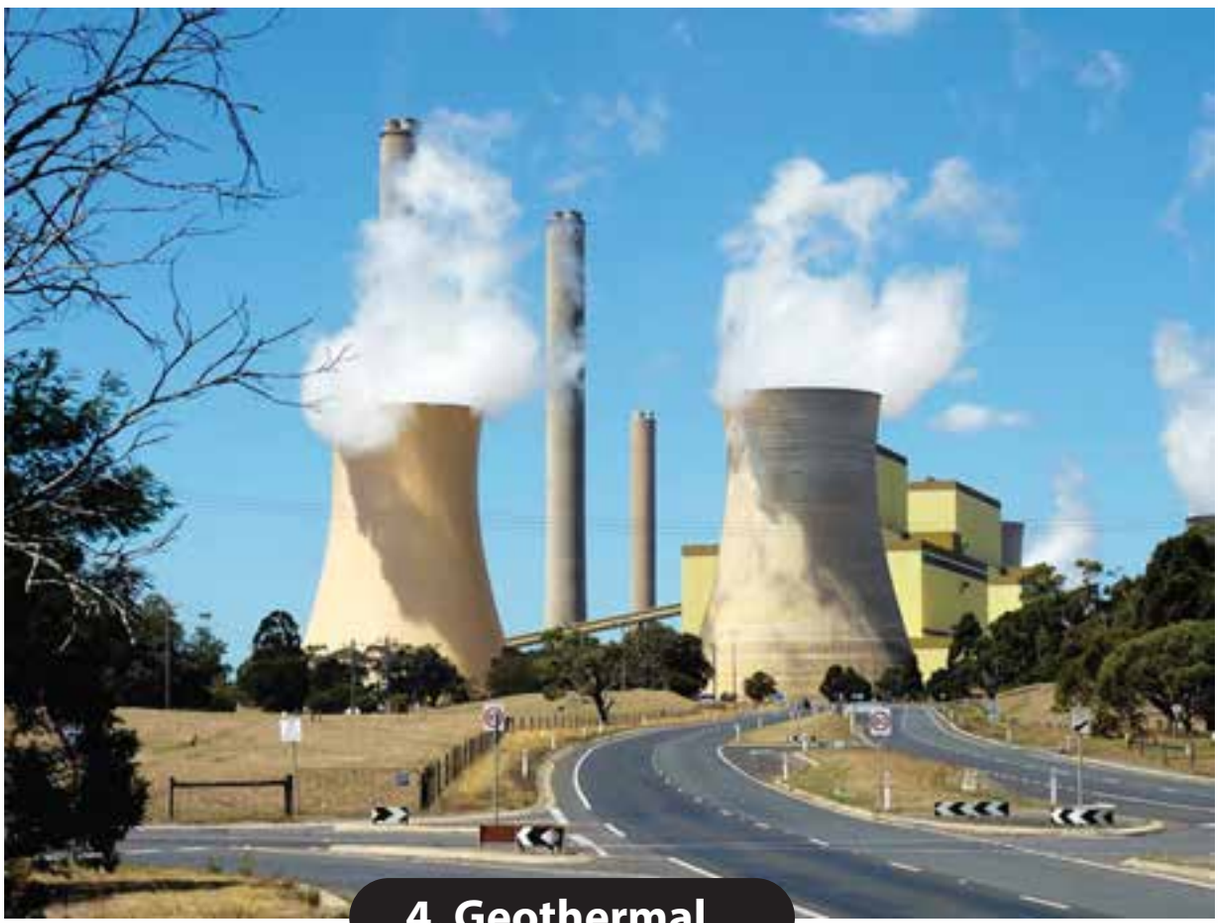
Dams are what people most associate when it comes to hydroelectric power. Water flows through the dam's turbines to produce electricity, known as pumped-storage hydropower. Run-of-river hydropower uses a channel to funnel water through rather than powering it through a dam.

Benefits

Hydroelectric power is very versatile and can be generated using both large scale projects, like the Hoover Dam, and small scale projects like underwater turbines and lower dams on small rivers and streams. Hydroelectric power does not generate pollution, and therefore is a much more environmentally-friendly energy option for our environment.

Current Limitations

Most U.S. hydroelectricity facilities use more energy than they are able to produce for consumption. The storage systems may need to use fossil fuel to pump water. Although hydroelectric power does not pollute the air, it disrupts waterways and negatively affects the animals that live in them, changing water levels, currents, and migration paths for many fish and other freshwater ecosystems.



4. Geothermal

Geothermal heat is heat that is trapped beneath the earth's crust from the formation of the Earth 4.5 billion years ago and from radioactive decay. Sometimes large amounts of this heat escapes naturally, but all at once, resulting in familiar occurrences, such as volcanic eruptions and geysers. This heat can be captured and used to produce geothermal energy by using steam that comes from the heated water pumping below the surface, which then rises to the top and can be used to operate a turbine.

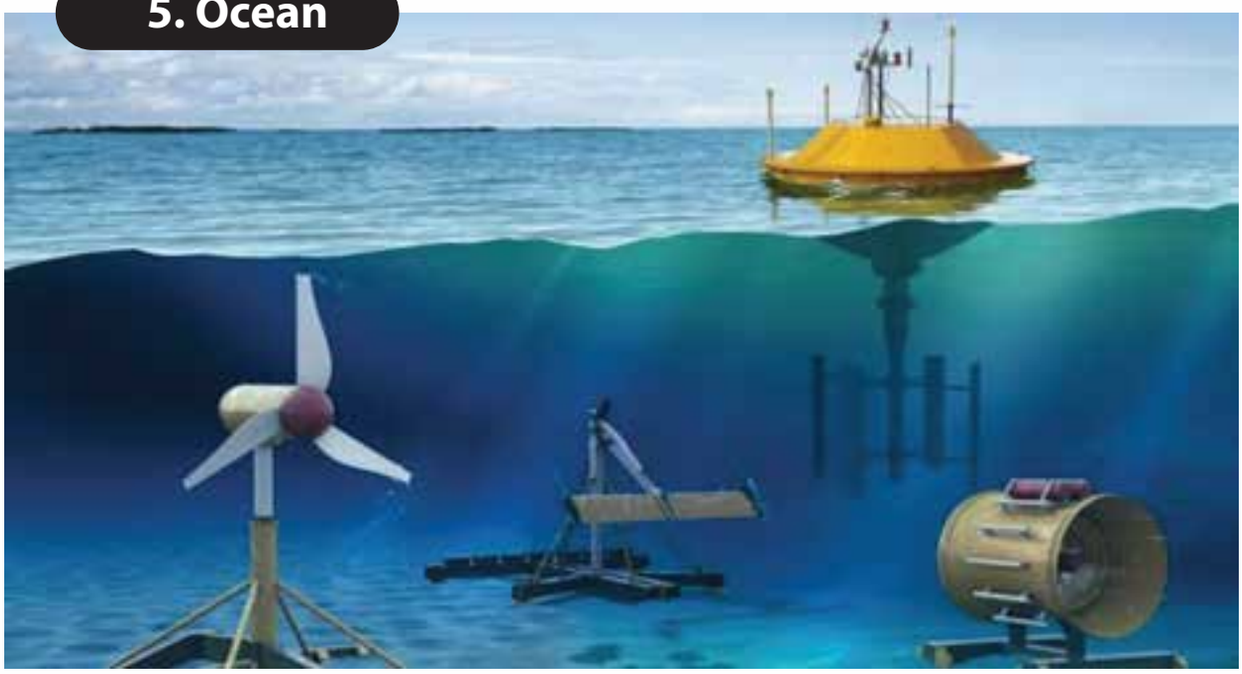
Benefits

Geothermal energy is not as common as other types of renewable energy sources, but it has a significant potential for energy supply. Since it can be built underground, it leaves very little footprint on land. Geothermal energy is naturally replenished and therefore does not run a risk of depleting (on a human timescale).

Current Limitations

Cost plays a major factor when it comes to disadvantages of geothermal energy. Not only is it costly to build the infrastructure, but another major concern is its vulnerability to earthquakes in certain regions of the world.

5. Ocean



The ocean can produce two types of energy: thermal and mechanical. Ocean thermal energy relies on warm water surface temperatures to generate energy through a variety of different systems. Ocean mechanical energy uses the ebbs and flows of the tides to generate energy, which is created by the earth's rotation and gravity from the moon.

Benefits

Unlike other forms of renewable energy, wave energy is predictable and it's easy to estimate the amount of energy that will be produced. Instead of relying on varying factors, such as sun and wind, wave energy is much more consistent. This type of renewable energy is also abundant, the most populated cities tend to be near oceans and harbors, making it easier to harness this energy for the local population. The potential of wave energy is an astounding as yet untapped energy resource with an estimated ability to produce 2640 TWh/yr. Just 1 TWh/yr of energy can power around 93,850 average U.S. homes with power annually, or about twice than the number of homes that currently exist in the U.S. at present.

Current Limitations

Those who live near the ocean definitely benefit from wave energy, but those who live in landlocked states won't have ready access to this energy. Another disadvantage to ocean energy is that it can disturb the ocean's many delicate ecosystems. Although it is a very clean source of energy, large machinery needs to be built nearby to help capture this form energy, which can cause disruptions to the ocean floor and the sea life that habitats it. Another factor to consider is weather, when rough weather occurs it changes the consistency of the waves, thus producing lower energy output when compared to normal waves without stormy weather.

6. Hydrogen

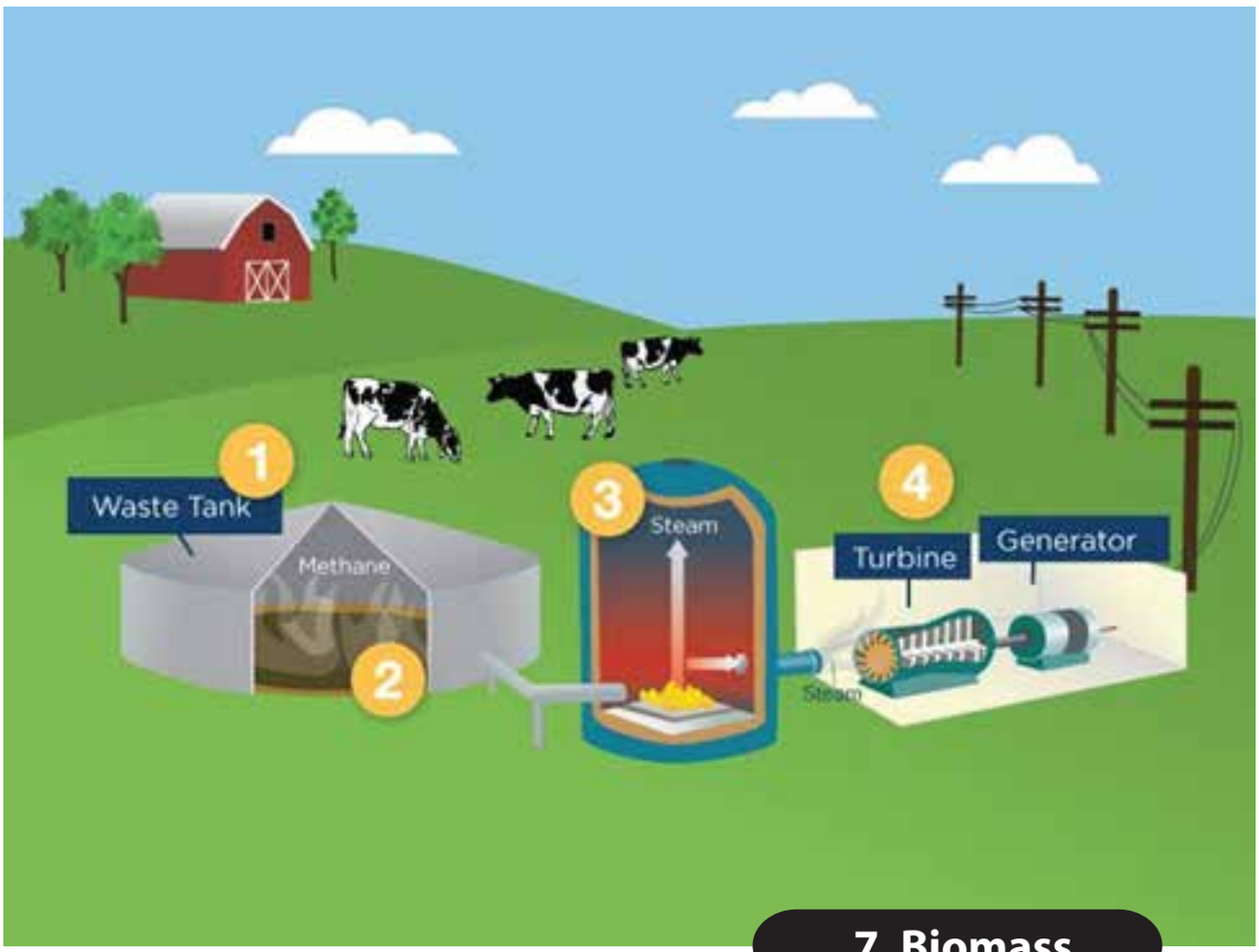
Hydrogen needs to be combined with other elements, such as oxygen to make water as it does not occur naturally as a gas on its own. When hydrogen is separated from another element it can be used for both fuel and electricity.

Benefits

Hydrogen can be used as a clean burning fuel, which leads to less pollution and a cleaner environment. It can also be used for fuel cells which are similar to batteries and can be used for powering an electric motor.

Current Limitations

Since hydrogen needs energy to be produced, it is inefficient when it comes to preventing pollution.



7. Biomass

Bioenergy is a renewable energy derived from biomass. Biomass is organic matter that comes from recently living plants and organisms. Using wood in your fireplace is an example of biomass that most people are familiar with.

There are various methods used to generate energy through the use of biomass. This can be done by burning biomass, or harnessing methane gas which is produced by the natural decomposition of organic materials in ponds or even landfills.

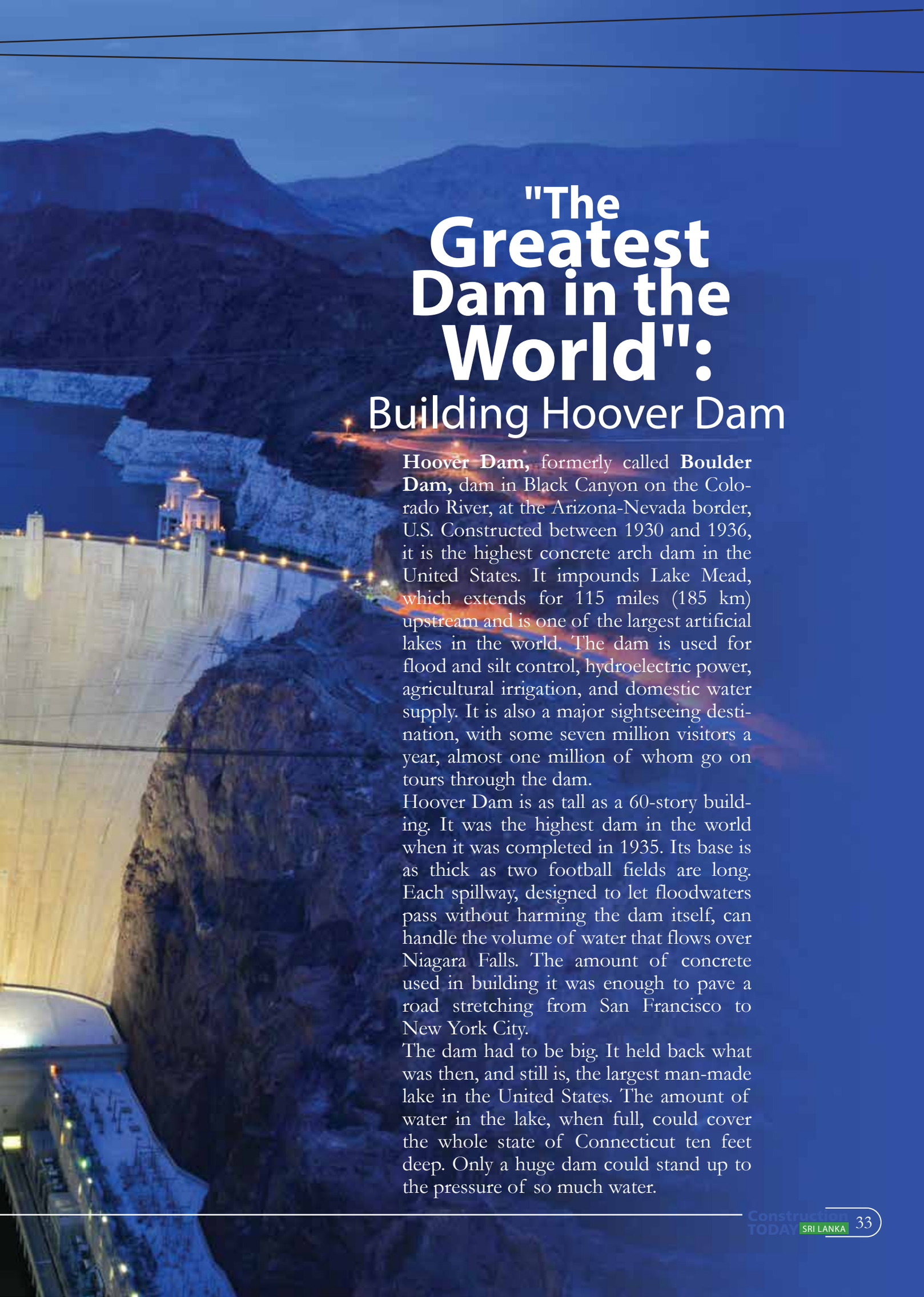
Benefits

The use of biomass in energy production creates carbon dioxide that is put into the air, but the regeneration of plants consumes the same amount of carbon dioxide, which is said to create a balanced atmosphere. Biomass can be used in a number of different ways in our daily lives, not only for personal use, but businesses as well. In 2017, energy from biomass made up about 5% of the total energy used in the U.S. This energy came from wood, biofuels like ethanol, and energy generated from methane captured from landfills or by burning municipal waste.

Current Limitations

Although new plants need carbon dioxide to grow, plants take time to grow. We also don't yet have widespread technology that can use biomass in lieu of fossil fuels.

Courtesy : justenergy.com



"The Greatest Dam in the World": Building Hoover Dam

Hoover Dam, formerly called **Boulder Dam,** dam in Black Canyon on the Colorado River, at the Arizona-Nevada border, U.S. Constructed between 1930 and 1936, it is the highest concrete arch dam in the United States. It impounds Lake Mead, which extends for 115 miles (185 km) upstream and is one of the largest artificial lakes in the world. The dam is used for flood and silt control, hydroelectric power, agricultural irrigation, and domestic water supply. It is also a major sightseeing destination, with some seven million visitors a year, almost one million of whom go on tours through the dam.

Hoover Dam is as tall as a 60-story building. It was the highest dam in the world when it was completed in 1935. Its base is as thick as two football fields are long. Each spillway, designed to let floodwaters pass without harming the dam itself, can handle the volume of water that flows over Niagara Falls. The amount of concrete used in building it was enough to pave a road stretching from San Francisco to New York City.

The dam had to be big. It held back what was then, and still is, the largest man-made lake in the United States. The amount of water in the lake, when full, could cover the whole state of Connecticut ten feet deep. Only a huge dam could stand up to the pressure of so much water.

Building such a mammoth structure presented unprecedented challenges to the engineers of the Bureau of Reclamation. It stretched the abilities of its builders to the limits. It claimed the lives of 96 of the 21,000 men who worked on it.

Construction began in 1931. Americans began coming to see the big dam long before it was completed four years later. Most had to travel many miles, at the end through a hostile desert, to reach this location on the border between Nevada and Arizona. The builders soon constructed an observation platform on the canyon rim to keep the tourists away from the construction site.

Hoover Dam did, and continues to do, all the things its supporters hoped it would. It protects southern California and Arizona from the disastrous floods for which the Colorado had been famous. It provides water to irrigate farm fields. It supplies water and power to Los Angeles and other rapidly growing cities in the Southwest.
But the dam also had an entirely unexpected result, one that began while it was still under construction. For millions of people in the 1930s, including those who would never visit it,

Hoover Dam came to symbolize what American industry and American workers could do, even in the depths of the Great Depression. In the early 21st century, almost a million people still come to visit the huge dam every year.

Hoover Dam is 726 feet (221 metres) high and 1,244 feet (379 metres) long at the crest. It contains 4,400,000 cubic yards (3,360,000 cubic metres) of concrete. Four reinforced-concrete intake towers located above the dam divert water from the reservoir into huge steel pipes called penstocks. The water, after falling some 500 feet (150 metres) through the pipes to a hydroelectric power plant in the base of the dam, turns 17 Francis-type vertical hydraulic turbines, which rotate a series of electric generators that have a total power capacity of 2,080 megawatts. Nearly half of the generated electric power goes to the Metropolitan Water District of Southern California, the city of Los Angeles, and other destinations in southern California; the rest goes to Nevada and Arizona. The dam, power plant, and reservoir are owned and managed by the U.S. Department of the Interior's Bureau of Reclamation.

From the time of the dam's construction, a federal highway traversed the dam's crest, serving both visitors to the dam and travelers between Nevada and Arizona. As the dam and surrounding Lake Mead recreation area rose in popularity, traffic increased; traffic problems became especially severe under the security restrictions imposed after the attacks of September 11, 2001. Construction began in January 2005 on a long-planned Hoover Dam Bypass Project, and in October 2010 a concrete arch bridge with a 1,060-foot (322 metre) span - the longest in North America for that type of bridge opened for through traffic within view of Hoover Dam. The old road aong the crest is reserved for use by visitors to the dam.

Visiting the site

Hoover Dam is located approximately 30 miles southeast of Las Vegas, on the Nevada-Arizona border. From Las Vegas, take US Highway 93 South and continue about 20 miles to Boulder City. In Boulder City, take a left at the second stoplight in town (there are only two of them). Continue on US 93 for about 5 miles to the turn-off to Nevada State Route 172—the Hoover Dam Access Road. Take NV SR 172 for about 2 miles to the dam. All vehicles are required to undergo a security inspection prior to visiting the dam. Tickets for tours of the dam and the power plant are available at the Visitor Center.

Tickets can also be purchased on-line. There is a charge for the tours, in addition to an admission charge for the Visitor Center. The Visitor Center is open every day of the year except for Thanksgiving and Christmas days. All visitors are required to go through security screening when entering the Visitor Center.

Access to the Visitor Center is most convenient from the parking garage on the Nevada side of the dam. There is a fee for parking. Oversized vehicles, recreational vehicles, and vehicles with trailers must use the parking lots on the Arizona side of the dam.

IMPORTANT INFORMATION

A good portion of the Hoover Dam experience is outdoors, please plan for all types of weather.

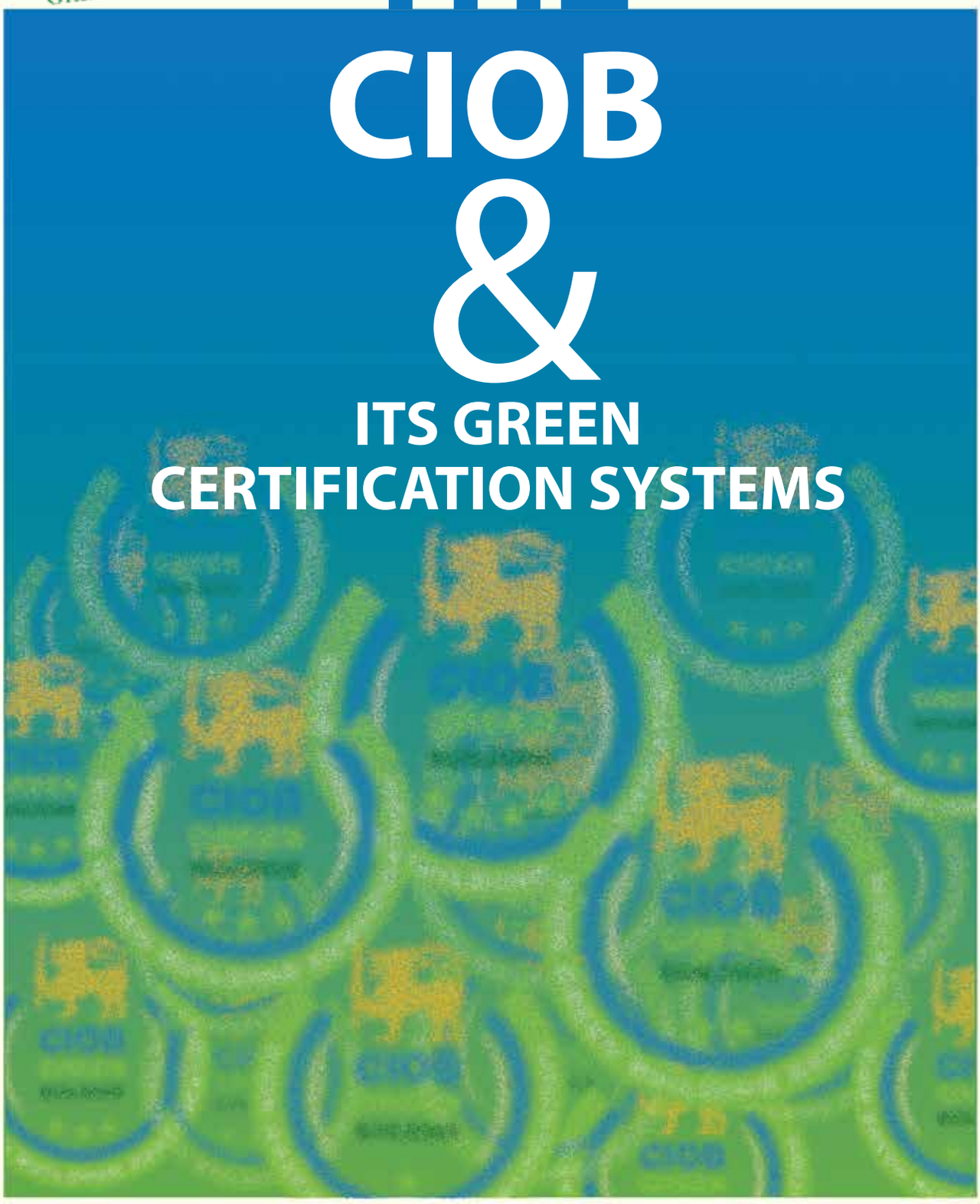
Ticket Sale Information

Tours available daily except for Thanksgiving and Christmas.

Dam Tour $30.00 (Must be 8 years of age or older. This tour is not handicap accessible.) – Includes 10-minute movie on the history of Hoover Dam, a 1-hour guided tour to a platform, overlooking a 30-foot diameter penstock pipe, the Nevada Wing of the Powerplant, and a stop in an original inspection tunnel inside the dam. Also includes the Visitor Center exhibits and observation deck along with the 1940s era Original Exhibit Building topographical map presentation.

Courtesy : The Editors of Encyclopaedia Britannica & nps.gov – Articles on Historic Places

THE CIOB & ITS GREEN CERTIFICATION SYSTEMS

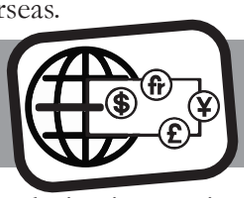


The Ceylon Institute of Builders (CIOB)
was first established
in 1961 by some of the most illustrious engineers of Sri Lanka.
It has been contributing actively over the decades towards
development of the Sri Lankan construction industry
whilst raising its professional standard. Some of the key objectives
of CIOB are as follows;

- Develop and disseminate the Science and Technology of modern Building Practices to assist all builders by means of seminars and workshops with inputs from specialist national and international resource persons.

- Promote competency and standard of practices for the builders to reach professional status.

- Act to improve conditions affecting the industry with a view to expanding the industry, which will include seeking opportunities for contracts overseas.



- Through its international affiliations will seek to use its influence to attract investments to the construction industry.

- Being the pivotal Organisation for building profession it would promote Training and Research for builders by establishing a library and Training and Research Centres.

CIOB certification after training is well recognised and respected throughout the construction industry. Coupled with international affiliation and with other national industries, CIOB members are privileged for contracts wherever they are in the world.

Activities of CIOB

CIOB membership opportunities are designed in a manner to ensure an aspirant to progress along a well structured development programme that will take them towards the ultimate goal of corporate membership of the institute.

CIOB qualifying routes will be tailored for new and young entrants as well as mature professionals with or without a background in construction to achieve professional level career in the country.

- CIOB contributes towards development opportunities and upgrading the construction industry so that it will be in a position to play a key role in the Sri Lankan economy.
- CIOB plays a key role to provide feedback to the government on their policies affecting the industry.
- CIOB Working Committees frequently engage to play the role of a "Think Tank" for the construction industry.
- CIOB works with the Government to provide appropriate solutions to the problems affecting the industry.

CIOB's Green Mandate

The Ceylon Institute of Builders is the premier professional body of building and construction professionals in Sri Lanka. Its membership is comprised of Architects, Engineers, Quantity Surveyors, Valuers and Builders etc. The Institute is affiliated to the Chartered Institute of Builders of UK and the Council of Research and Innovation in Building and Construction in the Netherlands. It also has partnerships with Construction Federation of India (CFI) and Building and Construction Authority of Singapore.

The advancement of green building practices was identified by the Council of CIOB as one of the possible ways of making Sri Lanka a more sustainable place to live. The CIOB launched its Green Building Certification programme in 2010 and worked out a 5 year strategic plan to develop an internationally acceptable and comprehensive Green rating system in Sri Lanka. With the objective of creating a necessary impetus, the CIOB Council decided to hold the first World Construction Symposium 2012 jointly with the International Council for Research and Innovation in Building and Construction (CIB) and the University of Moratuwa in Colombo, Sri Lanka during 28-30 June 2012, in order to create greater awareness on Green Building among all industry stakeholders in Sri Lanka. The CIOB also had the purpose of becoming informed about green buildings and making a decision about future work to encourage the construction of green buildings in Sri Lanka. Prior to hosting the WCS 2012 in Sri Lanka, members of the CIOB Council visited Vietnam in 2011 and participated in the WCS 2011. The World Construction Symposium focusing on sustainable construction. The details of the previous three versions of the Symposium are as follows;

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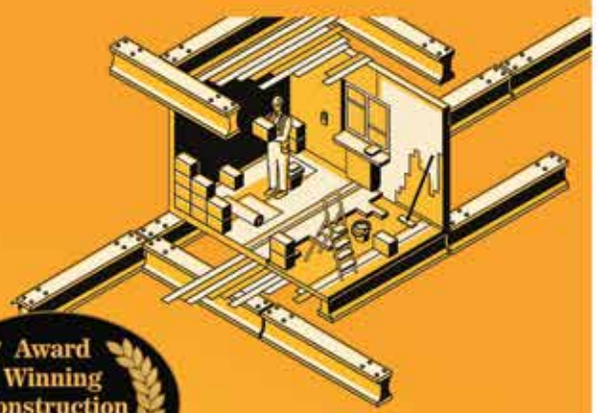

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1st World Construction Symposium on the theme "Global Challenges In Construction Industry" held during 28 – 30 June 2012 at the Cinnamon Grand Hotel, Colombo.

2nd World Construction Symposium on the theme "Socio-Economic Sustainability in Construction: Practice, Policy & Research" held during 14 - 16 June, 2013 at the Cinnamon Lakeside Hotel in Colombo.

3rd World Construction Symposium on the theme "Sustainability & Development in Built Environment: The Way Forward" held during 20 - 22 June, 2014 at the Galadari Hotel in Colombo.

4th World Construction Symposium on the theme Sustainable Development in the Built Environment: Green Growth & Innovative Directions" held during 12 - 14 June, 2015 at the Galadari Hotel in Colombo.

5th World Construction Symposium on the theme "Greening Environment , Eco Innovations & Entrepreneurship" held during 29 - 31 July 2016, at the Galadari Hotel in Colombo.

6th World Construction Symposium on the theme "What's New and What's Next in the Built Environment Sustainability Agenda" held during 30 June – 01 July 2017, at the Galadari Hotel in Colombo.

7th World Construction Symposium on the theme "Built Asset Sustainability: Rethinking Design, Construction and Operations" held during 29 June – 01 July 2018, at the Galadari Hotel in Colombo.

8th World Construction Symposium on the theme "Towards a Smart, Sustainable and resilient built environment" held during 8 - 9 Nov. 2019, at the Galadari Hotel in Colombo.

9th World Construction Symposium on the theme "Reshaping Construction : Strategic, structural and cultural transformations towards the Next Normal" held during 9 - 10 July 2021, Online.

The International Symposium series is in line with CIOB's embedded mission, embracing a green agenda of **fortifying, forging and propagating.** First, CIOB endeavor to continuously fortify benchmarks and standards for certifying green buildings in Sri Lanka, taking into consideration our native's social, cultural and climate context.

Secondly, it is by forging relationships with the government, the industry and the public that the society can recgonises and appreciates the benefit of green environment and its inherent economic values. Forging alliances with green fraternities, industry practioners, green organizations and green ambassadors, is another important aspect for synergy and knowledge sharing.

Thirdly, CIOB is also equally eager to propagate seeds of green ideologies, expertise and know how to all stakeholders for the betterment of the nation and wellbeing of its people. This is planned to be done through its membership and training programme, Continuing Professional Development programme, earnest participation in green conferences, exhibitions and trade shows. CIOB's other impending outreach programmes include; collective researches on green technologies and collaboration with educational institutions etc.

The Government of Sri Lanka (GOSL) has also recognized the role of CIOB in the promotion of green construction concepts, technologies, methodologies and materials.

Objectives of CIOB-GMS

(a) To encourage consumers to purchase construction commodities (products and material) with significantly reduced adverse environmental impacts of their products;

(b) To provide manufacturers and importers with incentives to reduce adverse environmental impacts of their products;

(c) To provide a clear and independent guide for consumers considering environmental factors when making purchases;

(d) To ultimately improve the quality of the built environment and encourage sustainable management construction resources;

(e) To encourage Builders, designers, architects and other professionals involved in construction practices in Sri Lanka to achieve greater

environmental and sustainability standards in their designs and ground level projects and

(f) To draw the attention of policy makers to create an enabling environment and to facilitate all stakeholders to voluntarily achieve and comply with higher environmental and sustainability standards in the construction industry in Sri Lanka.

The Programme

The **CIOB Green Mark Scheme** is launched as an initiative to drive Sri Lanka's construction industry towards more environment-friendly buildings. It is intended to promote sustainability in the built environment and raise environmental awareness among developers, designers and builders when they start project conceptualisation and design, as well as during construction.

The CIOB Green Building Certification (CGBC) is awarded to:

- Constructed Buildings (New & Existing)
- Building Products and Materials
- Green Building Professionals Accreditation
- Green Builders (Contractors) Certification

International Partners

BENEFITS OF GREEN MARK

CIOB Green Mark provides a meaningful differentiation of buildings in the real estate market. It is a benchmarking scheme which incorporates internationally recognized best practices in environmental design and performance. This can have positive effect on corporate image, leasing and resale value of buildings. Benefits of CIOB Green Mark include:

- Facilitate reduction in water and energy bills,
- Reduce potential environmental impact,
- Improve indoor environmental quality for a healthy and productive workplace,
- Provide clear direction for continual improvement.

CIOB CERTIFICATION FOR GREEN BUILDINGS

CIOB Green Mark is a green building rating system to evaluate a building for its environmental impact and performance. It is supported and accredited by the Building and Construction Authority of Singapore and endorsed by the Ministry of Construction, Engineering Services, Housing and Common Amenities and the Ministry of Environment and Natural Resources. It provides a comprehensive framework for assessing the overall environmental performance of new and existing buildings to promote sustainable design, construction and operations practices in buildings.

Under the assessment framework for new buildings, developers and design teams are encouraged to design and construct green, sustainable buildings which can promote energy savings, water savings, healthier indoor environments as well as the adoption of more extensive greenery for their projects. As for existing buildings, the building owners and operators are encouraged to meet their sustainable operations goals and to reduce adverse impacts of their buildings on the environment and occupant health over the entire building life cycle.

To Page 44

Towering Success with par Excellence...

We have reached higher echelons of the construction industry, setting benchmark in our journey of excellence spanning eight decades.

A legacy of
80 years
of excellence in construction

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Chartered Building Company

The assessment criteria cover the following key areas:-

- Energy Efficiency
- Water Efficiency
- Environmental Protection
- Indoor Environmental Quality
- Other Green Features and Innovation

The assessment process involves a pre-assessment briefing to the project team for a better understanding and evaluation of CIOB Green Mark requirements and the certification level sought. Actual assessment would then be carried out at later stage to verify the relevant reports and documentary evidences and that the building project meets the intents of the criteria and certification level.

The assessment identifies the specific energy efficient and environment-friendly features and practices incorporated in the projects. Points are awarded for incorporating environment-friendly features which are better than normal practice. The total number of points obtained will provide an indication of the environmental friendliness of the building design and operation. Depending on the overall assessment and point scoring, the building will be certified to have met the CIOB Green Mark Platinum, Gold, Silver or Bronze rating.

Certified Green Mark buildings are required to be re-assessed every three years to maintain the Green Mark status. New buildings certified will subsequently be re-assessed under the existing buildings criteria. Existing buildings will be re-assessed under the existing buildings criteria.

CIOB CERTIFICATION FOR GREEN BUILDING PRODUCTS

The CIOB Green Building Product (CGBP) certification scheme is a \dedicated building product labeling scheme that evaluates building products and equipment for their environmental impact and performance. CGBP provides industry-recognised benchmark for green building products through its integrated and multi-criteria approach. The assessment criteria focus on five key areas;

1. Energy efficiency
2. Water efficiency
3. Resource efficiency
4. Health and pollution control
5. Other requirements such as Environmental Quality Management Systems (EQMS) and technical performance/ innovation

With an increasing number of companies claiming that their products are eco-friendly as they ride on the green trend, businesses and consumers alike need to differentiate what is truly green from what is just "greenwash".

CIOB's Certification Scheme for Green Building products is a part of its overall mission to develop a truly sustainable and environmentally-friendly built environment. It is a dedicated green building product certification scheme that adopts an integrated and multi-criteria approach in its assessment. The CIOB's certification scheme complements the Green Mark Scheme of the Building and Construction Authority (BCA) of Singapore.

The assessment criteria are formulated by building professionals and experts. The multi-tiered certification scheme adopts an independent, multi-criteria third-party approach that complies with the ISO 14020 Type I International Standard for environmental labelling. The assessment criteria adopt a scientific approach to ensure the assessment is rigorous and technically sound. Also, the criteria are based on comprehensive product life-cycle assessment to determine a product's long- term impact on the environment.

CIOB's multi-tiered certification scheme is highly supported and recognised by the Building and Construction Authority (BCA) of Singapore, as well as local government authorities and organizations, such as the Ministry of Housing & Construction, and the Ministry of Mahaweli Development & Environment. This encourages businesses to constantly improve the eco-friendliness of their products. The CGBP certification scheme assesses products on a several levels of sustainability achievement, reflected by the number of ticks awarded.

Certified products are grouped into the following key categories:

CIOB CERTIFICATION FOR GREEN BUILDING PROFESSIONAL SERVICES

Other than products, CIOB also recognises green services provided by building consultants who have attained a level of achievement in green building services delivery and who are committed to supporting the green movement.

The CIOB Green Building Services (CGBS) certification scheme aims to promote best practices to support environmental sustainability amongst building consultancies and services firms in the industry. The certified firms can expect greater recognition and new business opportunities. CGBS certification is currently available for the following disciplines:

- Architecture
- Mechanical & Electrical (M&E) Engineering

- Quantity Surveying (QS)
- Environmental Sustainability Design (ESD)
- Energy Performance Contracting (EPC)

CIOB's Green Services Certification is the first of its kind in Sri Lanka and aims to enhance green building performance through the industry's delivery of services. The scheme recognises building consultants who are committed to supporting the green movement. It aims to promote best practices to support environmental sustainability among service firms in the industry. CIOB's Green Services Certification will commit building consultants and practitioners to develop their in-house capabilities and competencies; adopt green corporate practices; and deliver sustainable designs and services. As CIOB is a trusted brand, certified firms can expect greater recognition and new business opportunities.

The assessment criteria focus on the following areas:

a. Staff competencies and development

b. Green corporate practices in the entire business value chain

c. Support for the Green community, such as participation in the activities of Green NGOs and promotion of Green Building knowledge

d. Track record in the delivery of Green projects and promotion of Green Building design, including pushing the frontier for excellence and achievement of awards

CIOB's Green Services Certification will bring about a major shift in the green movement - making green value and spirit a way of life for the industry.

Management and Administration of CIOB-GMS

The GMS is managed and implemented by CIOB:
In order to oversee the establishment and operation of the CIOB-GMS as well as attract wider participation by the local community, an Advisory Committee comprising of members from CIOB, academics, industry, environment organisations and commercial sectors has been established.

The CIOB-GMS is supported by the CIOB-GMS Advisory Committee which consists of academic, commerce, environmental and scientific members. The Committee is entrusted with the task of providing comments and reviews on the operating procedures, the development and implementation of the eco-labelling standards and gives direction and advice to the program.

The CIOB - GMS Advisory Panel

The CIOB-GMS is honoured to have the following members in their respective areas of expertise:

1. Prof. Chitra Weddikkara - Chartered Architect, Chartered Quantity Surveyor, President-Sri Lanka Institute of Architects (SLIA)

2. Prof. Mohan Kumaraswamy	-	Director, Centre for Infrastructure & Construction Industry Development, University of Hong Kong
3. Prof. M.S. Manawadu	-	Senior Professor of Architecture, Director ,Post Graduate Studies, University of Moratuwa
4. Prof. Kapila C. K. Perera	-	Former Vice Chancellor, University of Moratuwa
5. Dr. Asiri Karunawardena	-	Director General, National Building Research Organisation (NBRO)
6. Dr. T.A. Piyasiri	-	Former Vice Chancellor , University of Vocational Technology
7. Dr. Tissa Meepe	-	Specialist, Water & Sanitation
8. Dr. A.M. Mubarak	-	President - Sri Lanka Association for Advancement of Science (SLAAS)
9. Dr. Rohan Karunaratne	-	President- CIOB, Ex-officio member
10. Eng. Rohan Tudawe	-	Chairman - Tudawe Brothers (Pvt) Ltd
11. Eng. Walter Perera	-	Managing Director - Frigi Engineering Services(Pvt) Ltd.
12. Eng. Saliya Kaluarachchi	-	Secretary- CIOB, Ex-officio member

The Committee mainly advises on:

(a) Operational guidelines, product categories, and respective product environmental criteria;

(b) The CIOB-GMS application and assessment mechanisms;

(c) Approval or disapproval of CIOB-GMS applications; and

(d) Issues in connection with licensing, product certification, and/or revoking the use of the CIOB- GMS label.

The CIOB-GMS Technical Panel

The Technical Panel comprises scientific and technical experts from universities, laboratories, environmental disciplines and the Industry who are invited/ appointed on the basis of their technical excellence and experience.

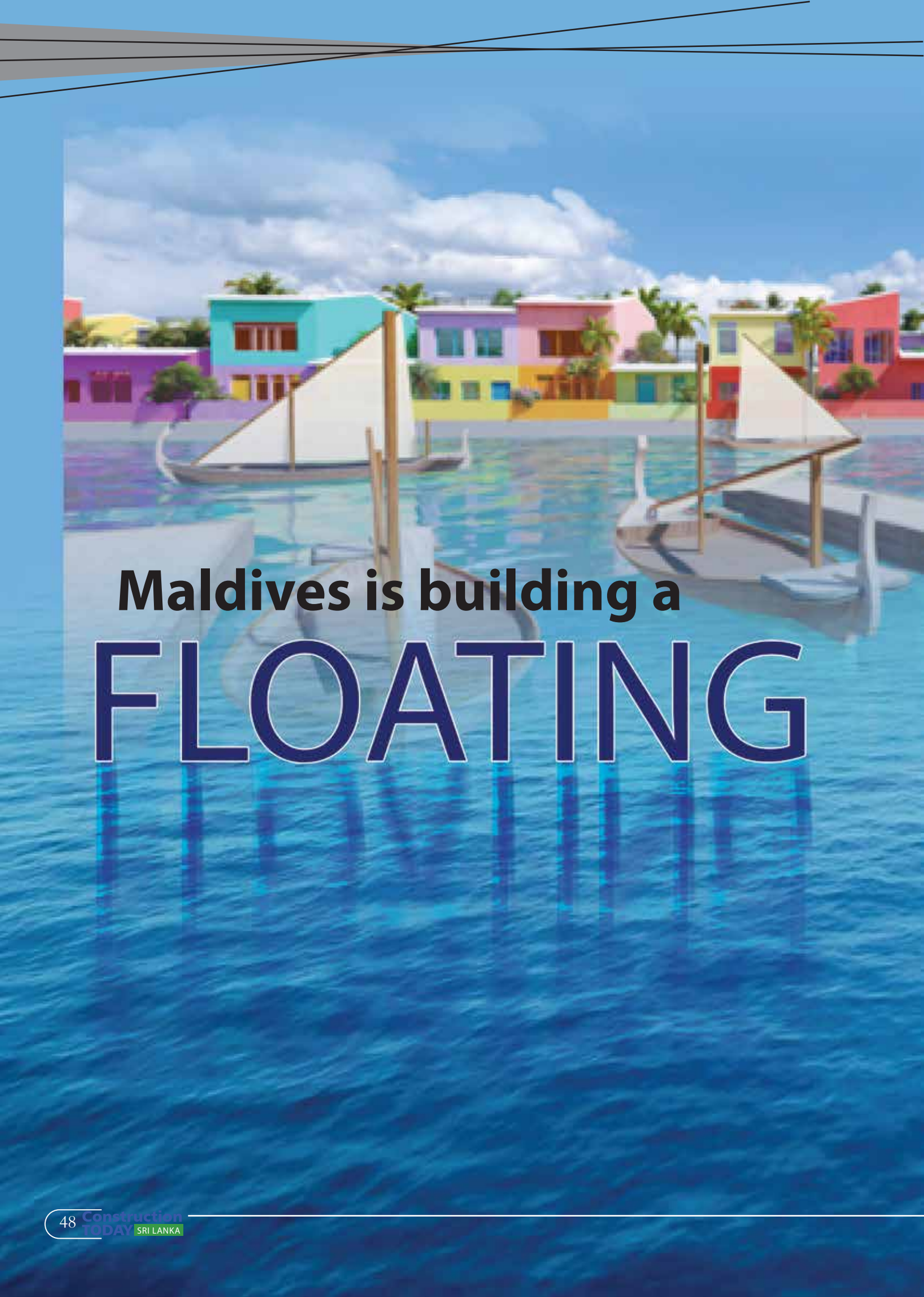
Members of the Technical Panel undertake the task of reviewing and making recommendations in regard to the applications received for certification, conducting their evaluations including site/ factory visits etc. In the process, all relevant information as the Technical Panel deems necessary to carry out their tasks are furnished to them. CIOB will appoint members of the panel consisting qualified Green Auditors.

Participation of the Industry

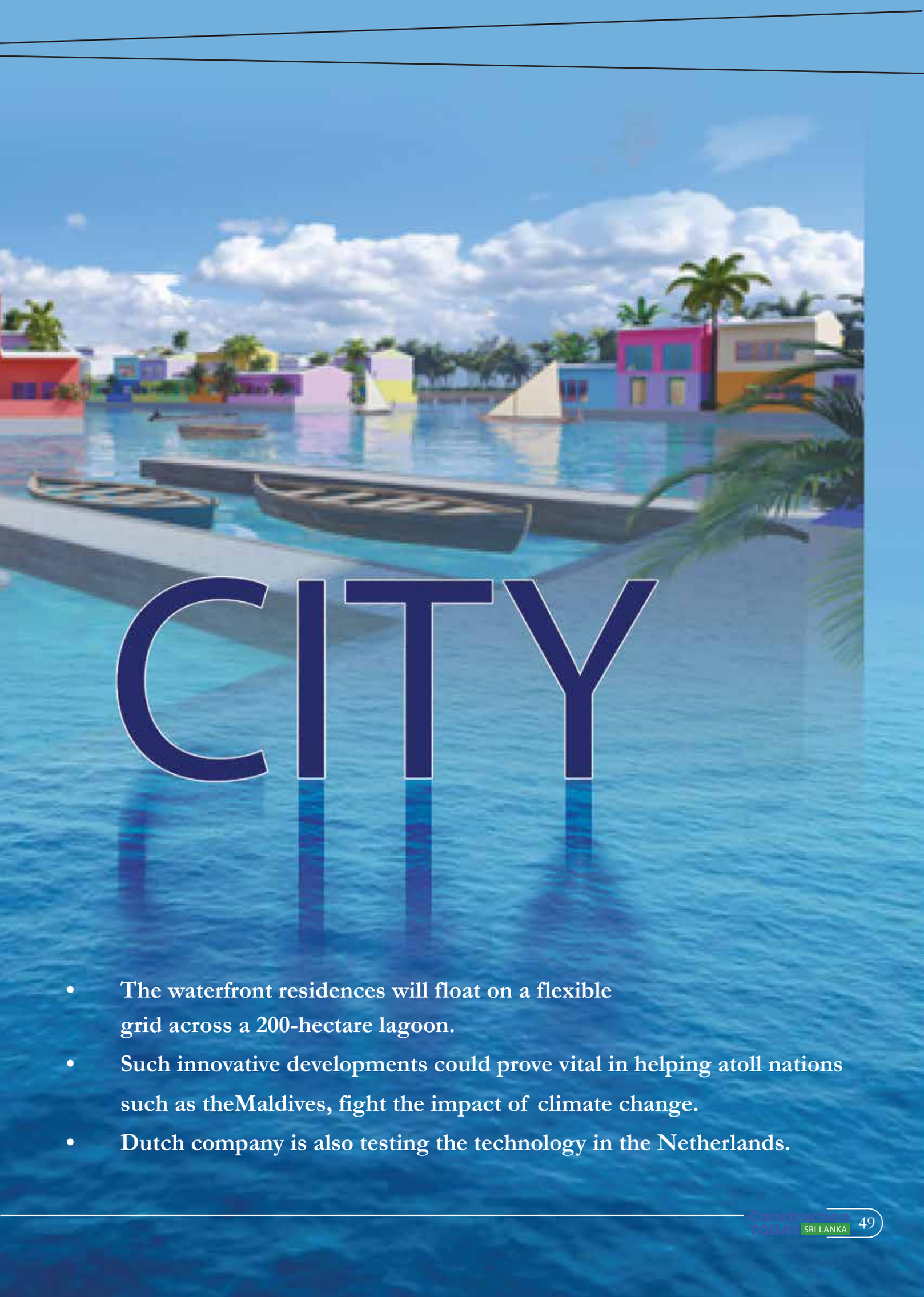
Since the industry's participation in the CIOB-GMS is conducive to the success of its implementation, relevant industrial associations in Sri Lanka have been invited to support the Scheme through:

(a) Providing opinions and suggestions on various aspects of CIOB-GMS such as the establishment of product categories and the associated criteria, application procedures and assessment mechanism from the industry's perspective; and

(b) Promoting the CIOB-GMS to local industry members.



Maldives is building a FLOATING



CITY

- The waterfront residences will float on a flexible grid across a 200-hectare lagoon.
- Such innovative developments could prove vital in helping atoll nations such as theMaldives, fight the impact of climate change.
- Dutch company is also testing the technology in the Netherlands.

The atoll nation of Maldives is creating an innovative floating city that mitigates the effects of climate change and stays on top of rising sea levels.

The Maldives Floating City is designed by Netherlands-based Dutch Docklands and will feature thousands of waterfront residences and services floating along a flexible, functional grid across a 200-hectare lagoon.

Such a development is particularly vital for countries such as Maldives – an archipelago of 25 low-lying coral atolls in the Indian Ocean that is also the lowest-lying nation in the world. More than 80% of the country's land area lies at less than one metre above sea level – meaning rising sea levels and coastal erosion pose a threat to its very existence.

Sustainable design

Developed with the Maldives government, the first-of-its kind "island city" will be based in a warm-water lagoon just 10 minutes by boat from the capital Male and its international airport.

Dutch Docklands worked with urban planning and architecture firm Waterstudio, which is developing floating social housing in the Netherlands, to create a water-based urban grid built to evolve with the changing needs of the country.

Maldives thrives on tourism and the same coral reefs that attract holiday makers also provide the inspiration for much of the development.

The hexagon-shaped floating segments are, in part, modelled on the distinctive geometry of local coral.

These are connected to a ring of barrier islands, which act as breakers below the water, thereby lessening the impact of lagoon waves and stabilizing structures on the surface.

"The Maldives Floating City does not require any land reclamation, therefore has a minimal impact on the coral reefs," says Mohamed Nasheed, former president of the Maldives, speaker of parliament and Climate Vulnerable Forum Ambassador for Ambition.

"What's more, giant new reefs will be grown to act as water breakers. Our adaptation to climate change mustn't destroy nature but work with it, as the Maldives Floating City proposes. In the Maldives, we cannot stop the waves, but we can rise with them."

Affordable homes

The islands' seafaring past also influenced the design of the buildings, which will all be low-rise and face the sea.

A network of bridges, canals and docks will provide access across the various segments and connect shops, homes and services across the lagoon.

Construction is due to start in 2022 and the development will be completed in phases over the next five years – with a hospital and school eventually being built.

Renewable energy will power the city through a smart grid and homes will be priced from $250,000 in a bid to attract a wide range of buyers including local fishermen, who have called the area home for centuries.

Rising sea levels

In March, the UN's World Meteorological Organization (WMO) warned that oceans were under threat like never before and emphasized the increasing risk of rising sea levels.

Around 40% of the global population live within 100 kilometres of the coast.

WMO Secretary-General Professor Petteri Taalas said there was an "urgent need" to protect communities from coastal hazards, such as waves, storm surge and sea level rise via multi-hazard warning systems and forecasting.
Atoll nations are even more at risk than other island-based countries, with the Maldives one of just a handful – alongside Kiribati, Tuvalu and the Marshall Islands in the Pacific – that have built societies on the coral-and-sand rims of sunken volcanoes.

So-called king tides – which can wash over parts of habitable land – and the storms that drive them are getting higher and more intense due to climate change.

Connecting communities for ocean resilience

The World Economic Forum, Friends of Ocean Action and the UN Secretary-General's Special Envoy for the Ocean will explore how to take bold action for a healthy, resilient and thriving seas during the Virtual Ocean Dialogues 2021 on 25-26 May.

The online event will focus on the vital importance of mainstreaming the ocean in global environment-focused forums and summits – from climate and biodiversity, to food and science.

Courtesy : World Economic Forum

HOME LANDS SKYLINE

INNOVATION AND EXCELLENCE

Sri Lanka's Best Property Developer,

Home Lands Skyline was assigned a National Long-Term Rating of A(lka)/Stable by Fitch Ratings.

Home Lands Group is the largest residential real estate solution provider in Sri Lanka, owning 45% of the market share. CIDA has certified Home Lands Skyline (Pvt) Ltd and Home Lands Holding (Pvt) Ltd as the Highest-Grade Property Developer with LB1 and L1 status. Home Lands was recognized as the Most Preferred Brand in the Residential Real Estate Sector as per the recent Brand Health Survey by RIU. Also, Home Lands Skyline (Pvt) Ltd was awarded as the Best Developer in Sri Lanka by PropertyGuru Asia Property Awards in 2021. Moreover, Home Lands Skyline was assigned a National Long-Term Rating of 'A(lka)' with a Stable Outlook by Fitch Ratings.

Home Lands Skyline was assigned a National Long-Term Rating of 'A(lka)' with a Stable Outlook by Fitch Ratings which is a reliable international agency

that is located in more than 30 countries and controls approximately 15% of the ratings market. This credit rating reflects the company's expanding market position in its markets and healthy financial profile supporting its growth plans in the medium terms. Home Lands Skyline provides its investors and customers a firm assurance of the company to act in their best interest before arriving at their investment decisions.

Home Lands Group is the largest residential real estate solution provider in Sri Lanka, owning 45% of the market share. It is known for its exquisite land plots and opulent residential spaces aimed at the local and global masses. Home Lands Group was founded in 2003 and marked an era of exceptional growth in the residential real estate industry. Currently, the company comprises nine (09) well-established companies which make it a 360 -degree total solutions provider, and is the undisputed leader in the residential real estate sector in Sri Lanka..

Home Lands Skyline was awarded the deserved title and the most prestigious award in the residential real estate sector of 'Best Developer – Sri Lanka', proving its position as Sri Lanka's No. 1 property developer at the Annual PropertyGuru Asia Property Awards 2021. When the ceremony night ends, the company had received six other awards which was a magnificent triumph to be recognized amongst the 135 companies which were in contention for this year's regional accolades.

As per the recent RIU brand health survey, Home Lands was recognized as the Most Preferred Brand in the Residential Real Estate Sector and the No.1 Brand with the Highest Brand Awareness among local prospective customers and the diaspora. This is merely because of the virtue of bringing stylish and modern residential solutions to their valued customers coupled with outstanding customer service.

According to Neilsen, 85% of customers trust recommendations from family and friends over any other type of advertising. As per the RIU study, Home Lands Group was rated No.1 in potential brand referrals and No.1 on 'Top of the Mind Recall'.

In addition, CIDA has certified Home Lands Skyline (Pvt) Ltd and Home Lands Holding (Pvt) Ltd as the first real estate companies in Sri Lanka with the Highest-Grade Property Developer (LB1 and L1) status, assuring the company's strength and the capability in construction to all its stakeholders.

Home Lands Skyline claims to develop the Largest Residential Real Estate Development in Sri Lanka which is the Canterbury Golf Resort Apartments and Residencies project, which is South Asia's 1st Golf Resort Apartments project. The project features a lavish array of Victorian-architecture inspired Golf View Apartments. The project extends to 55 acres and consists of 1200 residential units with over 50 amenities.

Santorini is Sri Lanka's 1st Theme Park Style Resort Apartment and Residencies project, which is a gated community of 396 residential units built on 17 acres of land in a prime location in Negambo. It offers apartments and residencies complex based on the architectural designs of Santorini with a Theme Park, bringing a touch of Greece Architecture to the city of Negombo. Fitness Park, Kids Park, Water Park, Green Park, Community Park, Food Park, Entertainment Park, Game Park, and Wellness Park are among the 9 theme parks offered by Santorini Apartments & Residencies. This project is organized into four zones: Entertainment & Shopping Zone, Activity Zone, Diplomatic Zone, and Housing Zone.

Home Lands Skyline was the first real estate company in Sri Lanka to implement the Blue Ocean Strategy in the residential real estate sector and came up with the novelty concept of Resort Apartments. Home Lands Skyline is transforming the dynamics of the residential real estate industry innovatively with this concept. Ariyana was their 1st Resort Apartment Project, and it was successfully completed in March, 2021 with 344 residential units expanded on 11 acres of land.

Continuous observation of market traits helped the company to understand the needs of resort apartment complexes. Our continuous research and developments identified the need of the Colombo commuters to reside in a residence that is calm and quiet yet close to the metropolitan city.

Through completing over 550 lands projects and over 3500 apartments as well as individual housing projects, Home Lands believes to be

etched their brand name in peoples' minds. This relationship they built with people ever since 2003 is now being reflected and reinforced through the industry studies and awards.

Implementation of the 'Blue Ocean Strategy' has opened a new market space resulting in the emergence of 'Affordable Luxury', which helped Home Lands Skyline to increase the buyer value and lower cost at the same time. Moreover, Home Lands Skyline focuses its sustainability through Triple Bottom Line, i.e. 3Ps. The company gives due attention not only for Profits but also for People and Planet. Home Lands Skyline Developments distinguish from other development by their great attention to the environment. Also, the company focus on employees, social health, societal well-being, and quality of life. Attention is given to prime locations, in addition to allowing their customers to live with everything on their doorstep – supermarkets, schools coffee shops, stunning views, great architecture, nature-loving environment, allowing natural light to fill the home are included in our intriguing residents' facilities. Resort Apartment projects are blended with nature and it increases residents' moods, feels warm energy through their home, and multiplies their satisfaction levels.

As a result of Home Lands Group being comprised of fully integrated subsidiary companies providing different real estate related services, it has higher efficiency, consistency, and speed which build the confidence of their customers in the company's real estate developments.

When focusing on the need for residential real estate, one of the critical factors to consider is the current population and urbanization. The expected population in the country is expected to reach 24 million by 2030, and a 0.39% increase in the year 2021 alone. Sri Lanka's current rate of urbanization stands at 1.22% and is expected to rise by 3% - 4% per year. Colombo District has the highest population density of 3,512/km^2, and it is constantly growing. 28% of the total population is located in the Western Province, which is equivalent to 6% of the total area of the island. Therefore, demand for residential real estate is growing as Sri Lanka requires around 100,000 units per year to close the housing deficit by 2030. However, only 25,000 units are being built each year. The annual real estate market report of the RIU 2020/21 demonstrates that the industry operated with tenacity and perseverance over the previous year despite the economy's exceptional problems. Moreover, the studies revealed that over the next 2-3 years, Sri Lanka would experience an undersupply of residential real estate assets, and real estate would become a seller's market due to the post-COVID-19 demand surge. However, this would be a limited opportunity which is expected to continue until mid-2023.

Despite the challenges in the prevailing business environment, Home Lands Skyline remains confident in the residential real estate industry and looks to invest in new concepts leveraging its extensive experience in the industry. They maintain the newness of each project and they excel at creating exceptional buyer value while creating favourable investment opportunities even in an uncertain market. The year 2022 seems another winning year for Home Lands Skyline as they come up with another splendid project in Wadduwa, Sri Lanka. It seems they keep on marking that they are the Undisputed Market Leader in the Residential Real Estate Sector in Sri Lanka.

A voice from yesterday to today for tomorrow

- up close and personal with the legendary Engineer Mr. M. K. D. Abeyapala

- By Shanika Gamage -

"We shape our buildings, thereafter, our buildings shape us" – Winston Churchill

The development of humans has always gone hand in hand with the development of the construction industry. Learning to shape stones and the discovery of the wheel and fire had significant consequences to the humans. Basically, the history is written by the builders of certain areas on the buildings they built. May it be the Mayans, the Incas, the Aztecs, the Egyptians or the Helayans of the old Sri Lanka, if you want to learn about the history just look at the old buildings. Some of these buildings are as old as the civilization itself and still stand tall to tell their story. Just imagine how well these buildings must have been planned, designed, and executed for them to survive the test of time. The tourism industry in most countries is thriving today thanks to these old builders and their work.

It is often said that these great structures were built using forced labour or slaves by the rulers of the period. Many evidences can be put forward pro or against the argument, but whatever the case in other part of the world the following shows that this was not the case in this country. The Lohaprasada or Brazen Palace (Lowamahapaya) of Anuradhapura was first built in the reign of King Dutugamunu in the second century B.C. We have a most detailed account of building this marvellous structure in "Mahawamsa". It says that the King decided to pay the workmen and before beginning deposited eight lacks of money. Thousand suits of clothing, vessels filled with honey and sugar at four gates for the use of workers. The palace rose to a height of nine stories (later reduce to seven stories). Each story contained hundred apartments. This shows that they have planned, designed, and made a cost estimate. The king has approved and deposited the estimated amount in advance. They kept accounts of expenditure, provided work cloths (100 suits) as part of health and safety measure and provided some forms of food as a welfare measure. Does this not look similar to what happens in any construction project today?

Apart from the building of major structures, during his 24 year reign King Dutugemunu built and maintained in 18 different places, hospitals for the infirm. Records on the building of Ruwanwelisaya also shows that he maintained the principle of paying the workers employed in all works carried out during his reign.

Another aspersion was that the Sinhalese builders constructed the structures especially the dagabas on insufficient foundations and this too had been proven untrue as mentioned in "The lost cities of Ceylon" by G.F. Mutton (1919). "The shaft sunk at Abhayagiriya which revealed brick to a depth of 26 ft and was founded on a bed of concrete. As a matter of fact these solid erections with their tremendous weight could never have stood through the march of time as they have done had they not been well and truly laid with foundation extended to resist lateral as well as the direct vertical thrust."

This goes to show the construction industry had maintained good standards and work practice during the period of the Kings who reigned even before the beginning of the Christian era.

Sri Lanka had a sustained and thriving population up to the 12th century. By the time the Portuguese came in the 15th Century much of the country has been depopulated, old cities abandoned and rover run by jungles, with that much of the good practice and methods used in construction too have perished.

Portuguese and more so the Dutch who came in 1656 tried to develop the maritime provinces under their control, but it was only after the British taking the Kandyan Kingdom in 1815 the country became united under one administration and the public works were taken up in all areas of the country.

The construction work under the new administration was carried out according to British standards and Code of Practices and whatever left as traditional practices gradually went out of use.

When the entire country came under the British administration the population of the country was around 960,000 people and was concentrated on an area of about 1.6 million acres (727272 hectares) and the main crop cultivated was paddy. The cultivation of spices other food crops too were popular but paddy came first mainly in the kandian areas. In fact, the maritime provinces according to British records have been importing rice for maritime provinces at the time they captured the Kandian kingdom, from which one can assure that the Kandyans were self-sufficient in rice.

With the failed uprising of Kandyans in 1917 British destroyed much of the tanks and irrigation works .of the Kandian Kingdom, especially that of Uwa Wellassa areas and planted coffee and other cash crops on the land taken over from the Kandyans making the rulers to import rice for upcountry population as well. By 1845, coffee became the main plantation crop. Plantation became the main industry. Europeans and low country planter flock to upcountry to take up coffee to plantations by plantation. Indian workers were brought to work in the estates.

Red spot decease destroyed the coffee in 1872. Tea and Rubber were introduced which could grow even higher and lower altitude than coffee. While foreign planters were concentrating on tea and rubber, local planters extended the coconut plantations from Dondra to Chilaw and Jaffna to Batticaloa areas. The Construction Industry played only a supporting role plantation industry by constructing the infrastructure necessary for the plantation industry such as road , railways tea and rubber factories and the housing but most of the unite were either manufactured or fabricated abroad and brought here to assemble on site.

When Sri Lanka gained independence in 1948 the population in the country was around 9,300,000 people and the rice requirement for the country in 1954 was 500,000 tons but the country's production was only 400,000 tons. So the new Government made the paddy production as their main priority to make the country self-sufficient in food especially in rice

It was noted that out of total land area available only around quarter of the land (out of16 million acres only 3.5 million acres) were already cultivated. The Government Land utilization committee reported that further 3,225 million acres were rendered irrigable by gravity, so the Government adopted the policy of bringing large areas under paddy cultivation and continued to irrigate vast areas of land for paddy cultivation establishing large multipurpose development projects like Gal oya project to produce rice and

hydro-electricity etc. At the same time to improve the energy requirements the projects like Lakshapana to produce electricity etc were also carried out.

That gave a tremendous boost to the Construction Industry and the inherent short comings became acute problems to the industry The country was in short of all technical grades from engineers down to the skilled personal, not much of material for construction was produced in the country, practically all construction machinery was imported and above all there were no established contractors to take up complex construction projects.

Under the colonial administration, construction most work of each department was carried out by direct labour or by the Public Works Department. Personnel needed were trained mostly within the department including technical grades and for what cannot be trained suitable candidates were hired from abroad. The training of craftsmen within the department sort of an apprentice trainee system.

The system continued for few years after independence. The thinking of the time was that the construction work under the under the department system was expensive; time taken to complete work was too long, the system was not transparent enough and encourage corrupt practices. Also they are not geared to take up large complex projects. To overcome these difficulties new organizations were created to expedite work including the construction work. The first of such corporations was the Gal Oya Development Board (G O D B). Most departs had training canters to train their middle grade technical officers. Following the example GODB also started a Technical Training Institute (TTI) at Amparai to train its technical personal requirements.

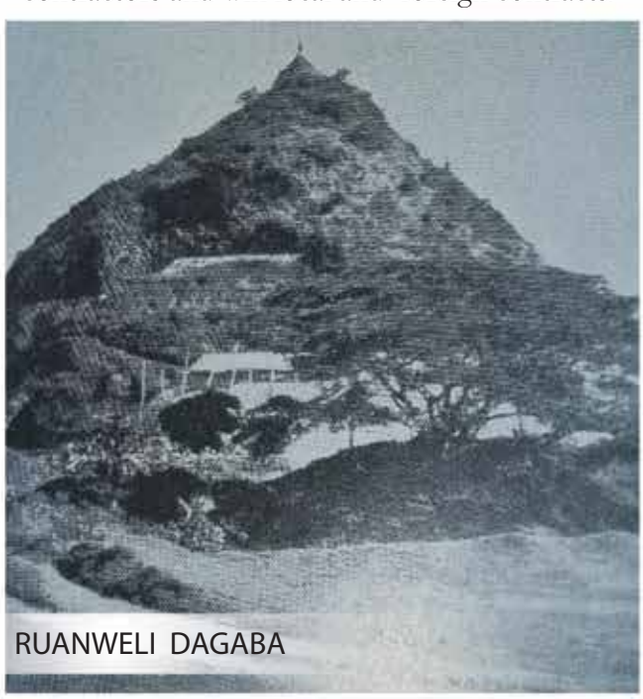
My career in construction industry started in nineteen fifties as a trainee at TTI and as I remember the morale of the industry was high and everyone took pride in their work, the comradeship among all workers was very high. Generally, work was done as for the specification and work was completed on target

To overcome the shortage of technical personnel and skilled craftsmen successive governments introduced development measures which lead us to the position that we have today. However, the problems existed in 1960 are still bugging the construction industry today.

Industry today is short of trained personnel of all grades and not much of construction material produced within the country except crush rock, sand, and bricks, still most of the material needs and the machinery needed are imported to the island. There were so many solutions brought forward by so many specialists, but we have not achieved the expected results. Is it not time to investigate where we went wrong?

The construction of the Gal Oya Dam was the first major project started by the new government; the country had no contractors to take up such a complex project, so this was given to a foreign contractor. Subsequently, most down-stream work was done by Gal Oya Development Board by direct labour. At that time, measures were taken to build up the availability and the capacity of private contractors in the country. Even though the contractors are utmost important member of the construction industry, it appears that the authorities and the public were reluctant to recognise and appreciate their role they play in the industry.

Though we have contractors to take up medium scale projects but the authorities seems reluctant to take step to promote or improve capabilities of the local contractors .Every one concern should help local contractors to improve to the standard that they could compete with international contractors and win local and foreign contracts.



RUANWELI DAGABA

To train technical personnel and skilled craftsmen there is a large number of training institutes or technical collages established all over the country. In 1950's there were only two universities; two or three technical collages and some departments had their own programmes, to train their officers

With all measures taken by various governments, should we not ask ourselves why we are at this position today, still short of technical personnel of all grades, short of skilled craftsmen, importing most material and machinery and foreign contractors are winning the bulk of the contracts? The government various times took several initiatives to improve the condition of the construction industry which would have had benefited the industry in a big way had it been implemented properly. Somehow, it has become a practice now that any noble idea is planned without studying the details and make a mess at the implementing stage resulting either abandoning the project half way or not achieving the expected result at all.

Some countries use the specification and the condition of contract to promote their own products and local contractors.

There are certain clauses that could be introduced to bring in the desired results one such is the introduction of the form call Collusive Tender Certificate which has to be filled and signed by all tenderers.It says that the Tenderer has not had communicated or had any dealings with any other person involved in the preparation of the tender other than the person calling the tender to discourage any corrupt practices.

Some have a clause to say that all foreign contractors must have a local partner to apply for the particular contract or employ a given percentage of local personnel.

On subcontracting ,a clause to say that the main contractor must carry out a certain percentage (about 60%) of the work by themselves thus preventing the practice of subcontracting all the work keeping a substantial profit for himself.

The clause that limit the number of times a contract can be sublet, is introduce to stop the practice contractor dividing their part of the contract yet again into smaller portions and subcontract to a smaller contractors. This is to prevent the the contractors diluting the quality of the materials used and the workmanship in search of profit and ending up with a substandard finished product.

My opinion is that these should be included in all government contracts if we are to improve efficiency of the local contractors but the contractor too must play fair on their part

For example, few years ago a non-government organisation involved in construction sector, organized a group of top-level contractors and government corporations to form a consortium to tender for a hydro-power project. The project involved the construction of tunnels, the power-house a rock fill dam and other structures. Unfortunately, none of the contractors in the consortium had the experience of building rock fill dams for the consortium to satisfy the prequalification requirements. We knew there was no other corporation or contractor in the country who can fill the gap, so decided to get an Indian company with required experience to join us.

Few years prior to the incident, Sri Lanka built several Rock fill Dams under the accelerated Mahaweli project and they were all built by foreign contractors without any participation of local contractors. Had there been an opportunity for local contractor to work with main contractors of these projects the situation mentioned above would not have happen.

The second point that came out with this tender is concerning the competitiveness of local constractors. It was agreed in advance that if we win the contract to break the contract and give eato section and give each section to the partner who has the most experience in that work, to prepare the tender for that part of the work. So the tunnel works to one company, power house to another etc. The Indian partner suggested that we call similar tender from Indian companies with the promise if we won the contract and if their tender is the most suitable for said work, they will be given construction work of that section. In the rate analysis, it turn out to our surprise that the rates given by our companies were higher than the Indian companies in wide range of items.

Anyway, we lost, and the contract was awarded to a Chinese company. But the point is that why the local companies' rates are are so high and where can they improve to become competitive. Maybe they have a problem of efficiency of their workforce or maybe they are looking excessive profits. It is up to the loc companies to improve and to be more competitive. Construction work is a lucrative business and competition to get works is very high in any part of the world.

To Page 60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Competition becomes sharper according to the complexity of the work the competitors resort to various tactics to win contracts some even bring various outside pressure on the authorities awarding the contract. If our construction industry is to prosper all stakeholders must understand nature of their business and act in a fair manner in all sectors without looking for short term profit as individuals or companies.

Medium and small-scale contractors in the house building sector or on property development sector receive investment from the private individuals or companies. Unlike the government sponsored large projects there seems to be no organized procedures specially when it comes to small contracts.

There is no system where public can get information about possible contractors or a proper procedure to police the work so the people have to go through a various contact to get a contractor some ending up with rouge contractors. Many such people are unofficial brokers. They recommend a contractor because they will get a fee from the contractor for the introduction. This system has made it possible for rouge contractors as well as suppliers to operate freely and innocent people are being cheated at every turn. Unfortunately, there is no proper system for the public to lodge complaints against such people except going to the police. Many think it is a waste of time and suffer the loss in silence.

If there is a system that provides such information, maybe operated by the Government or by a private organization where public can have free access to all information with regards to small scale contractors, it would be more profitable to all. In some countries local authorities and the contractor associations maintain such lists.

There are contractors practicing in the country that has no training at all and does not even know the basics of contract procedures. Some has no permanent workforce with then technical or otherwise, it is a one man show he hires sub contractors or workers for the job. How such people get registered as construction companies is a worrying question. Perhaps the government organization set up to register, monitor and upgrade contractors are not aware of the ground situation.

Complain made by some contractors is that there are only few opportunities to improve their knowledge and even the available opportunities are arranged during hours that are not convenient for them to attend.

Contractor is an important member of the construction industry. Having good knowledge and skill contractors is an asset to the industry. It will be beneficial to all parties if the government or the contractors' organizations could consider the problem and come up with a solution to remedy the situation. It will be a help to many small and medium scale contractors.

Successive governments have taken several measures to address the continued shortage of technical personnel including skilled craftsmen in the industry. As mentioned before at the initial stage the practice was that each department trained their own staff. and had their own training program and schools like the Gal Oya Development Board having the technical training institute (TTC) to train the technical staff needed for the Board to fulfil the .Now there are technical colleges and a stream line training programme but still the shortage exists. Training the workforce is a very complicated issue and a matter best to be left with the expert in the field to tackle.

But if this situation is allowed to continue the untrained people entering the trade as skilled tradesmen and carrying out substandard work or importing tradesmen will be the inevitable result. There is no system of registering craftsman. Most of the people also call them self-craftsman had no training at all except working as a helper to a skilled person for few weeks and they expect to be paid the salary of a skilled craftsman. The quality of their work is poor and cannot keep to time targets. Like finding a contractor, finding a craftsman too now happens mostly through contacts. This has led to a situation where middleman making good money by providing the service. Middleman gets his money from the craftsman and in turn craftsmen recover the money by putting up his rate for work.

Is it not possible to have a system to recognize the trained craftsman from the inexperienced people calling themselves craftsmen. After all, if drivers can be given a driving license to say he is a qualified to drive a vehicle why can't craftsmen be given a similar identification document to say he is qualified to do the work. It will give the persons his due recognition and will eliminate the pretenders.

The government has various organizations and institutions set up to train youth in these trades and also to regulate the standard of the craftsmen who are trained in the traditional way that is learning the work as a helper to an experienced craftsman. It here is a government organization which can test and issue certificate to tradesmen who have not followed a formal training perhaps they should look into this problem seriously. There are collages practically in every major town conducting courses in all these disciplines under the NVQ system. Then why is the shortage? Either we are not producing enough people to meet the demand or people leave the country in such big numbers that all the colleges put together can produce. The other scenario could be that though we have training institutions they are not working at all in their full capacity.

Few years ago, I was involved on an advisory capacity to an organization which had four schools to train the youth of the tsunami affected areas. They conducted courses on masonry, carpentry, plumbing, electrical wiring, and aluminium works. All trainees were 18 to 30 years and has passed 7th grade. They were trained under the NVQ systems and schools were approved by the Skills Development Authority to train youth up to NVQ Level 3 certificate.

What we noticed was that all classes were full for the first and second intake, but amount dropped sharply around the 4th intake. When it co mes to about fifth/sixth intake there were not enough students to maintain the school and had to start winding up the place. Our analysis of the situate ion was that the number dropped because there were no further students eligible to follow the course in the catchment area where students could come to the school without much problems. It must be kept in mind that majority of students who are interested in following crafts men course come from the low-income families in rural areas living away from the townships. Because of the nature of the work and the social status youth in the townships prefer less hardworking job. They would rather become a three-wheel driver than becoming a mason or a carpenter.

This type of jobs is more attractive to the young people in the rural areas and the youth of the plantation area (estate sector) than the youth of the urban areas. The schools we had were in the coastal towns. Boys and girls interested, who are in the villages that have no means to come to school on time because of the non-availability of public transport or they cannot afford the expenses needed simply gave up the idea of following a course. Then the way out for them would have been to get boarded near the school but they cannot afford the boarding fees and there are few placed that would take such students as boarders.

It may be that this is true for other schools too. Most of our training institutions are in town areas and it may be that many are not running at full capacity. Perhaps a survey would reveal the true problem. If that is the true situation quickest and easiest way to tackle is to arrange residential facilities to those who do the NVQ courses or arrange some system to pay for their boarding and other expenses and run all institutions at full capacity or even extra courses overcome the skills shortage.

Whatever the way urgent action is needed in this regard, if not it may come to a situation that the country will have to import craftsmen instead of exporting. Is it not possible for the government to provide a grant for the youth selected for these courses, something similar to Mahapola given to student doing higher studies?

The shortage of personnel in the supervisory grades is even more serious. These officers are a very important sector of the industry. Day today progress and the quality of work depend on these officers. The quality of their training and working practices need re-evaluation by the authority's responsible, if the quality of the construction industry is to be improved to meet the modern-day demands.

Using sub-standard or fake materials is one of the biggest problems in the industry. For example, a material extensively used in construction is the clay brick manufactured locally. The bricks should be produced to the standard specified by the Sri Lanka Standards Institute and should be approved by them. Unfortunately, most bricks in the market do not meet the standards in dimensions or strength or the surface finishing. General public believe that quality of these is monitored by the Standard Institute to assure the manufacturer keeps to the expected standards. It is difficult to understand, how so many sub standard materials available in the market.

Using substandard material brings uncertainty at the designing stage and the designer takes precaution in the design to give extra safety, sometimes leading to over design. This may be the reason why even a two-story building use concrete columns and beams as skeleton structure of the house making the concrete to do the work that ought to be done by bricks. This increases the cost of the work.

Take case of a brick that is ¼" short in al dimension. Then there is a reduction in volume that must be taken up with sand and cement mortar which cost almost double the cost of clay .A reduction of ¼" in all sides of a standard brick would increase cost of building of a 10 ft height and 10 ft long. 9" thick brick wall by around Rs.25, 000/- that is an increase of Rs.25 per sq.ft. Same argument is true with the improper surface finish of bricks. All irregularities have to be taken up with sand, cement, mortar which increases the plastering costs.

Brick is not the only material that does not conform to standards. Sand cement blocks, timber and lot of other items does not do any better. It is difficult to get a suitable timber section to match exactly to the specified measurements. Market is flooded with substantial or fake goods. There are rules and regulations and organization to check and control such material entering the market and yet the errand traders operate freely.

One other reasons for the cost increase of the locally produce material is multilayer system of the supply chain. By the time a material travel from the place of production to the construction site there are several middlemen involved in the process. They all take a percentage as the commission which add to the cost of the material.

Many years after Independence, our country was concentrating on large irrigation and power project.

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Reviving The Construction Industry Amidst The Forex Crisis

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They were carried out by the Government and the Government organizations or large-scale foreign contractor and projects were largely in underdeveloped areas and land use and their effect on the environment took low priority.

Construction work has now moved to the devel oped areas. Land use and the environment impact has become the most important factor and the construction industry too has to change to face the new requirement. The designers must utilize every bit of land available to good use whenever possible.

Land in urban areas carry a very high price. Authorities acquire land for the road widening scheme and construct open drains on bed side of the road. These roads have no designated foot paths. So, pedestrians use the carriage way obstructing the traffic movement. Is it not better value for money, if the drains were covered by placing concrete slabs over the drain or use concrete pipes for the drains and use that area as a pedestrian foot path, it will reduce the pedestrian / traffic conflicts, making it safer for pedestrians and increase the flow of traffic

However, when providing foot path with slabs over drains they should not be death traps like what we have in many towns. The slabs laid over drains in our roads are never laid to line and level. Having a slab jumping up a few inches without a warning or a broken or a rocking slab is a common situation in some place one often finds a slab missing altogether. The authorities who design and construct these seem to consider that foot path does not deserve much consideration. Foot paths are there for the public who does not use vehicle to get about. It is used by the children, elderly and the sick people. It is used by the people in wheelchairs and many others with disabilities who need better care than those who use motor vehicles. State of the foot path system is a good indicator how the society cares for its weaker members. The saddest thing about it is that these are been designed built and maintained by the people involved in the construction industry.

The photos are Lowamahapaya and Ruwawalisaya
taken in the year 1919 by G .E.Mitton;
he author of the book The last cities of Ceylon

The development work of the future will take place more in the urban areas with increase in dwelling place and new industries and improvements in the .statutory services needed to accommodate the increase. Many of the investment will be coming from private investors. They would expect value for money, quality of work and keeping target as planned. They would give work to those who could meet their targets. Local players must be prepared to compete with foreign counterparts and win on merit.

To say a country has a healthy construction industry, locals should be the leading players of all sectors of the industry. If planning, designing, supervising, and construction is done by outsiders how can there be a healthy local construction industry?

Apart from the problems mentioned above there are many other problems in the industry. If what is reported in paper and electronic media is to be believed giving or taking commissions, bribes, kickbacks, and favouritism seems to be prevalent in the industry. This sort of things happens in many countries more so in developing countries than the developed countries, however Sri Lanka seems to beheading fast to reach the top of the list of such countries. This image is causing damage to the industry as well as to the country in many ways It is time that everyone who involved in the constructions industry to come clean to improve the industry. This cannot be done by government alone. It would have to be a joint effort of all stakeholders of the industry especially the top officials like engineers, architects, administration as well as contractor irrespective of the status of the companies. All organizations in the construction industry must play their role to recognize and correct these problem areas. Then only we will see the true development of the country. Just because lot of buildings are being built by foreign contractors, does not mean that the country has a thriving construction industry. To have a healthy industry local players must lead in all its activities and if we are to achieve that goal everyone in the industry should accept the need to change, give up the old habits, reform and modernize in double quick time. We are still not too late!

Name: Eng. M.K.D.Abeyapala CEng. MICE (Lon) FIE (sl), Age: 86 years,
Schoolas: Pannila Vidyala. Rakwana & St. Aloysius college, Ratnapura, Technical Training Institute, Amparai (Hardy T T I). Went to the UK for higher studies.
Over 50 years as a Chartered Engineer in Sri Lanka. Worked in Gal Oya Development Board, Mahaweli Development Board and River Valleys Development Board.
In England worked with Consulting Engineers and with Local Government Service.
Experienced in Municipal Engineering over 20 years and the rest on major development works on roads and airports. Widely travelled. Worked in Sri Lanka, UK, Nigeria and Micronesia.

Digitizing & Digitalizing Construction

The time is right to set up a real digital strategy in construction. For continuous success in the years to come, it is essential to launch a real digital strategy.

The formerly so called "brick and mortar" industry is entering the digital age. The digital push is accelerating and even if construction industry players are still confused and hesitant about the change and new technologies, the time has come for them to develop a real digital strategy. Many players have created innovation labs and launched "proof of concept" (POC) explorations, often through local business unit initiatives, to test possible options and to remain open to possibilities without investing too heavily. Those local experiences are not sufficient anymore to ensure success in the future and to be on top of the wave for the years to come.

It is important to note that while the necessary digital evolution can be a threat if not approached properly, it is mainly a land of opportunities both regarding cost efficiency, as well as regarding top-line client experience improvement and offer differentiation.

Digitizing & Digitalizing

Digitize vs digitalize: Understanding the key differences between these two terms is essential when formulating a business strategy.

Digitization means to convert something into a digital format, and usually refers to encoding of data and documents.

Digitalization means to convert business processes over to use digital technologies, instead of analogue or offline systems such as paper or whiteboards.

In a nutshell, digitization refers to information, while digitalization refers to processes.

A Comparison Table

To help you more clearly distinguish between digitization and digitalization, here's a side-by-side comparison of the two concepts.

	Digitization	Digitalization
Definition	Converting analogue information into a digital form	Incorporating digital technologies into business processes and interactions
Deals With	Information	Processes & Interactions
Examples	• Scanning a document into a PDF • Scanning a photograph into a digital image file e.g jpg, png • Converting a paper form into a digital version • Turning a VHS recording into a digital file e.g. mp4 • Capturing printed or handwritten notes via OCR • Converting typed or handwritten reports into usable data	• Sending messages via email instead of by post • Chatting to someone in real-time via instant messaging instead of by phone • Meeting up with someone via video conferencing instead of face-to-face • Monitoring equipment using digital sensors instead of visual inspection • Assembling products with a robot instead of by hand
Benefits	• Faster access to information • More permanent storage of information • Access to historical data	• Efficiency & productivity gains • Greater accuracy of information • Enhanced visibility • Better decision making
Possible Tools	• Scanner • Digital Camera • Online Forms & Software • Storage & Retrieval Systems • OCR Software	• ERP Software • Messaging & Conferencing Software • Predictive Maintenance Systems • Robotics & Controller Systems • Computers, Servers & Networks

Digitalizing a Business

As a result of digitalizing a business, an amount of digitization will also occur, simply because information that was once stored in a non-digital format, is now captured in digital form as the processes are updated, so the two concepts are closely related.

The digital business that results from digitalization is generally an integrated mix of digital and physical activities, across many different channels and formats.

Some of the business activities may be automated as a result of digitalization, such as manufacturing lines or equipment monitoring, while others still require human involvement with a greater reliance on digital technology, such as online chat tools or social media management.

Digitalization is also likely to require retraining of employees, either to make use of the new technologies and digital processes, or to redeploy them into a new activity within the business.

At the end of the day, digitalization creates a business that has digital information at its core.

The Benefits of Digitalization

Digitalization may contribute to a change in business models, as new technologies provide access to ways of doing business that were previously unavailable.

A digitalized business can also generate additional evenue through the provision of additional value to their customers and access to new opportunities and markets.

Efficiency gains are another key benefit of business digitalization, with less double-handling of data and greater accuracy of work, leading to better utilization of resources and greater profitability.

Digitalization also enables better visibility of an organization's performance through real-time data capture and reporting, and this improvement in the quality of data enables business decisions to be made more quickly and with greater accuracy.

You can also look at these concepts using time as a framework, in that:

- Digitization refers to things that have already happened (i.e. information being captured)
- Digitalization is about things that are happening right now (i.e. business processes)
- Digital transformation is about what will happen in the future (i.e. businesses evolving)

Courtesy: 1. OliverWyman 2. Next Service

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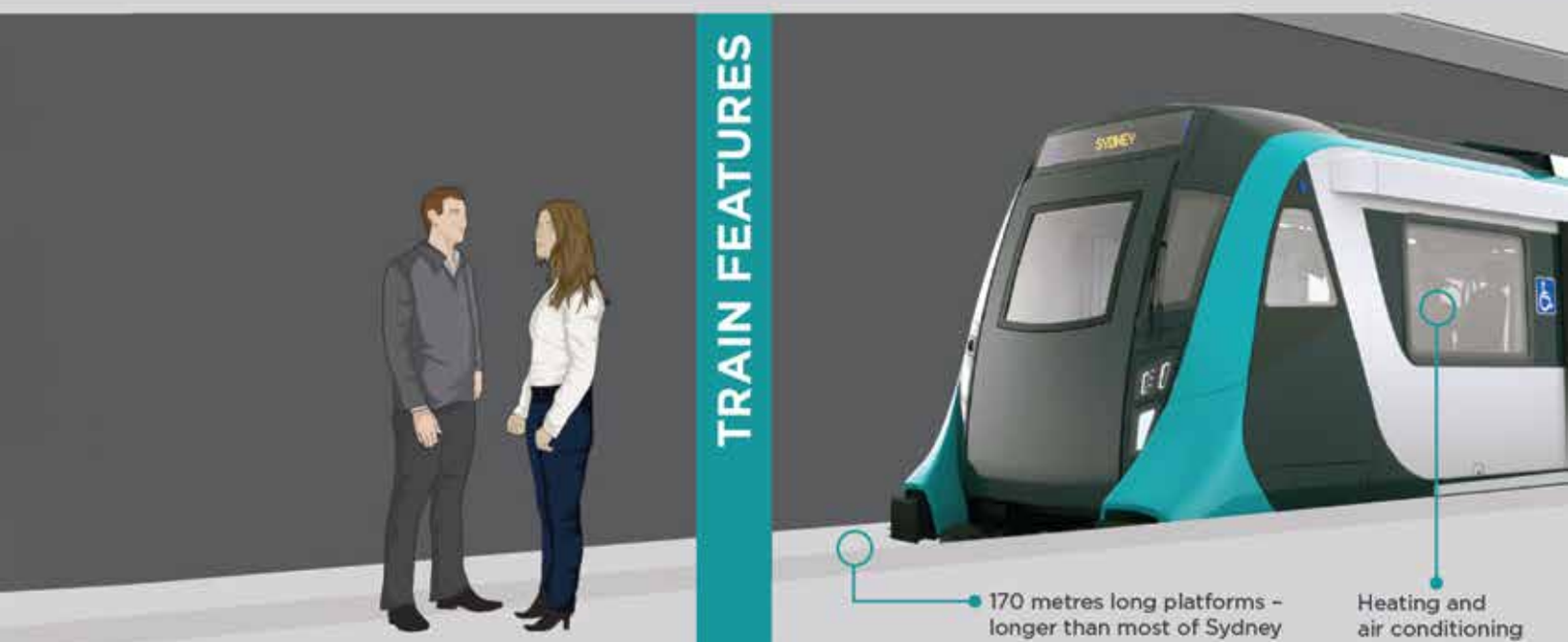


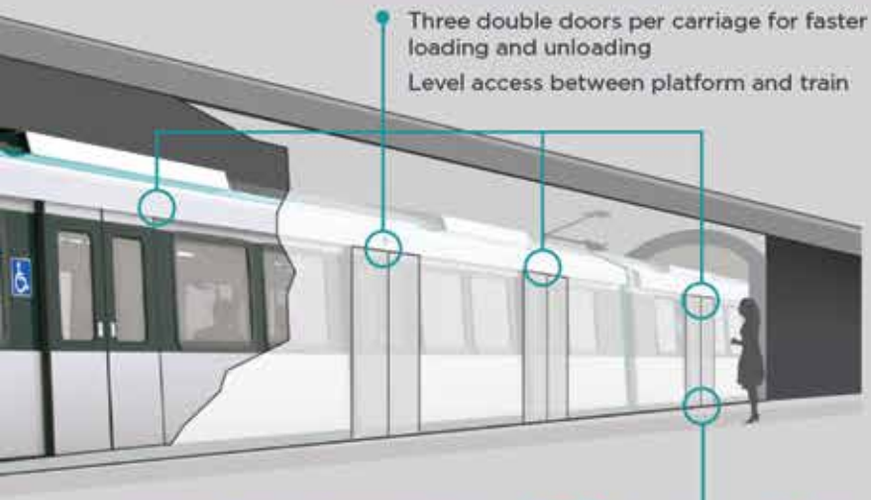
170 metres long platforms – longer than most of Sydney

Heating and air conditioning

Customer service assistants at every station and moving through the network during the day and night

ABOUT SYDNEY METRO

Sydney Metro is Australia's biggest public transport project. From the north west, metro rail is being extended under Sydney Harbour, through new underground city stations and beyond to the south west. In 2024, Sydney will have 31 metro railway stations and a 66-kilometre stand-alone metro railway system, revolutionising the way Australia's biggest city travels.



Two multi-purpose areas per train for prams, luggage and bicycles

Wheelchair spaces, separate priority seating and emergency intercoms

Real time travel information and live electronic route maps

Inside you can see from one end of the train to the other

Platformscreen doors keep people and other objects away from the edge and allow trains to get in and out of station much faster

Chatswood to Sydenham

The Environmental Impact Statement for this project was on display in 2017 and around 560 submissions were received. The Submissions and Preferred Infrastructure Report for the Sydenham to Bankstown Metro Upgrade was on exhibition during July 2018.

Project approval was received on 10 January, 2017. Using five tunnel boring machines, tunnelling finished in early 2020 on new 15.5-kilometre twin railway tunnels between the end of the Metro North West line at Chatswood and Sydenham.

New stations will be delivered at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo, along with new underground platforms at Central Station.

Sydenham to Bankstown

Sydney Metro received planning approval on 19 December 2018 to upgrade the T3 Bankstown Line between Sydenham and Bankstown to metro standards. In 2024, customers will benefit from a new fully-air conditioned Sydney Metro train every four minutes in the peak in each direction with lifts, level platforms and platform screen doors for safety, accessibility and increased security. For more information see the Bankstown Line Metro Conversion newsletter.

The Submissions and Preferred Infrastructure Report for the Sydenham to Bankstown Metro upgrade was on exhibition until 18 July 2018.
You can view a summary of the project in the Sydenham to Bankstown Preferred Infrastructure Report Overview.

The Submissions and Preferred Infrastructure Report for Sydenham to Bankstown metro upgrade and accompanying documents may be viewed on the NSW Department of Planning and Environment website

By the end of the decade, the network will be expanded to include 46 stations and more than 113 kilometres of world-class metro for Sydney.
Metro means a new generation of world-class fast, safe and reliable trains easily connecting customers to where they want to go. Customers don't need timetables – they just turn up and go.

Technology will keep customers connected at all stages of their journey, from:

- planning at home using smart phone travel apps
- real time journey information at metro stations and on board trains
- accessing information and other public transport to help get to their final destination after they leave the train.

This approach will help customers achieve their daily tasks, whether it's getting to work, meetings, school or education, sport, a day out or running errands and of course, getting home.

Connecting Sydney

When Sydney Metro is extended into the central business district (CBD) and beyond in 2024, metro rail will run from Sydney's booming North West region under Sydney Harbour, through new underground stations in the CBD and beyond to the south west.

There will be ultimate capacity for a metro train every two minutes in each direction under the city, a level of service never before seen in Sydney. Sydney's new metro railway will have a target capacity of about 40,000 customers per hour, similar to other metro systems worldwide. Sydney's current suburban system can reliably carry 24,000 people an hour per line.

Sydney Metro, together with signalling and infrastructure upgrades across the existing Sydney rail network, will increase the capacity of train services entering the Sydney CBD – from about 120 an hour today to up to 200 services beyond 2024. That's an increase of up to 60 per cent capacity across the network to meet demand.

Project features

- An air-conditioned metro train every four minutes in the peak
- Fully accessible stations including lifts
- Improved CCTV surveillance, platform screen doors, platforms level with train floors, minimal gaps between platforms and trains
- New or upgraded concourses and new station entries
- Improved station interchange facilities
- All trains stopping at all local stations – no waiting for the right train
- Less time spent waiting due to higher frequency services
- Safe and efficient connections during the peak and non-peak periods between key centres along the T3 Bankstown Line
- Reduced travel times to key employment and education precincts
- New, direct and fast services to Martin Place, Barangaroo, North Sydney, Chatswood and Macquarie Park
- Interchanges to other rail services at Sydenham, Central and Martin Place.

Indicative timeline

Indicative timeline	Indicative construction time frame							
	2017	2018	2019	2020	2021	2022	2023	2024
Early works								
Tunnel construction								
Station excavation and structual works								
Services facility excavation and structural works								
Tunnel fit out								
Station construction and fit out								
Services facility construction and fit out								
Testing and commissioning								

Room for 100,000 extra customers across Sydney

Sydney Metro, together with signalling and infrastructure upgrades across the existing network, will increase the capacity of train services across Sydney from about 120 an hour today, to up to 200 services an hour beyond 2024.

After the conversion, metro trains from Bankstown will run at least every four minutes in the peak, or 15 trains an hour.

The metro network will be fully segregated from the existing Sydney Trains network between Sydenham and Bankstown, improving the reliability of services on the line. Interchange between Sydney Metro and Sydney Trains at both locations will be provided, with improvements to station way-finding and signage. Sydney's new-generation metro trains are designed to make customer journeys easy – from level access with platforms to multi-purpose areas for prams, luggage and bicycles and real-time travel information.

Fast, safe and reliable, the trains operate exclusively on the Sydney Metro network and are required to run at 98 per cent on-time reliability. The new train is made by world-class manufacturer Alstom. It's customised for Sydney but is based on the international Metropolis train, which is used in 25 cities including metros in Singapore, Barcelona and Amsterdam.

Sydney Metro train features

- Level access between the platform and train and three double doors per side per carriage for faster loading and unloading.
- Heating and air-conditioning in all metro trains.
- A new generation of fast, safe and reliable metro train.
- At all times, a team of expert train controllers will monitor Sydney Metro, making sure everything runs smoothly.
- Wheelchair spaces, separate priority seating and emergency intercoms inside trains.
- Continuous mobile phone coverage throughout the metro network.
- Two multi-purpose areas per train for prams, luggage and bicycles.

Environmental management

Sydney Metro has a Construction Environmental Management Framework (CEMF) that sets out environmental and sustainability management standards to help ensure Sydney Metro and its contractors comply with statutory and planning requirements.

This framework addresses the management of environmental impacts in relation to:

- noise and vibration
- traffic and transport
- local businesses
- landscape and visual amenity
- ground water and geology
- soil and water quality
- flooding and hydrology
- air quality
- waste management
- flora and fauna
- stakeholder and community involvement
- general site works
- spoil management
- visual amenity management
- carbon and energy management
- materials management
- heritage

Documents outlining how these environmental impacts are managed are accessible from the Sydney Metro document library.

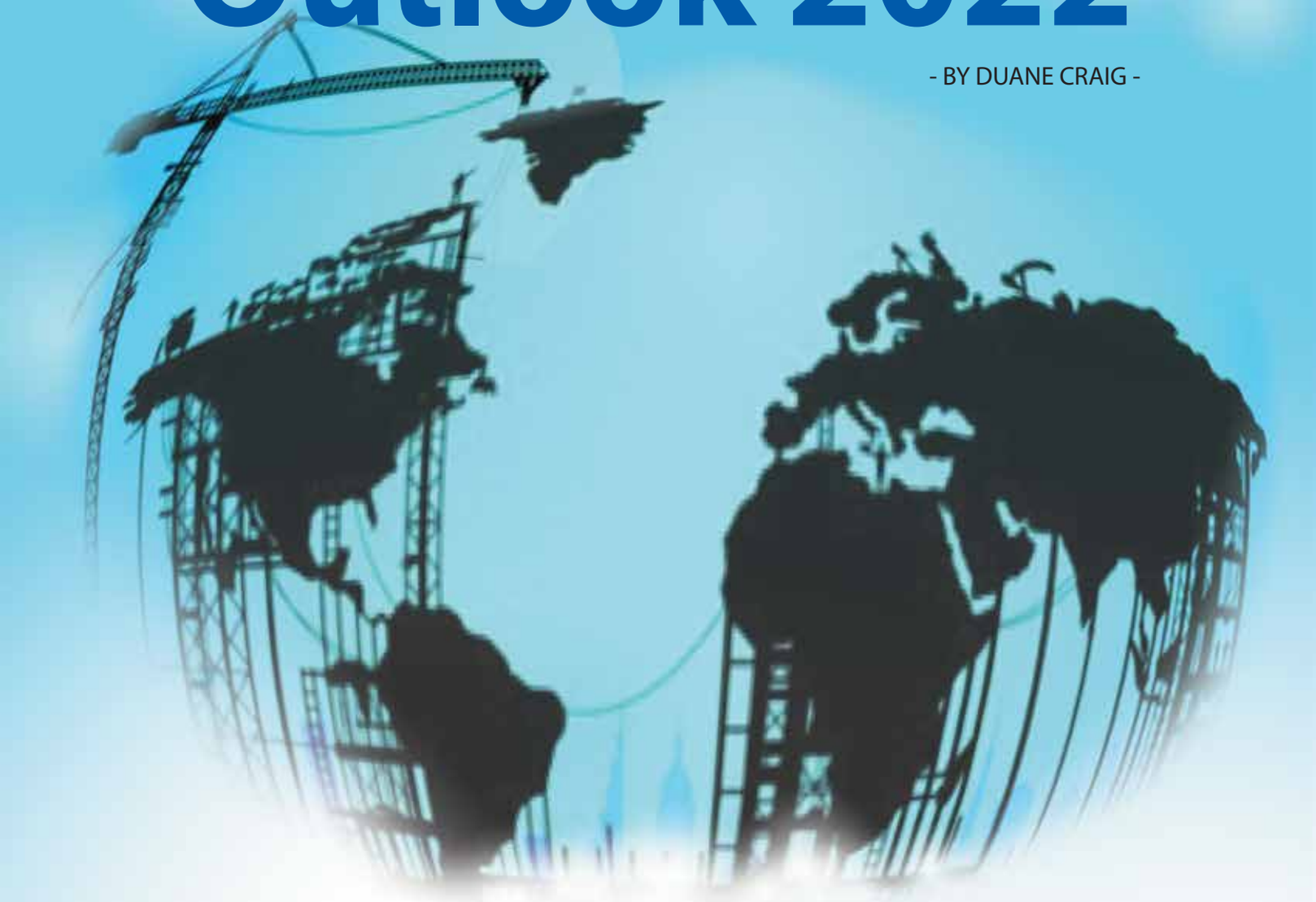
Environment Protection Licence

The program of works carried out by Sydney Metro includes scheduled activities under the Protection of the Environment Operations Act 1997 (NSW) - . Sydney Metro has developed an Environment Protection Licence (EPL) strategy to ensure the requirements of these licences are managed and met effectively-(NSW Environment Protection Authority).

Courtesy : Sydney Metro

Global Construction Outlook 2022

- BY DUANE CRAIG -



Global construction industry trends in 2022 include a generally favorable economic outlook along with some challenges that are expected to continue.

In the U.S., the American Institutes of Architects' Consensus Construction Forecast predict non-residential construction will grow 4.6% in 2022, while a 9% growth is expected in the residential sector, according to Oxford Economics and Construct Connect forecast .

Across the European Union construction will grow from 1.5% in Spain to 3% in France and the Netherlands. The average growth across the EU is projected at 2.7%, while the United Kingdom is looking at 6.3%. Construction worldwide is predicted to grow 3.7% in 2022 according to the Construction Intelligence Center, with the largest share of growth to happen in the Asia-Pacific region and China. The fastest growth is expected in Sub-Saharan Africa, including Ethiopia and Eastern frican countries.

A recent report by the Housing Industry Association in Australia warned of a slowdown in Australian residential construction

starting mid-2022, and Master Builders of Australia predicted the sector would enter negative territory next year. The red hot housing markets that have been spurred by grants for building and renovating are expected to slow down in the face of market saturation and rising costs. Master Builders also expects commercial construction in Australia to drop. In Canada, the 2022 construction growth is projected at 16.4%, with residential seeing 5.5% growth and non-residential at 23.6%.

Beyond macroeconomics and the potential effects of unknown monetary and public policies, a couple of operational trends could put a damper on the expected growth, while another trend could help minimize their impact.

Labor and Skills Shortages

On the global scale, construction faces growing labor headwinds from decades of low productivity. According to McKinsey, "poor project management and execution, insufficient skills, inadequate design processes, and underinvestment in skills development, R&D, and innovation" are the chief causes for the productivity problems.

Every area has its own culprits. For instance, the U.S. construction industry has struggled with labor problems for decades. The national emphasis on four-year college being a must for all, along with construction's reputation as dull, dirty, and dangerous, the industry's inability to establish a reliable labor pipeline, the decline of unions, and the lack of political will to promote trade education all but hollowed out potential pipeline of construction employee candidates.

Then came the great recession, political and cultural battles over immigration, and a pandemic. It's no wonder construction finds itself in worse shape than ever regarding its labor potential. Besides a numbers issue, it's also a skills and experience issue since long-term employees head for retirement.

Tech Will Help Attract New Talent

Across the world, technology is one factor that's helping uplift construction's reputation. Young people who have grown up with tech are prime candidates for the new roles in construction, such as virtual reality, augmented reality, robotics, and building information modeling specialists. The same candidates can find interesting work in scheduling, estimating, and project management, all of which have heavy tech footprints.

While robotics and autonomous machines will also see more use in 2022, there is still a great need for manual workers. The manual construction processes like finishing concrete or building frame walls still need to be done. A first step many construction companies are taking is putting a big emphasis on keeping the skilled workers they have. Whether through incentives, bonuses, pay raises, benefits, or adjusting career paths, construction companies will continue pulling out all stops to keep their people in the coming year.

Consolidation is another approach. When a general contractor buys up other trade businesses, they immediately gain greater control over the subcontractor labor portions of the projects. Mergers and acquisitions will continue in 2022 as not only a way to bolster the employment ranks but also to move into new territories or expand into other construction sectors.

Higher Input Costs

Supply chains were stretched to capacity even before the pandemic, which then multiplied the problems. Experts in the U.S. don't expect great improvement until at least 2023. The European Union projects its supply chain issues will resolve sometime in early 2022. Rising materials prices alone made Canadian reconstruction costs jump by 6.4% from May 2020 to May 2021 as contractors struggled with increased costs and shortages.

In the UK, supply chain shortages have had a disproportionate effect on small to medium-sized businesses. Australia's

decades-long manufacturing decline has left the construction industry there heavily reliant on offshore materials, creating an intractable problem for contractors and owners that's expected to continue for some time.

In the U.S., supply chain challenges haven't gone unnoticed by Congress. The current Build Back Better Act (H.R. 5376) under consideration includes $5 billion for supply chain resilience. It comprises supply chain mapping and monitoring, establishing standards and best practices, strengthening security, identifying and promoting technological advances and providing grants to support resilience. Only three percent of the money can be used for administrative purposes.

Contractors can see some benefits by moving materials and supplies conversations up the chain to owners to counter supply chain woes. By doing so during contract negotiations, it's possible to build some resiliency into the picture through creative sourcing, materials storage, owners supplying materials funding upfront and locking in owner selections far earlier than normal.

There are some other strategies to consider. Contractors may consider increasing the frequency of schedule updates, including delivery of common materials in planning, challenging contract clauses that increase risk in light of supply chain problems, limiting hard bid projects with long price lock-ins, and using contingency clauses to reduce material price volatility.

Tech Adoption Moving to the Platform

High-performance construction companies have abandoned single-point technology solutions and wholeheartedly embraced the cloud platform—that's the key learning from a recent Procore survey into construction's tech use. Those that rely heavily on manual and siloed solutions tend to underperform.

In 2022, look for more companies to adopt cloud-based construction project management and other solutions that integrate with their existing tech while involving their partners more deeply.

The global trend of using an ecosystems approach has taken hold this year. More and more firms are differentiating themselves by embracing the platform concept not just for themselves but also by including other project stakeholders. Construction firms that have their subs, their vendors, their engineering, and their design all tapped into a cloud platform are on the cusp of this major tech change for the industry. This trend will only accelerate in 2022, according to Deloitte.

Two other preeminent tech tools that will accelerate in tandem with this collaborative new paradigm are BIM and 3D modeling. These technologies are making prefabrication of components more exact so trade contractors can assemble, test and deploy larger portions of the work offsite under controlled conditions. Besides cutting costs, the goal is to improve quality and reduce rework.

While construction firms can rack up major competitive advantages by using more tech tools and automation, this requires careful investment. Running after single-point solutions that don't integrate with existing software, hardware and business processes can work to a firm's detriment in the long term.

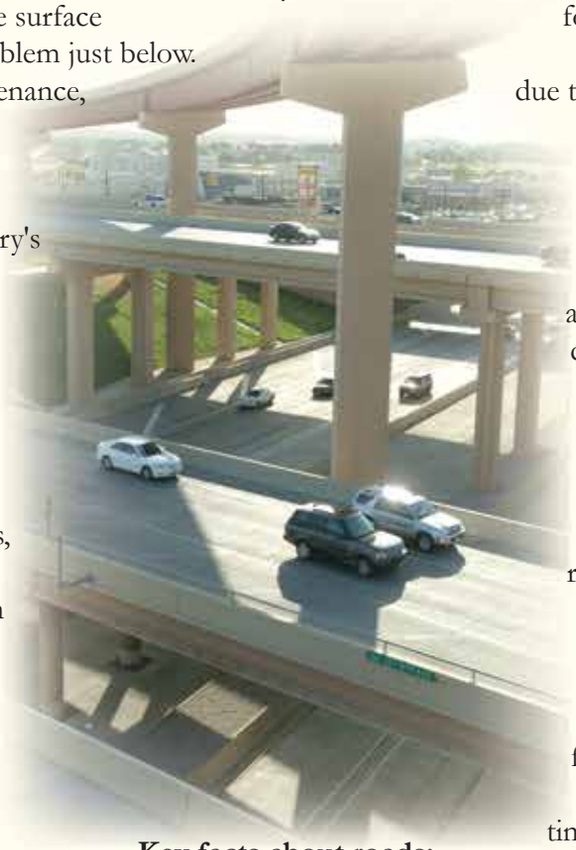
Courtesy : procore.com

Roads to Highways

Roads make a crucial contribution to economic development and growth and bring important social benefits. They are of vital importance in order to make a nation grow and develop. In addition, providing access to employment, social, health and education services makes a road network crucial in fighting against poverty. Roads open up more areas and stimulate economic and social development. For those reasons, road infrastructure is the most important of all public assets. Due to use and time, road infrastructure is becoming aged. And what looks acceptable on the surface can be hiding significant problem just below. As a result, it requires maintenance, renewal and modernization. When it comes to modernization, building highways are vital to a country's development. By linking producers to markets, workers to jobs, students to school, and the sick to hospitals, roads are vital to any development agenda. However, while roads bring economic and social benefits, they can also come with social costs such as pollution or deforestation. The difference between a road and highway is that a road is a way used for travelling between places, usually surfaced with asphalt or concrete modern roads, both rural and urban,are designed to accommodate many vehicles travelling in both directions while highway is a main, direct public road, especially a multi-lane, high speed and connecting major cities.

The word highway goes back to the elevated Roman roads that had a mound or hill formed by earth from the side ditches thrown toward the centre, thus high way. Highway construction requires a lot of energy at different levels:for the production of asphalt and cement destined topavements and excavating materials, for road maintenance, and by vehicles stuck in congestion due to poorly designed highways.

All freeways are highways, but not every highway is a freeway. A freeway is a "controlled access"highway also known as an express highway. That's designed exclusively for high speed vehicular traffic. Traffic across a freeway is carried by overpasses and underpasses. Highways can relatively reduce travel time to villages, cities and towns thereby encourage people to travel for business and trade. Highways make journeys faster, comfortable and safer than usual while at the same time reduce fuel consumption.



Key facts about roads:

The 21st century is seeing an unprecedented expansion of roads
At least 25 million kilometers of new roads are expected worldwide by 2050 - enough to circle the Earth over 600 times
90% of all road construction is occurring in developing nations, including many regions with exceptional biodiversity and vital ecosystem services
Roads penetrating into Earth's remaining wildernesses are a major driver of habitat loss and fragmentation, wildfires, overhunting, and other environmental degradation
Much road construction is chaotic or poorly planned
Not all roads are environmentally detrimental
Roads or road improvements in areas where most native vegetation has already been removed, and where farming yields are low, can help to improve agriculture and local livelihoods with limited environmental costs

Source : Global Road Map

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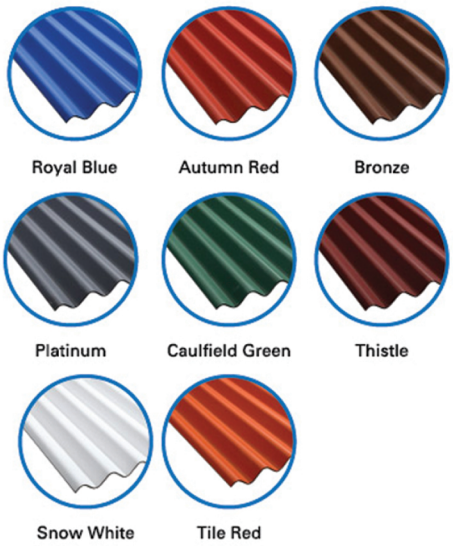

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