

Issue 13 - June - July 2023

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CIOB



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## Editor's Note

In this issue of our magazine, we delve into the transformative landscape of the construction industry in Sri Lanka, focusing on the post-Covid and post-financial crisis. The challenges brought forth by these unprecedented times have tested our resilience, but as builders, we remain steadfast in our commitment to shaping a brighter future for our industry.

Amidst the trials and tribulations, we find reason for optimism as our beloved country begins to recover and rebuild. Sri Lanka's construction sector is on the cusp of an exciting chapter, with new projects and opportunities on the horizon. The pages that follow highlight the potential and possibilities that lie ahead.

While we recognize the crucial role that the government must play in supporting local construction companies, we also acknowledge our own responsibility as industry stakeholders. The Ceylon Institute of Builders (CIOB) has been at the forefront, actively participating and voicing our concerns throughout the Covid crisis and financial challenges. However, we must not solely rely on external factors for progress; instead, we must take charge of

our industry's future by fostering innovation, adaptability, and sustainable practices.

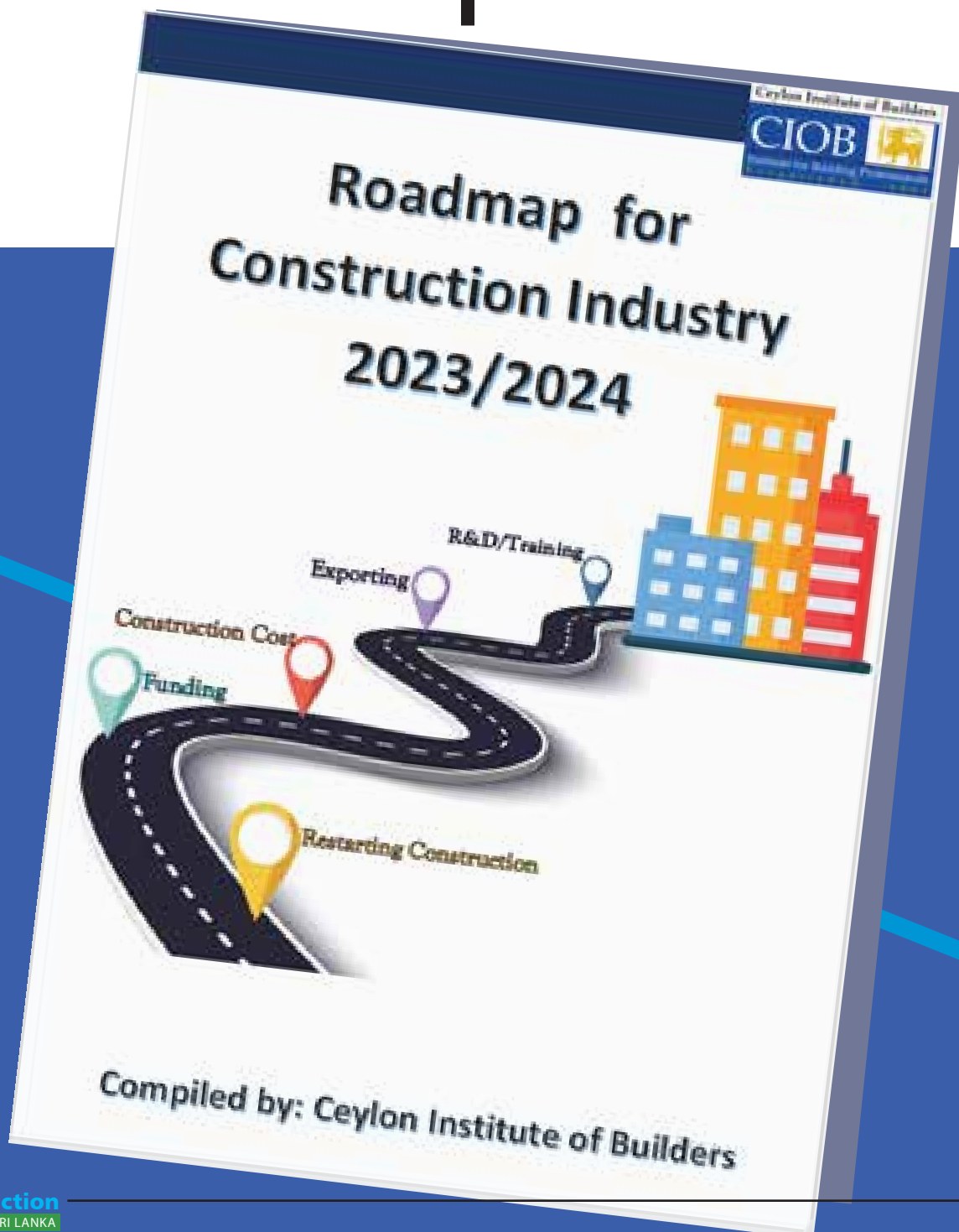
This issue emphasizes the need for positive thinking, collaboration, and a proactive approach in navigating the evolving construction landscape. We explore how the CIOB is striving to develop the industry through technological advancements and fostering a culture of continuous improvement. By embracing change and adopting forward-thinking strategies, we can position ourselves at the forefront of global construction trends.

As we turn the pages of this magazine, let us be inspired by the stories of resilience, innovation, and determination showcased by our fellow builders. Together, we can overcome the challenges that lie before us, creating an industry that not only builds structures but also fosters economic growth, job opportunities, and sustainable development for Sri Lanka.

The journey ahead may be challenging, but it is also ripe with opportunities for those who are prepared to seize them. Let this magazine be a catalyst for positive change as we collectively shape a promising future for Sri Lanka's construction industry.

# CIOB hands over Construction Sector Roadmap to The President,

Governor of Central Bank, World Bank,  
ADB, Ministry of Urban Development,  
CIDA, EDB & BOI







Left to right: Mr. Jaikish Tudawe (Vice President), Mr. Kalana Alwis (Vice President), HE the President, Dr Rohan Karunaratne (President), Eng. Saliya Kaluarachchi (Secretary), Mr Ruwan De Silva (Vice Presidents)

After a significant period of research & correspondence with all stakeholders of the construction industry, the Roadmap to re-start the Construction industry for the year 2023/24 was formulated and handed over to all decision-making bodies related to the Construction Industry.

The stoppage of construction and non-payment to contractors have led The Sri Lankan Construction Industry to its demise. This has led to the unemployment of 650,000 direct workers (many being from the poorest classes of society) and copious small, medium and large contractors to face bankruptcy, which includes over 4000 SME sector contractors and about 50 major contractors have reached standstill. This decision obliterates the development of the construction industry and halts the built environment of Sri Lanka. A key reason for this being that banks have no way of funding due to high interest rates, in spite of the fact that the government owes above Rs.200bn to contractors and the government unilaterally decided to put a hold on the construction industry.

The Construction Industry is one of the largest industries in Sri Lanka. To elucidate, it had contributed around 9.6 % to the GDP. Nearly 2.6 million stake holders including architects, engineers, contractors, suppliers, quantity surveyors and manufacturers depend solely on the Industry. This industry and its contribution to the GDP has since then fallen to a range below inflation.

## The roadmap proposed 30 action points to consider:

1. Settlement of Dues
2. Settling industry issues with banks
3. Re-commencing halted projects which are essential, add value to the economy and help economic revival
4. Price escalation
5. Refrain from encashment of securities, imposing Liquidated Damages etc
6. Encourage Funding agencies to provide a soft loan to the industry
7. Establishing an Infrastructure Development Bank/Fund
8. Fair Distribution of work
9. Foreign investment
10. Abandoned Building survey
11. Unrealistic construction cost
12. Cutting down Interest Rates
13. Issues with Regulatory Bodies
14. Re-commencing the procurement commission
15. Dealing with Unsolicited proposals
16. Create Investor Forum
17. Dispute Resolution (see Appendix 5 & core pillar 1)-
18. Help with the Labour crisis
19. Stimulate entrepreneurship
20. Research & Innovation Division
21. Sustainability
22. Export of Construction Industry
23. Recognition of Construction Sector as an Industry
24. Reduce Price point of the construction sensitive few materials
25. Calculate Construction Inflation Index properly
26. Managing Supply Chain
27. Strengthen Mineral Industry
28. Self-sustenance of authorities
29. Create Smart cities
30. Revive Energy industry



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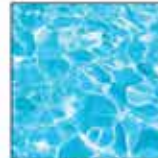
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# Impacts on Construction industry Due to The Recent Economic Crisis in Sri Lanka



Sri Lanka's economic crisis, which began three years ago, has resulted in great hardship for the people and has posed the greatest challenge to the government. Lanka is currently experiencing an economic and political crisis, which continues with high inflation and sporadic demonstrations throughout the country. The government of Sri Lanka requests citizens abroad to send home cash 13 Lankan banks have been placed on rating watch negative Sri Lanka defaults on \$51 billion in external debt. Trouble is brewing on the island paradise. There is no food available. Sri Lankans have fallen into poverty by at least 500,000 in the last few

months. There is no fuel, no medicines, and critical surgeries are being cancelled. According to doctors, the economic crisis may cause more deaths in Sri Lanka than COVID did. The construction industry is a major contributor to the economic development of Sri Lanka. However, it faces significant challenges and difficulties which are unique to the specific industry. Therefore, it is a vital role to recognize them and offer solutions. This paper is focusing “The challenges” faced by Construction Industry and identifies the “Motivators” “which can play the key roll to overcome the current challenges faced by Construction Industry.

## 1. Introduction

Various factors contribute to the current economic crisis in Lanka from 2019 to 2022. Such factors include economic mishandling, a rise in foreign debt, diminishing foreign reserves as well as a diminished currency and the rising prices. Apart from tax reductions, money creation, and national policy shift towards organic and biological farming, there were other factors like the Easter bomb attacks, and the effect of the (COVID-19) virus which added to the crisis. Coalition government has lost its majority with March-April 2022, and political unrest has risen, including their resignation from ministerial posts. After a fall in output as well as a shortage of food, switching to organic agriculture has been reversed. Sri Lanka was set aside for a sovereign default as the outstanding foreign exchange reserves would not be enough to meet the country's external debt obligations in 2022.

It has been documented that the construction industry is being faced many problems and challenges. In developing countries, these problems are compounded alongside a general situation of socio-economic stress, chronic resource shortages, institutional weaknesses and a general inability to deal with the key issues by inadequate investment plans and changing government priorities due to

various sociological, economic and political constraints. Some studies evidenced that these problems have become greater in extent and severe in recent years in many countries., the fluctuating construction workload, unfair competition by foreign contractors, skills drain and shortages and high cost of developing skills were the main identified problems.

However, in Sri Lanka, the construction industry places a vital role in economical and physical development. Further in Sri Lankan economy, construction is the fourth highest sector after services, manufacturing and agriculture. The big question in the minds of many is for how long the local construction industry, which employs 650,000 workers direct and another 325,000 indirectly, could survive without a total collapse due to the multiple shocks it had to face during last 2 years. For economic revival after overcoming a recession, the catalytic inputs of the construction. Therefore, it is important to consider the present context of the industry to identify precincts and to get counteractive measures in order to uplift the industry to meet the future challenges. This research has focused to identify critical challengers which need immediate attention and effective mechanisms by inducing by motivators for development of the construction industry in Sri Lanka.



### 1.1 “Our economy has completely collapsed.”

The debt Sri Lanka has incurred is, further hampering their ability to boost their reserves. Recently, they defaulted on a \$78 million loan from international creditors, and in total, they’ve borrowed \$50.7 billion. The largest source of their debt is by far due to market borrowings, followed closely by loans taken from the Asian Development Bank, China, and Japan, among others. Sri Lanka is home to more than 22 million people who are rapidly losing the ability to purchase everyday goods. Consumer inflation 39% at the end of May 2022.

Due to power outages meant to save energy and fuel, schools are currently shuttered and children have nowhere to go during the day. Protesters calling for the president’s resignation have been camped in the capital for months, facing tear gas from police and backlash from president Rajapaksa’s supporters, but many have also responded violently to pushback.

India and China have agreed to send help to the country and the International Monetary Fund IMF arrived in the country to discuss a bailout to restructure foreign and local loans. Additionally, the government has sent ministers to Russia to discuss a deal for discounted oil imports.

### 1.2 A foreshadowing for low-income countries

Governments need foreign currency in order to purchase goods from abroad. Without the ability to purchase or borrow foreign currency, the Sri Lankan government cannot buy desperately needed imports, including food staples and fuel, causing domestic prices to rise. Furthermore, defaults on loan payments discourage foreign direct investment and devalue the national currency, making future borrowing more difficult. What’s happening in Sri Lanka may be an ominous preview of what’s to come in other low and middle-income countries, as the risk of continues to rise globally. The Debt Service Suspension Initiative was implemented by G20 countries, suspending nearly \$13 billion in debt from the start of the pandemic until late 2021

## 2. Identifying Challenges to Construction Industry

This paper is to focus and identify the significant Challenges, and motivators. ECONOMY NEXT- Sri Lanka’s construction sector is in a deep crisis as contractors are in owed 150 billion rupees in arrears on work carried out for the state, head of National Construction Association of Sri Lanka (NCASL) said amid slowing business in construction after the country’s economic crisis. Sri Lanka has temporarily halted imports of building materials in its latest list of over 300 items from August 23 until further notice. Some industrial machinery including metalworking machinery, packing machines and ball bearings have are in the list. “Even though many projects were started during the previous government, due to not being able to complete the payments, the whole construction industry is in a great financial crisis. The crisis is mainly because of unsettled due payments by the government to construction contractors amounting up to 150 billion rupees. “If the government is unable to pay this amount, we ask the government to discuss regarding this and come up with a solution for this issue immediately.” Sri Lanka’s economic crisis has forced the government to stop many projects including highways and roads as it cannot afford to continue them without increasing the state revenue. Industry experts say essential building items such as Aluminum, tiles, water pumps, and rain water gutters have been included under the temporarily banned imports, a move to stop foreign currency outflow. “Around 70 percent of the state’s project are on hold at the moment, the past President of the NACSL told reporters.

The industry is struggling to give a definite budget for customers for any building projects with the continuous spike of raw material prices parallel to sharp depreciation of the currency and fuel price hike to record level. “It has now become a dream to build something now,” Pole said. (Colombo/Aug 27/2022

Sri Lanka is in economic and political crisis, recently defaulting on its debt payments and sparking mass protests across the country. The country's foreign currency reserves have plummeted an astounding 99%, from 2019, decreasing the ability to purchase imports and driving up domestic prices for goods.

The visual below breaks down the historical events leading up to the current situation in Sri Lanka.

Construction impacts everyone across the globe. The construction industry accounts for 6% of global GDP and is considered to be a powerful stimulant for economic growth. Various studies conducted worldwide have predicted a steady growth trajectory for the construction industry in the current decade. This presents numerous opportunities for Sri Lankan construction organizations to venture abroad. Sri Lanka too will continue to witness a continuous increase in construction-related activities. Large scale infrastructure projects are already in the pipeline and the country's mega Port City development project is open for construction activities. The land reclamation and filling work of Port City has already been completed and the next phase will see the infrastructure facilities being developed within the Port City followed by construction of buildings. It is needless to say that we can be certain that there will be a massive increase in construction activities in Sri Lanka in the next few years.

In Sri Lanka, the construction industry contributes 7.1% to the GDP of the country and is considered to be one of the major drivers of economic development in Sri Lanka. Despite the rosy pictures as mentioned above, the Sri Lankan construction industry itself has been facing severe difficulties and financial losses; and is not able to capitalize on the growth opportunities. Why is that? To intimate involvement with the construction industry for the last three decades has given me the opportunity to understand and analyse the numerous problems faced by the construction industry. In my book, I endeavored to discuss these problems faced by the Sri Lankan construction companies, suggest recommendations for correcting the current problems faced by the industry and the measures that could be taken to make the construction industry on par with the international standards. I hope that this book will create awareness among the Government policy-makers, Government officers, construction sector professionals and business leaders of the current problems affecting the industry and the measures that need to be adopted to develop the industry.

The reasons for the current state of affairs in the construction industry can be attributed to many factors. This paper have identified 42 factors that are vitally important to the construction industry. 33 of these factors are related to the current problems that the industry faces and hence need to be either rectified or improved through policy intervention and industry involvement. The other nine factors are linked to the emerging global issues and need to be embraced by the country and the construction industry.

The paper analyses these factors in detail and provides recommendations for rectifying the shortcomings and developing the industry to become internationally competitive.

The identified following factors can be broadly categorized into six categories as follows:

1. Government regulatory landscape;
2. Business and labor landscape;
3. Economic landscape;
4. Education and technical skills;
5. Competitive landscape;
6. Absorption of latest developments by the local construction industry

Following are some of the problems faced by the construction contractors in their interaction with Government authorities:

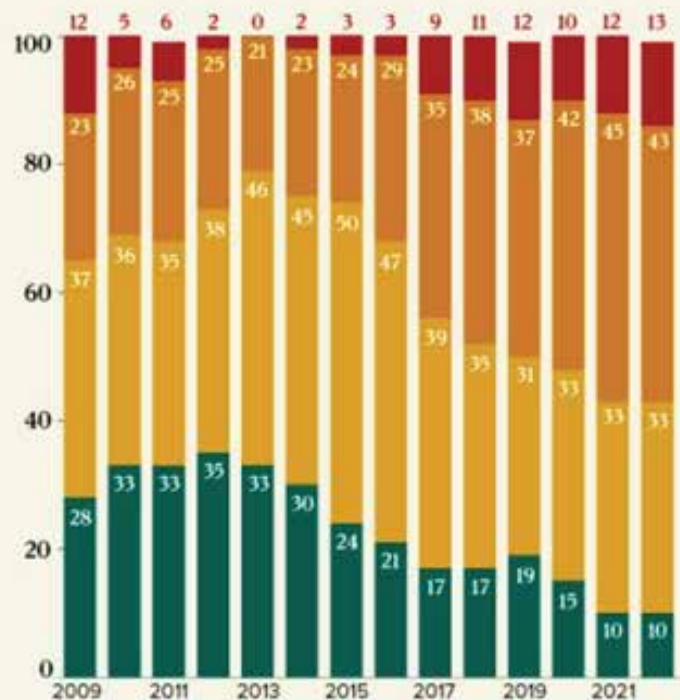
- \* Inconsistencies in system and procedures adopted by the Government ministries
- \* Discrepancies between works procurement guidelines, and CIDA 'Standard bidding documents'
- \* Conditions of contract that is not suitable to the Sri Lankan conditions
- \* Bureaucratic delays
- \* Unrealistic total cost estimates
- \* Price fixing committees
- \* Pricing preambles
- \* Retention money and performance bond in the conditions of contract
- \* Delay in payments
- \* Unfair liquidated damages
- \* Ease of doing business
- \* Political stability and uncertainties
- \* Business and labour landscape
- \* Labour shortage and productivity
- \* Shortage of skilled labour
- \* Labour laws
- \* Holidays
- \* High employee turnover among construction professionals
- \* Micro, small and medium scale contractors
- \* Survival and development of large-scale contractors
- \* Industry productivity
- \* Safety and health in construction
- \* Image and Industry
- \* Entrepreneurship in construction industry
- \* Economic landscape
- \* Cost of finance
- \* Inflation, exchange rate and cost of raw materials
- \* Tax structure
- \* Construction guarantee fund

## Rising Debt Risks

The proportion of countries in debt distress, or at high risk of debt distress, has doubled to 60 percent from 2015 levels.

% of DSSI countries with LIC DSAs

Low Moderate High In debt distress



- \* Financing the construction industry via development banking
- \* Economic slowdown
- \* Economic freedom
- \* Education and technical skills
- \* Education and training
- \* Capacity building
- \* Language proficiency in construction
- \* Competitive landscape
- \* Threat from international contractors
- \* Unfair competition from state agencies
- \* Industry competitiveness
- \* Absorption of latest developments by the local construction industry
- \* Technical infrastructure and knowhow
- \* Research and development
- \* Innovation in construction industry
- \* Design – build
- \* Sustainable Development Goals
- \* Global warming and construction

In addition to the above issues, the COVID-19 pandemic that has been ravaging the world during the past one year has brought about long-lasting changes to the way we live and work. Existing business models are giving way to entirely new business models and remote working has become a necessity. This will continue at a rapid pace and we need to adjust to this new reality. The outbreak of the pandemic and the subsequent lockdowns have resulted in massive losses and cash flow problems to majority of the business sectors including the construction sector worldwide. This had a devastating effect on the Sri Lankan construction industry which was already undergoing a crisis. The much-desired new normalcy and

various health guidelines have now led to change in the manner in which general and specific construction operations are carried out. These serious changes to the long-established working practices have largely contributed to overall and individual changes of the unit rates, preliminaries and other overhead components like head office overheads. The changes for the standard resource norms have caused productivity-related issues (for which the contractors are not responsible), work practice constraints and continuous disruptions due to volatile and dynamic operational environment caused exclusively by COVID-19 related issues.

In this regard, we note at this stage that general work rates noted in the standard Building Schedule of Rates (BSR) will no longer render applicable warranting immediate attention from the authorities for change. Additionally, we see certain constraints and hurdles in recovering such costs-alcy and under contractual claims under force majeure (exceptional events), changes in legislation or other appropriate claim headings.

While COVID-19 has affected all the economies of the world, the extent of damage to our economy is likely to be much more serious. We are an island nation with a population of 21 million and our economy was in a precarious situation even before the pandemic hit. Therefore, while we are still battling the COVID-19 pandemic, we should prepare ourselves to face the challenges and opportunities emerging in the post-pandemic period. There needs to be a policy and strategic planning initiative to address the issues and problems faced by the construction industry.



Given the right environment, the local Construction companies have the potential to complete successfully with International contractors and win projects not only in Sri Lanka but also internationally. The Government should view the construction services as a potential export income earner for the country. Through addressing the above issues and finding proper long-term solutions for these ailments, we can build a world-class construction industry that will enable our construction companies to become internationally competitive and bring the much-needed foreign income to our country.

During this period, authorities such as ICTAD (presently CIDA) and CHPB were formed to assist the construction industry. The National Construction Association of Sri Lanka, which was formed in 1990 with the assistance and guidance from World Bank, provided the construction companies with a forum to collectively address the challenges faced by the industry, voice their grievances and have a constant dialogue with the Government. It is important that we need a similar focus by the Government at this crucial period when the construction industry is facing enormous difficulties and challenges.

The decision-making was painfully slow due to frequent shuffles of ministries. The fact that the Government could not present a proper Budget and had to rely on supplementary budgets instead. The increases in tax rates had debilitating effect on the businesses. This was further exacerbated by the dastardly Easter Day bombings which shook the economy of the country to the core. The hotel and tourism sector came to a complete standstill. This had a cascading effect on other sectors including the construction sector. There were suspension of construction and refurbishing of hotels by hotel owners which affected the construction contractors badly.

There were many outstanding payments due to contractors who had been working on tourism and hotel related projects due to suspension of loans and financial facilities given to hotel owners. However, with the changing of Government in 2019, the Prime Minister intervened and presented a cabinet paper to settle the long overdue amounts totaling Rs. 400 billion to the contractors. As explained above, the construction companies had faced a severe crisis during the last six years.

In fact, the construction industry was the hardest hit during this period, even more so than other industries such as tourism, exports, etc.

The contribution of the construction industry to the country's economy has declined enormously during the last six years and hence considerable amounts of resources need to be channeled to affect a swift 'V-shape' revival of the industry and to get it back to its growth stage. Therefore, I earnestly request both President Gotabaya Rajapaksa and Prime Minister Mahinda Rajapaksa to make radical changes necessary to make the industry great again.

At present, there are many Government institutions and authorities that are involved in construction-related matters either directly or indirectly. CIDA, NBRO, UDA, RDA, Water Board, Education, Health, Irrigation, Land Reclamation Board, HDFC and National Procurement Commission are some of the entities with stakes in construction sector. All these organizations have their own development agenda, procurement procedures and regulations which are more often contradictory to each other's. This creates confusion among the industry firms and result in decision making delays. Establishing a dedicated unit under the Ministry of Finance to act as a single window for providing solutions to all the problems faced by the construction industry, will go a long way in alleviating the numerous problems faced by the contractors and the industry currently. This unit should be given the necessary legislative authority to issue directives and circulars as and when necessary to ministries, departments, authorities, provincial councils and local government institutions to strictly implement clear and consistent policies and should have the power to enforce these directives. The unit should have the authority to hold the public sector officers accountable for implementing its directives.

Since this unit should have the authority to issue directives to a multitude of Government institutions that deal with the construction industry, it is suggested that this unit be setup under the Finance Ministry. The Finance Ministry already issues to and enforces directives across all the Government ministries; and hence the circulars sent by them will be more authoritative across all the ministries. Setting up this unit under the ministry of construction or any other ministry will not serve the purpose for which the unit is setup as the directives issued by them will not be taken seriously by the institutions that come under different ministries, provincial councils and local authorities. In addition, this unit could regularly monitor the regulations and payments to be made to the contractors by line ministries, departments, provincial councils, etc. and ensure that the ministries don't deviate from the established standard

contract document, procurement procedures and directives issued by this unit. There is also a necessity to issue public finance circulars and directives regularly to address anomalies in tax structure, depreciation of Rupee against Dollar, etc., and to protect the contractors from future payment delays and mitigate disputes. This unit also should have the authority to issue temporary circulars for specific periods as and when unforeseen risks strike the industry; and should have the mandate to formulate and reform policies, rules and regulations as and when necessary, with immediate effect. This unit also should look into settle the outstanding payments owed to the contractors in an effective manner. This will greatly ease the financial burden that the contractors are saddled with at present and ensure speedy delivery of development projects.

This unit should incorporate private sector participation by inviting representatives of the construction industry, construction professionals and academia to serve in the advisory panel. This would enable the Government to have a holistic view of the construction industry. Private sector participation will facilitate the unit to not only find out the problems faced by the industry but also to understand the measures that could be taken to make the Sri Lankan construction industry to be on par with the world's best. The construction contractors contribute in no small measure to the GDP of the country. The Government should view the construction contractors as partners in nation building. There is an urgent need for the Government to seriously address these issues that are crucial for the long-term survival of the Sri Lankan construction contractors.

The construction industry is the backbone of a healthy industry. industry will be imperative. However, with the scant attention of authorities to the issues facing the construction industry, the Chamber of Construction Industry of Sri Lanka (CCI) cannot be certain of the future that lies ahead. CCI, as the apex representative body of all engaged in the construction industry, request urgent resolution of following issues.

### **Outstanding payments**

The total amount of payments outstanding to contractors and consultants on work performed on contracts in roads, school buildings and water supply projects alone exceed Rs. 100 billion. When outstanding payments on contracts in other sectors are also considered, this will be a huge amount. Some of these payments are overdue for

over 12 months. Authorities must understand the inherent nature of the construction industry, which has a relatively low capital base and a high turnover, operating with a low profit margin averaging 5 percent. Consequently, it is very vulnerable to unsteady cash flows. As such the government should take immediate steps to settle all outstanding payments that are overdue for more than 3 months in government projects, along with the interest payments allowed under the contract terms.

### **Reimbursement of price escalations**

During the last 4 months, the prices of most construction materials have more than doubled. In last November a Cabinet Decision was taken to allow price fluctuation on all contracts over 3 months completion period that had excluded price fluctuation as per the CIDA formula, subject to an upper limit of 20 percent of contract sum. In the context of steep price increases it is urged to remove the 20 percent cap and also allow this even on contracts less than 3 months. Also as the CIDA formula does not adequately cover MEP items and some imported civil items as well, it is suggested to reimburse the difference in foreign currency fluctuation on the current CIF Values of these. Another burning issue is the increased diesel cost. To bridge the gap created by the CIDA formula on transport costs, it is proposed to grant a 5 percent increase on contract sum as compensation for fuel cost increase.

### **Building & Construction Industry Security of Payment Act**

As stated above, it is very important that timely payments for work done are received by the contractors. In the present situation with unprecedented price increases of materials, exchange rate and bank interest increases, the need for timely payments is critically felt as never before. As such it is strongly suggested to introduce a 'Building & Construction Industry Security of Payment Act' much similar to the Act in Singapore.

### **Suspension of projects**

The Secretary to the Treasury by the National Budget Circular No. 03/2022 has informed the suspension of projects funded locally. As per this all new projects and projects on which construction work not commenced will be stopped. In addition projects commenced but with poor progress could also be suspended with understanding between the parties. However, this circular will

not affect the foreign funded projects. CCI believes that this suspension, though mentioned as temporary, would last at least until end of this year. This will be a severe blow to many consultants and construction companies, who are not much engaged with foreign funded projects. Within next 3 months most certainly large scale job losses will be evident in the construction sector due to lack of work. Consequent to devaluation of Rupee, import restrictions, material shortages, high prices and unbearable interest rates there will be no new investments from the private sector, local or foreign, as well.

For locally funded projects which are deemed important to continue, it is proposed to establish a credit line of about US\$ 100 million to cover the import of materials and equipment required. To properly manage the disbursements on this credit line, CCI is willing to assist by setting up a mechanism to monitor the project requirements and make recommendations to the Finance Ministry. In this situation CCI wish to propose the acceleration of foreign funded projects, which will improve the inflow of foreign funds. Towards this end it is suggested that all payment claims of contractors for work done shall be certified and paid within 3 weeks. To ensure steady progress of work foreign exchange received on these projects shall be utilized to fund the project import requirements

### **Recommence aborted projects with concessionary funds**

CCI also wish to propose that the Government should negotiate immediately to recommence the aborted LRT project and upgrading of KV railway line with JAICA and ADB funds.

On both these projects, feasibility studies, EIA, detailed designs and even contract documents were done and later abandoned due to ill gotten advice, similar to the fertilizer ban. The JAICA loan package of US\$ 1.85 billion on LRT was on very concessionary terms with an interest rate of 0.1 percent, payback period of 40 years and a grace period of 12 years on capital plus interest payments. We have not received such concessionary funds on any other project to date. Even the upgrading of KV line with loan package of US\$ 1.2 billion from ADB was on concessionary terms. As both these projects had EIRR of 20 percent and 16 percent respectively, the reasons for cancellation cannot be economic non viability but surely other considerations. Had these projects proceeded without a disruption our local companies could have got a fair share of the work involving nearly US\$ 3.0 billion..

### **Apartment buildings**

The government has announced a Golden Visa scheme to foreigners who invest US\$ 75,000 or US\$100,000 to purchase an apartment. But now most apartment projects area a standstill due to the same reasons stated above, viz devaluation of rupee, important restrictions, material shortages, high prices and unbearable interest rates.

To mitigate these impacts to some extent, it is proposed that the property developers should be allowed to utilize foreign exchange earned by them to import the materials and M& E equipment required for these projects. As announced by the Central Bank Governor the interest rate increase is a short term strategy, in which event to sustain the property development and home building, it is proposed that a concession should be given on housing loans.

### **Uneconomical projects**

It is observed that one of the main reasons for the present foreign exchange crisis is the projects undertaken without any economic viability with foreign loans, based on unsolicited proposals. There are ample examples of such projects. To avoid occurrence of these in future following are proposed.

- Establishment of an independent National Planning Commission (NPC) similar to NPC in India with the appointment of qualified persons approved by Constitutional Council. One member of the NPC shall be a nominee of CCI.
- All projects more than Rs.500 million to have the approval of NPC, who should approve only on the basis of National Priority and satisfactory EIRR.
- Procurement for projects to be strictly on the basis of minimum 5 competitive bids. On very exceptional circumstances number of bids may be reduced to 3.No unsolicited bids to be allowed.
- TEC's for project procurements in excess of Rs.500 million to have a representative of CCI to ensure transparency.
- Replace the present outdated Government Procurement Guideline 2006 with what was developed by the now defunct NPC in 2018, after extensive industry consultations.

### **Stable govt. and good governance to attract investments**

To kick start the economy with more investments and thus create more employment it will be essential to ensure political stability with good governance, rule of law, transparency and a conducive

environment even after a degree of economic stability is reached by debt & economic restructuring with IMF intervention and rating upgrade. This economic programme may include very painful measures to increase taxes, scale down welfare measures, restructuring loss making SOEs to achieve fiscal consolidation. No single party government will be willing to carry out the needed economic programme to resurrect the country from the present situation. As proposed by the BASL and Joint Chambers the need of the hour is the formation of a National Government comprising of all parties in Parliament for a limited period to carry out a reforms programme. A good example is the war cabinet in UK during 2nd world war. This National Government should be headed by a Prime Minister acceptable to all parties in Parliament and the street protestors, If no such person can be found in present Parliament, a suitable person from civil society should be brought in through the national list.

To ensure public confidence it will be essential to withdraw 20A and introduce 21A with all good features of 19A and also converting Executive Presidency to a nominal Head of State elected by parliament as in India. The argument that the Executive President is required due to the formation of Provincial Councils has no justification, with India being the best example. In the Constitutional Council the majority of members should be representatives from outside the Parliament, as per the original proposal. In addition it is proposed that the Colombo Port City Economic Commission and the National Planning Commission shall be brought under the CC.

### **Independence of public service**

It is seen that ensuring independence of public service which is essential will not be achieved only with the appointment of PSC by CC as per 19A. We witnessed this during 2015-2019. At present the Ministry Secretaries who are expected to manage and control the ministries & institutions have to function under the whims and fancies of the Ministers. To ensure independence the following measures are proposed. Cabinet Ministry Secretaries who are the Chief Accounting Officers of the ministries and institutions under the ministries as per the Public Finance Act, should be appointed with the approval of CC similar to Superior Court Judges. Cabinet Ministry Secretaries should have a fixed term of 5 years similar to the practice in India which has 7 years. Even though Ministry Secretaries are expected to function as the CEO and CAO to supervise ministries & institutions under their hands retired

by Sec 52(2) of the Constitution which states that a Ministry Secretary shall be “subject to the direction and control of the Minister”. This should be changed to read as “subject to the policy direction of the minister”. Once the Ministry Secretaries are ensured independence and stability, better management of the Ministries and Government Institutions can be expected.

### **Ensure building approvals within 3 weeks**

On the ‘Ease of Doing Business Index’ our country is placed below the other countries in the region with high growth rate. One factor badly affecting this is the delay in granting Preliminary Planning Clearance (PPC) and Development Permit (DP) on building applications. President in his Election Manifesto pledged to ensure building approvals within 3 weeks. The Chamber through the Presidential Commission to Simplify Existing Laws & Regulations (PCSELR) submitted a detailed proposal with the necessary amendments to the UDA Act, in June last year to establish – a mechanism to achieve this. Regrettably to-date no action has been taken on this proposal of the PCSELR. If the government is keen to attract more investments to the country then this proposal should be adopted without further delay. This measure will definitely improve the Ease of Doing Business Index.

### **Promote export of construction services**

If supported by the Government and the Central Bank, our construction industry is capable of increasing the earnings from export of construction and consultancy services. At present the support extended is almost negligible, at times even negative. In spite of many obstacles several of our companies have managed to undertake work abroad. The main difficulties to undertake work abroad are

- Lack of promotion by our embassies unlike other missions
- Difficulties in providing bank guarantees in foreign currency
- Inability to obtain working capital to overcome cash flow deficits during construction period

### **EPF & ETF to be paid direct to employees**

During the next few months many construction companies will face financial difficulties due to lack of work and economic slowdown. In this situation many project based workers will face either termination or paid partly. To mitigate this impact it is proposed that the government should



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## CONSTRUCTION INDUSTRIAL CHALLENGERS

A.	Financial
01	Rapid changes in the national economy
02	Inadequate support from banking sector
03	High inflation rate
04	Narrow profit margins
05	High interest rates
06	Limited credit facilities
B.	Government Policies / Practices
07	Government policies on taxes
08	Political instability
09	Low level of government support on construction
10	Bribe/corruption and favourism
C.	Technology
11	Low level of new technological development
12	Inadequate technological knowledge
13	Low level of technology transfer
14	Low level of usage of IT
D.	Management and Coordination
15	Poor cost planning
16	Poor documentation process
17	Extensive time slippage in contracts
18	Poor communication
19	Lack of progress monitoring
20	Low level of administrative flexibility
F.	Research and Development
21	Government involvement in R&D
22	Limited allocation of funds for R&D
23	Lack of opportunities for R&D
24	Reluctant in using innovative building materials
25	Low level of participation of institutes in industrial oriented R&D
G.	Resource
26	High labour turnover
27	Insufficient integration on design and built operation
28	Lack of high technical construction equipment
H.	Safety
29	Inadequate safety precautions
30	Undefined specification of construction safety
31	Improper implementation of safety rules
32	Limited funds for safety precautions
33	Low level of employment of safety officers
34	Limited knowledge on safety precautions
I.	Training and Development
35	Limited allocation of funds for employee trainings
36	Inadequate career development programmes
37	Inadequate support from Institutional organizations
38	Currently practicing government grading systems
J.	Social
39	Inadequate health on construction sites
40	Low level of facilities provided for workers
41	High environmental impact
K.	Skill
42	Inadequate skill development programmes
43	Availability of professionals
44	Low level of skilled workers
45	Skills of fresh graduates joint in the field
46	Scarcity of skills availability in the construction

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allow these companies to pay the EPF and ETF monies direct to the employees until end of this year. (The writer is the Secretary General / CEO Chamber of Construction Industry of Sri Lanka),

### 2.1 Critical Industry Challenges

Forty six significant challenges identified through are listed in table below.

in the Table 1. They are grouped under ten different areas including financial, government policies, technology, management and coordination, R&D, resource, safety, training and development social and skill levels.

**A. Financial** – Six financial challengers were shown as significant. Financial health of clients and contractors is very important for the success a project. However, respondents felt that it can deteriorate due to other external factors such as rapid changes in the national economy which is a most critical challenge observed from the t-test, followed by inadequate support from the banking sector, high inflation rate, narrow profit margins, high interest rates, and limited credit facilities. The construction industry has always had a close relationship with the banking system since the money transferring is enormous. However, in Sri Lanka, most of the bankers behave only as money lenders in extending financial facilities. Further, obtaining of a loan from a bank is a tedious procedure which, in some cases, takes months. This longer time period discourages the contractor who requires short term bridging finance. Respondents felt that the higher interest rates of the lending institutions too have made national practitioners not competitive with foreign counterparts who are able to get loans from their bankers with undercutting rates of interest. Further, many contractors do not have reasonable access to commercial borrowings and other facilities at reasonable and comparable rates as available in the developed countries. The lack of credit facilities is another constraint. Short term financing sometimes is available to construction enterprises from local banks, and is expensive. Most enterprises, therefore, operate without access to credit facilities.

**B. Government Policies** – It is identified that the construction industry has been experiencing lot of difficulties due to the lack of government policies or ineffective policies to support the construction industry. For instance, government tender procedures based on low price-based are sometimes shown very inefficient [18]. According to respondents, tax policies are another one of main concerns. Political instability of the country created rapid changes of certain policy decisions taken by the previous governments. For instance, decisions to awarding of contracts were revised in many instances. Therefore, the political instability of the government can affect the construction industry and its productivity. Therefore, the government of Sri Lanka should consider that there is a need for clear and effective policies for the construction sector. These policies should be developed by identifying objectives of national construction priorities and for providing guidance for the mobilization of investment. Further, such policies are able to provide a framework for enabling and facilitating

the development of the domestic construction sector through professional development, business enterprise and productivity enhancement. However, corruption and favourism is one of the main drawbacks created with the open economic policies in many countries.

**C. Technology** – Historically, Sri Lanka has developed largely a craft based construction technology, emanating from the experience gathered over 2000 years. This level of technology was sufficient to meet the construction needs even in the post-independence era. However the large scale rapid development projects such as irrigation, power and industrial building construction work that were launched in the fifties; demanded a high level of technology input. The local industry was not fully geared to meet the entirety of this increased technological demand as such; some of the large scale construction projects were carried out by foreign contractors due to lack of technological development, knowledge and transfer. For example, during the phase of the “accelerated Mahaweli development programme”, in late 70’s, the foreign contractors had dominated the industry. Further, a conscious effort does not appear to have been made to ensure a sufficient degree of local participation and technology transfer. However, during the last decade, it appears that a fair degree of technology transfer was achieved with a fairly well equipped technology and management base. But, still there is a lot more to achieve. Making use of IT in the construction industry is still at its adolescence stage though the IT industry is booming very fast. This was identified as one barrier for its development.

**D. Management and Co-ordination** – Management and co-ordination of projects are shown as great difficulties in the construction industry. In this survey, cost planning, documentation management, time management, communication, progress monitoring, administrative issues were shown in high profile. The cost planning plays a significant role in ensuring that company objectives are compatible with its resources. Poor cost planning of both parties due to lack of proper budgeting results in poor quality of work. For instance, for a contractor to use his mobilisation advance payment to purchase equipment which he cannot depreciate entirely on the particular job or even for other purposes outside the contract, leaving little or nothing to finance the work. A proper documentation process which can be transparent to all parties in the process is another

important fact yet not practised in many construction projects. Further, proper time management and progress monitoring strategies are yet to develop to make sure of its delivery on time.

**E. Research and Development** – Lack of initiatives, funds, opportunities and attitudes were identified as major issues for inculcating R&D culture in the construction industry. It was identified that most of the firms were reluctant to carry out R&D programs. This may be due to the fact that benefits are not quick and straightforward. Further, most of the practitioners believed that the government should encourage more on R&D as the construction industry plays a major role in the economy. Research projects conducted in universities can be more focused on industrial needs, rather than basic researches. Also, staff members who are carrying out these projects should be encouraged and recognised within the university system. Research forums and awareness programmes can be organised by training institutes for researchers highlighting the research areas to be needed, and providing various sources of funding for these researches.

**F. Resource** – Lack of labour, equipment, knowledge and integration are observed in this survey. Today, many construction workers are hired on a project basis and made redundant on project completion. This is a common fact to most of developing countries [8]. As a result, the construction industry is characterized by a pool of labours who works for a variety of contractors in different types of construction. Lack of integration on D&B operations for improving the industry performance is another main challenge. This may be due to lack of experience and knowledge. However, knowledge can be improved by getting various exposures from different projects carried out specially by foreign firms to a certain level.

**G. Safety** – The extent of construction accidents is more severe when compared to other industries [19-20]. From the survey results, inadequate safety precautions, lack of implementation of rules, limited fund; knowledge and qualified officers were identified for the extent of unexpected accidents and social problems in the construction industry. Further, the annual report published in 2002 by ICTAD also highlighted that the safety practices that are being adopted at construction sites are far below acceptable standards. On the other hand, low educational levels of many construction workers may be one of a main barriers

to imply the safety at sites. Most of the workers do not understand the importance of the site safety rules for their health and safety.

**H. Training and Development** – Training and development was highlighted as another significant issue among other concerns. Limited allocation of funds for employee training is one of major barriers of many organisations. On the other hand, the existing situation of many organisations is rather depressing for the employees, due to the reluctance in allocating funds for training and development. At the moment with the government involvement National Apprentice and Industrial Training Authority (NAITA), ICTAD, and a few other technical training institutes are conducting training and developing programs. But this support is not enough to satisfy the demand. In this regard, technical institutes, universities, etc., can take, as part of its responsibility to win the challenge.

**I. Social** – There are many social factors being neglected at the site level. They are highlighted in the survey as poor health, hygienic and welfare facilities for the workers. On the other hand, low educational level and attitudes of many workers may be responsible for the poor performance of health and hygiene at the site. This is another area that researchers should focus on finding mechanism to improve the existing conditions. Due to Low profit margins of contractors often intend to complete the projects with minimum supply of facilities to their workers. This may sometimes result even unacceptable hygienic conditions within the site.

**J. Skill** – The construction industry suffers from inadequate supply of professionals, less skill levels of fresh graduates and skilled labour force. High demand for the professionals in many countries and low level of salary schemes in the local industry may reduce the number of professionals retained in the local construction industry. This problem is not confined to the local industry, but is a common fact in many developing countries [1]. Less skill levels of fresh graduates may be due to inadequacy of the industry oriented training obtained during the degree programme. Further, it was revealed that less than 4% of the workers in Sri Lanka have been systematically trained and carry certificates that are indicative of their skill [21]. Lower skilled workers may be due to several reasons such as lack of training opportunities provided by the organizations and lack of



comprehensive training courses, skill development short courses and individuals less interest on attending such courses.

### 3. CONSTRUCTION INDUSTRY MOTIVATIVES

Out of 20 motivators shown below, 13 were shown as significant and they were further grouped using factor analysis to explore further relationships. Factor analysis was carried out to ascertain. A factor loading can be expressed as a correlation coefficient between an original variable and an extracted factor. To increase the factor loadings which indicates which variables were highly related to each factor.

#### CONSTRUCYION INDUSTRY MOTIVATORS

Motivators
Enhancing R&D
Increase skill levels of employees
Promote joint-ventures with foreign construction companies
Construction safety practice
Offering incentives for encouragement of employees
Institute involvement in training and development
Opportunities for career development programmes
Increase buildability practices
Maintain the construction quality standards
Improve the professional standards
Enhancing the relationship between construction companies
Offer knowledge on industry at the primary education system
Introduction of new forms of procurement systems

These five factors are as follows,

Factor 1: enhancing skills and efficiency

Factor 2: adopting incentive awarding mechanism

Factor 3: imposing quality practices

Factor 4: improving professionalism

Factor 5: improving procurement strategies

**3.1 Enhancing Skills and Efficiency** – Enhancing skills and efficiency was identified as the first factor. Respondents felt that the enhancing skills and efficiency in many ways could improve the image of the construction industry. It is noted that, it can be achieved through improving the skill levels of employees, R&D and promoting joint-venture. Individual organisations can take the leading role in improving skills of the employees. Further, they can initiate R&D to identify effective mechanisms of improving the efficiency of organisations. Different case study researches can be carried-out with especially international organisations that have shown great success in their business activities. Respondents have built-up their faith on promoting joint-venture with foreign companies to improve the skills and efficiency. This may be due to the different exposures and experiences gained through foreign companies to improve their current practices.

#### 3.2 Adopting Incentive Awarding Mechanism

– Respondents felt the incentives can help employees to encourage and motivate themselves. Incentives can be given as performance bonuses or providing training opportunities to improve their knowledge and skills. The organization can provide financial incentives for staff to undertake long-term training programmes and continuously, professional development programmes such as short courses, seminars, conferences are also be considered. Further, respondents felt that giving incentives for practicing and improving health and safety is important to develop the image of the construction industry. This can be implemented at two levels; government and individual organizational level. At the organizational level, incentives can be offered to their workers who observe health and safety rules. These practices can help the management to inculcate health and safety habits. However, this issue should be addressed by the government together with organisations as industry as a whole is performing far behind the acceptable levels of health and safety rules [22]. Further, the government could take a leading role in promoting organisations to adopt safety and health rules through introducing different incentive awarding mechanisms to organisations.

#### 3.3 Imposing Quality Practices

– According to respondents, the quality of the construction works can be enhanced through improving quality of works, employees, and quality standards. Pre-defined quality standards of a construction work can be easily achieved if the work is well

defined which, in turn, reduces the errors. Respondents felt that the construction errors can be minimized or eliminated, adopting highly buildable designs. In order to raise the buildability, there should be closer cooperation among designers, contractors, specialist contractors, material suppliers and component manufacturers during the design and construction stages. Quality standards play a great role in guiding the construction team to achieve the pre-defined quality of the final product. Therefore, existing quality standards should be reviewed, maintained and improved yearly. The strategies like total quality management mechanisms can be implemented. Further, respondents also felt that the career development of the construction team would help to improve the quality. For instance, career development programmes can improve employees 'carrier achieving quality outputs. Further, organisations can identify individuals' career paths and help them to develop their careers to motivate them to retain in the same organization which in-turn raise the performance levels of the organization.

**3.4 Improving Professionalism** – Improving professionalism was identified as the fourth factor. Respondents felt that professionalism can improve through enhancing professional practices, relationships and knowledge. Respondents proposed that the improving knowledge of professionalism can be started at the primary education level and continuously carried out up to the practitioner level. At school and institutional education, several modules can be included to their curriculums, where, as at the practitioner level, individuals can convert their knowledge in to practice. Further, certain guidance can be given through codes of conduct and exposures through making various relationships between different parties in the industry.

**3.5 Improving Procurement Strategies** – In the fifth factor, improving procurement strategies was observed. In Sri Lanka most of the contracts are based on traditional procurement method. Other procurement systems like joint-ventures, partnering, etc., are still at a very low profile. However, respondents felt that if these new strategies are developed, it will lead the industry towards the international market.

## 4. Conclusions

The research revealed that currently, there are many problems faced by the construction industry in Sri Lanka as seen by consultants and contractors. Sixty one challengers were tested and 46 are shown significant. They are from ten different areas including financial, government policies, technology, management and coordination, R&D, resource, safety, training and development social and skill levels. Further, the research identified 13 main motivators to help construction industry participants to improve the performance. Among these motivators, factor analysis revealed that some sub-factors were more important than others. Based on Eigenvalues, the five important factors were established to enable the construction industry to enhance its image. They are: enhancing industry skills and efficiency, adopting incentive awarding mechanism, imposing quality practices, improving professionalism, improving procurement strategies. These findings will create a momentum to all who are in the construction industry to look back on their existing practices and performance. Further, the recommendations given by identified factors will provide a simple guidance raising the image of the construction industry.



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# Vertical Forest Milan

## Project

Boeri Studio (Stefano Boeri, Gianandrea Barreca, Giovanni La Varra)

## Location

Milan, Italy

## Year

2007 – 2014

## Client

COIMA Sgr (ex HINES Italia s.r.l.)

## Commission

Residential towers

## Surface

Project area: 29 300 mq; GFA: 18,200 sqm; H: 112 and 80 m



The **Vertical Forest** is the prototype building for a new format of architectural biodiversity which focuses not only on human beings but also on the relationship between humans and other living species. The first example, built in **Milan** in the Porta Nuova area, consists of two towers that are respectively 80 and 112 metres high, housing a total of 800 trees (480 first and second stage trees, 300 smaller ones, 15,000 perennials and/or ground covering plants and 5,000 shrubs, providing an amount of vegetation equivalent to 30,000 square metres of woodland and undergrowth, concentrated on 3,000 square metres of urban surface. The project is also a device for limiting the sprawl of cities brought about through a quest for greenery (each tower is equivalent to about 50,000 square metres of single-family houses). Unlike “mineral” facades in glass or stone, the plant-based shield does not reflect or magnify the sun’s rays but filters them thereby creating a welcoming internal microclimate without harmful effects on the environment. At the same time, the green curtain “regulates” humidity, produces oxygen and absorbs CO<sub>2</sub> and microparticles, a combination of characteristics that have brought the project a number of important awards, including the **International Highrise Award** from the Deutschen Architekturmuseums in Frankfurt (2014) and the **CTBUH Award** for the best tall building in the world from the Council for Tall Buildings and Urban Habitat at Chicago’s IIT (2015)

The concept behind the **Vertical Forest**, that of being a “home for trees that also houses humans and birds”, defines not only the urban and technological characteristics of the project but also the architectural language and its expressive qualities. On a formal level, the towers are mainly characterized by large, staggered and overhanging balconies (each about three metres), designed to accommodate large external tubs for vegetation and to allow the growth of larger trees without hindrance, even over three floors of the building. At the same time, the porcelain stoneware finish of the facades incorporates the typical brown colour of bark, evoking the image of a pair of gigantic trees in which to live and which are rich in literary and symbolic implications. The contrast with a series of elements in white stoneware – the stringcourses of the balconies and some modules on the front of the windowsills – introduces a syncopated rhythm in the composition which breaks up and “dematerializes” the visual compactness of the architectural bodies and amplifies the presence of the plants even more. More than just surfaces, the façades can be viewed as three-dimensional spaces not only because of the denseness and function of the green curtain but also in aesthetic-temporal terms, due to the multi-coloured cyclical and morphological changes in the size of the plants.

The variations in colour and shapes of the plants produce a tremendous iridescent landmark in every season and it is highly recognizable even at

a distance. In just a few years this characteristic has resulted in the image of the **Vertical Forest** becoming a new symbol for Milan. This principle of variation also acts in relation to the different treatments applied on the sides of the towers and the various floors, where the choice and distribution of the plants and trees reflects both aesthetic and functional criteria applied in order to adapt to the direction and heights of the facades. The development of the botanical component, the result of three years of studies conducted together with a group of botanists and ethnologists, preceded the lifecycle of the building complex since it started in summer 2010 when the plants destined to be installed in the towers were in fact cultivated in a special botanical “nursery” set up at the Peverelli nursery and garden centre near Como in order to get them used to living in conditions similar to those found in their eventual homes.

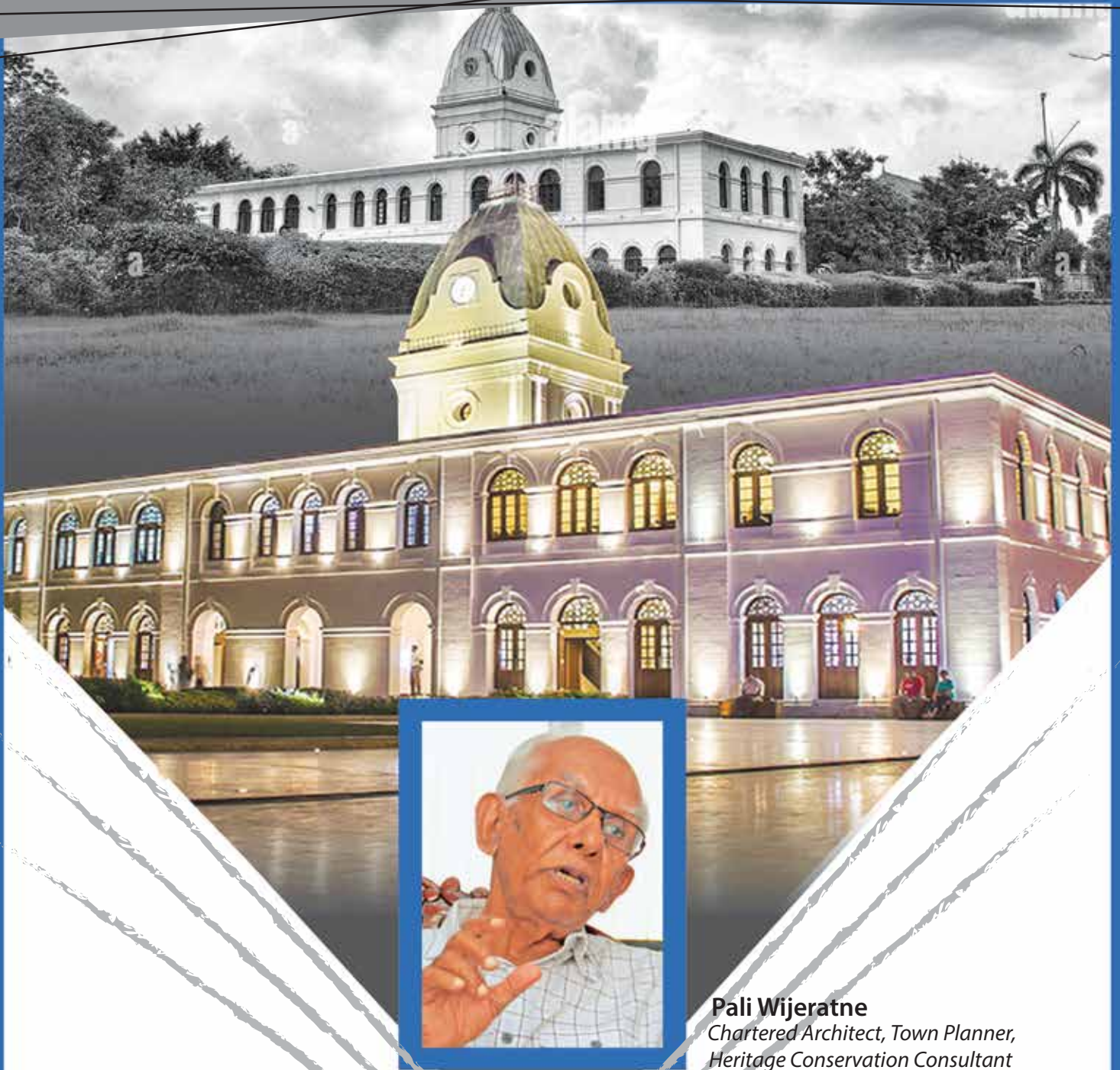
**Rather than just a simple architectural object**

therefore, the presence of the plant component means that the Vertical Forest is more akin to a set of processes – partly natural, partly man-managed – that accompany the life and growth of the inhabited organism over time. Perhaps the most unique component of this highly developed system, now widespread in urban imagery, is that of the “Flying Gardeners”, a specialized team of arborists-climbers who, using mountaineering techniques, descend from the roof of the buildings once a year to carry out pruning while checking

the state of the plants in addition to their eventual removal or substitution. All the maintenance and greening operations are in fact managed at the condominium level in order to maintain control of the anthropic-vegetal balance. Irrigation is also centralized: the needs of the plants are monitored by a digitally and remotely controlled installation while the necessary water is largely drawn from filtered effluent from the towers. All these solutions overcome the still essentially anthropocentric and technical concept of “sustainability” while moving in the direction of a new biological diversity. A few years after its construction, the Vertical Forest has given birth to a habitat colonized by numerous animal species (including about 1,600 specimens of birds and butterflies), establishing an outpost of spontaneous flora and fauna recolonization in the city.



Courtesy : Boeri Studio – Stefano Boeri Architetti



**Pali Wijeratne**  
*Chartered Architect, Town Planner,  
Heritage Conservation Consultant*

# 'PREVENTION IS BETTER THAN CURE'

## ROLE OF THE CONSTRUCTION INDUSTRY

Dutch Philosopher and Catholic Theologist, Desiderius Erasmus (1466-1536) originated the phrase 'Prevention is better than cure' to mean that 'It is better to stop something before it happens instead of having to repair it or deal with its consequences after it has already been done'.

This essentially means that it is easier to stop something bad from happening in the first place than to fix the damage after it has happened. When analysing this original meaning, it applies to many different facets of our way of life, even though the popular phrase is frequently used in



our daily life only for the medical and social strategies. The most active participant in this application today is the medical profession. They are trying to cope practicing this theory within the parameters created by man and nature such as the built environment, destruction of the natural heritage, pollution, global warming, and other factors. Therefore, prevention cannot be solved purely by health and social care systems alone. Addressing the root causes by others is as important as the actions taken by medical profession.

Everyone has a role to play in prevention and not just one set of professionals. Hence the community must work together to achieve the desired results for the wellbeing of the people. Whilst the government works out its own strategies, they should also be collaborating with the people who have a role in influencing health, communities, employers, industry, local government, housing, schools, and the built environment. It requires a joint effort in the investment in prevention to support people to live and help to guarantee our health and social care service in the long term. The investment need not be in monetary terms only. Conscious attitudes, concerns, lifestyles, and responsible thoughts sometimes carry more weight than monetary contributions. More important is that our actions today should not endanger the standards of living of the future generations. In addition, give people knowledge, skills, and confidence to take full control of their lives and making healthy choices as early as possible not only personally and collectively to safeguard environmental effects. This is to help people to stay healthy, happy, and independent as long as possible.

Good physical and mental health are the key to our happiness. Health cannot be just static. Improvements in the environment in which we grow up, live and work – from sanitation to nutrition, from housing standard to safety at work – mean we are less at risk from physical, emotional, and environmental harm. General socio-economic, cultural, and environmental conditions, living and working conditions, social and community networking, individual lifestyle factors and constitutional factors, amongst others have a bearing in our happiness and welfare. Homes and neighbourhoods are directly linked to wellbeing. Homelessness, badly maintained homes, poorer living conditions can have a negative impact on mental health. Overcrowded homes with children sleeping in the living room or sharing the bedroom with a parents can harm family relationships that will have an impact on mental health. Mental and physical health is also

shaped by the neighbourhoods we live in, including access to green space, community safety or walking routes. Air pollution poses one of the biggest environmental threats to healthy living. It can worsen asthma and effect lung functioning leading to complications and necessary admissions to hospitals. A medical specialist in United Kingdom have advised that reduction of air pollution over next two decades could prevent 50,000 heart diseases, 16,500 strokes, 9,000 asthma, and 4,000 lung diseases. Scientists in Europe have gone on record to say that hot temperatures in urban environments are associated with negative health outcomes such as cardio-respiratory failures, hospital admissions and premature death. They say that if a third of the cities are covered with trees, there would a significant cooling effect of the urban environment and help thousands of people survive the increasingly hot summers.

There is a need for urgent action to arrest climate change. This requires science-based approaches and willing participatory processes of all. It is known that humans have contributed to the warming of the atmosphere, ocean, and land resulting in widespread losses and damage caused to nature and people. In addition to the economic losses caused by climate change in the agriculture, forestry, fishery, energy, and tourism sectors, this has a bearing on the people's livelihoods, impacts on their homes, physical, environmental, social infrastructure, and socio-economic trends.

Thus, our health depends on the environment in which we live. There is a need to improve all aspects of our lives, across transport, housing, education, employment, and physical environment. Thus, everybody has a role to play in helping the country and the world to create healthy and happier communities. The building industry's contribution is not only during the construction stages but also during land-use planning, building design stages, and even the manufacturing processes of building materials. At present, the construction sector is resource-intensive (using 39% of all energy, 72% of all electricity consumption) and polluting (discharging 40% of all carbon emissions and 30% of all waste output). Cement production only, take up to 8% of the world's greenhouse emissions.

This suggests that those involved in planning of cities, design and construction of buildings can do much to counter the climate crisis. Those in the industry like to think themselves as public-spirited, well-intended people and attracts those who want to change the world for the better. What could matter more, than the prevention of environmental and societal collapse!

To avoid these setbacks, the building industry has a key role to play since healthy buildings, cities, neighbourhoods, and regions provide a key to a quality of life that human beings aspire. It is not enough to reduce what are called 'in-use' costs such as lighting, ventilation, air-conditioning, water, waste, and maintenance. The industry must be concerned about the 'embodied energy' that goes into construction and demolition such as quarrying cement, smelting steel, firing bricks, shipping, and transporting materials to site, putting them into place, taking them down and disposing of them. In addition, there are the effects of unplanned metal quarries and sand mining resulting in blighting the countryside.

The construction industry has many stakeholders that need to cooperate to provide the desirable end product. They have clients who invest in their workmanship. There are multi-disciplinary consultants who provide the designs, specifications, constant construction supervision, and management of the project on behalf of the client and paid for their services by the latter. The consultants in their designs have to abide by the Development Plans and the Regulations spelt out by the planners in addition to the materials and technologies of certain standards acceptable to the country. Then there is the construction arm that puts everything together and produce the end product that is experienced by all. But the industry must recognise that development planning has a political input. Thus, strategic planning emerges from organisational behaviour of specialist authorities such as for roads, physical, environmental, and social infrastructure agencies, and local authorities. The legislators have a key role to play in laying out the policy guidelines on these subjects. Thus, they too must be included in the equation.

In addition, even though there is no direct say or financial commitment in these developments, there are other stakeholders who influence developments. They are the occupants and users, host communities and the general public who are all affected functionally, aesthetically, visually, environmentally, economically, or socio-culturally. Therefore, the quality of environment around the buildings and its settings needs to be based on multidisciplinary and inter-disciplinary collaboration to address complex societal problems such as sustainable development, global environmental change, and public health challenges.

In 1987, the United Nations appointed Brundtland Commission, defined sustainability as '... meeting the needs of the present without compromising the ability of future generations to

meet their own needs ...'. It went on to describe that sustainability of developments depends on the three interdependent and mutually reinforcing pillars – Economic Growth, Environmental Protection and Social Equity. This theory was further strengthened by the Universal Declaration on Cultural Diversity (UNESCO 2001 and 2005) with the addition of the fourth pillar by explaining that '...Cultural Diversity is as important to human beings as biodiversity is for nature. ... Culture provides a satisfactory, emotional, moral, and spiritual existence in development projects. ...'

International Finance Corporation, a large global development institution and a member of the World Bank Group that advances economic development improves the lives of people by encouraging the growth of the private sector in developing countries. In 2012, they set out eight performance standards to achieve their overall development objectives for sustainable development and risk management. These conditions apply to the Building Industry than any other. The performance standards they have set out are as follows:

- Assessment and Management of Environmental and Social Risks and Impacts.
- Labour and Working Conditions.
- Resource Efficiency and Pollution Prevention.
- Community, Health and Safety and Security.
- Land Acquisition and Involuntary Settlement.
- Biodiversity Conservation and Sustainable Management of living natural resources.
- Indigenous Peoples, and
- Cultural Heritage

The United Nations provided a blueprint on this subject in 2016 in accordance with their 2030 agenda for Sustainable Development. These Sustainable Development Goals address global challenges including those relating to architecture and urbanism and the impacts of the built environment, sustainable cities and communities, responsible consumption and production, and climate action. Thus, there is a universal call for the future developments for exploitation of resources, the direction of investments and technological development to enhance current and future potential for meeting human needs and preserving biodiversity. The built environment can play a key role in providing the setting for human activities, ranging in scale from buildings to towns and to cities and regions. Since the earth's natural environment consists of living species interacting with each other, climate, and

weather, affecting humans and their environmental, social, and economic contexts, the building industry has a significant role to play in achieving the goals set out.

To respond to above challenges, the research arms of the industry should explore multidisciplinary and transdisciplinary collaboration in the nature-based design of a sustainable built environment. Nature based design is to learn from nature to develop sustainable solutions, including the integration of nature in buildings. Multidisciplinary collaborations and approaches for building design and improvement, innovative building materials, vegetation on and in buildings, planning of settlements and infrastructure as well as collaboration of management and related tools. Nature based solutions can protect, sustainably manage, and restore natural and modified ecosystems which address social challenges such as climate change, food and water security or natural disasters, effectively and adaptively, while supporting human wellbeing and providing biodiversity benefits. This calls for multi-disciplinary collaboration to encompass disciplinary interests of respective members along with providing a comprehensive approach to complex problems. All parties associated with the industry including the legislators, planning authorities, the developers and clients, architects, and their consultants, as much as the builders, and the building material manufacturers and suppliers have a social responsibility for the development of the built environment to have a positive and a favourable impact on the natural environment.

In a modern context, a study of Singaporean vision on the fusion of nature with the modern urban lifestyles within the limited land mass availability is an eyeopener to all disciplines of our building industry. Singapore was left with only around 0.5% of the primary forest land extent of what they had in 1965 when they were forced to go independent. They planned to use the greenery in its architecture to offset its need for removal of the ground level greenery for land development to stay independent. Yet they now have a population of five million living in comfort in an environmentally friendly country. In the 1960's the then Government set about turning the country into a tropical garden city and quickly realised that such 'Greening raised the morale of people and gave them pride in their surroundings.' It also proved to be good for tourism and for investors. They have found out that people in greener surroundings are less likely to suffer from stress, fall ill, are

more productive at work and perform better at school. In addition, the elderly living in inner cities with access to green communal areas are more likely to be sociable, interact with neighbours and have a stronger sense of community feelings than those in other parts of the urban areas. They feel a sense of belonging to the community.

The city passed building regulations requiring that if developers build in open space, they must replace it with green elsewhere. In addition, there are incentives given for landscaping of urban spaces and high-rise buildings, creating sky terraces and gardens. The result is a landscape of vertical and horizontal green spaces and parks interspersed with rivers and ponds amongst the high risers thereby creating a truly blue-green environment. There is a belief that plants on a roof or wall can reduce heat that penetrates a building fabric by 60-70%. In addition, it acts as a sound barrier, air purifier and a cooling agent.

Having decided to go green, Singapore decided on self-sufficiency in water as an added attraction. They started off by cleaning the existing waterways, rivers, and other reservoirs, planning to



**Garden City of Singapore with Horizontal and vertical gardens**

collect and reclaim storm water just as much as King Parakramabahu the first, advocated in the 12th C. in Sri Lanka. Today Singapore is a myriad of water reservoirs, rooftops, parks, roadways, and sidewalks to capture water. A complex system of water courses and pumps moves the water to treatment plants, controlled by microprocessors.

Sustainable design should not be seen only as a technical fix, a matter of paying the right consultant enough money to make sure the building ticks enough boxes, or of buying the most magical available piece of cooling technology. It should rather be integrated into the art of architecture. The ideal is that it should help buildings to be all round better, longer lasting, more pleasurable, and

more beautiful', as Allison Brookes, the architect declared. Slightly more radically, the profession needs to reconsider its value systems, to know what is considered good or bad.



**Children's play areas built over the car park  
– Photographs courtesy Havelock City Developers**

Creating such a suitable environment is a contribution that the Construction Industry can make in the cause of 'Prevention is better than cure'. In addition, stricter control of the 'Safety at Work' regulations by the stakeholders directly associated with the industry as well as the authorities, would also be a contributory factor in achieving these objectives. A multidisciplinary collaboration of such stakeholders encompasses disciplinary interests of respective members along with providing a comprehensive approach to complex problems. In such a multidisciplinary setting, individuals from different disciplines contribute to their perspectives to solve complex problems that individual discipline cannot. It needs inter communication but without negating the independence of each discipline. This exercise calls for transdisciplinary collaboration of all stakeholders to admit and confront the complexity in science, and challenges of knowledge fragmentation as it deals with the research problems as well as technical, economic, and social issues on the participating organisations, that are defined from complex domain such as sustainable development, global environmental change, and public health challenges. This collaboration is crucial since it is action orientated bridging across multi-disciplinary boundaries as well as between theoretical development and professional practice. In this setting the individuals from various disciplines shall contribute their perspectives to solve complex problems that individually they cannot.

It is not restricted to scientific or academic research only, but to be utilised in the practice of construction, architecture, urbanism, 'land-use planning', infrastructure development and all

associated manufacturing and installation trades. It provides a forum for stakeholders for discussions on decision making processes. These decisionmaking processes should involve not only those in planning and construction but also effective implementing and monitoring the vital decisions arrived at. Architecture and Planning are fertile grounds for such transdisciplinary contributions due to their multi- disciplinary nature involving natural and social sciences as well as action orientated practices aimed to transform the built and natural environments. Considering that the industry can be responsible for the negative impacts also of the built environment on the natural environment, the overarching research aim is to develop transdisciplinary collaboration framework that will facilitate the avoidance of such impacts and create a positive background for harmonious existence of the two. The responsibility for calling for such a transdisciplinary collaboration of all stakeholders is the responsibility of the legislators and statutory authorities. They should take the initiative and discuss with others a sustainable development process adopted from the universal guidelines such as the Brundtland Commission Report and the respective UN Charters. Professional Institutions associated with the building industry should cooperate with the state organisations with a sense of social responsibility towards the community and the future generations. They should collectively look at nature-based solutions to sustainably manage and restore natural ecosystems that address societal challenges such as climate changes, food and water security and natural disasters effectively and adaptively while supporting human wellbeing and providing bio-diversity benefits whilst still fulfilling the wishes of the clients.

The planning fraternity should be looking at the overall process of spatial, regional, planning at a macro level whilst at a micro level they should always be one step ahead of the developers who will try to take advantage of any shortcomings in the planning strategies or the regulations. Physical Planning is a social science that deals with the community interests and caters to not only policy making but to provide a healthy neighbourhood and environment that benefits all sectors of the society. In a Sri Lankan context, attention to cultural heritage that we have inherited is as important since this provides a 'satisfactory emotional, moral, and spiritual existence in our lives'. It gives us an identity that acts as a moral booster when chips are down. In addition, it results in contributing to the socio-cultural aspirations and



**A street in Paris**

economic gains of the community. Cultural heritage includes the tangible culture (such as buildings, monuments, landscapes, archive materials, books, works of art, and artifacts), the intangible culture (such as folklore, traditions, language, and knowledge), and the natural heritage (including culturally significant landscapes, forestry, flora and fauna and biodiversity). It is to be noted that in the Sri Lanka context, these three elements are interwoven to each other and facilities for practice and development of these factors are essential for sustainability of the development proposals. Thus, spatial planning and the regulations that provide guidelines, have a major role in making the people's lives comfortable.

In the early nineteenth century, there was 70% forest cover in Sri Lanka. With the accent on promoting the growth of cash crops such as tea, rubber, coconut, and spices in addition to the colonial picture of commercial timber extraction policy, these figures came down to 43% in 1948, 23% in 2000 and 29% in 2010. Due to rapid urbanisation and other commercial gains this figure has now being further reduced to 21.9%. This is despite Sri Lanka having Forest Ordinance and Fauna and Flora ordinance since 1800 and 1873, respectively. Other sensitive natural elements such as coast conservation, wetlands, mangroves have also suffered the same fate over the years. These areas come under the various statutory agencies such as the Department of Wildlife Conservation, Forest Department, Coast Conservation Department, Central Environment Authority, and the Marine Environmental Protection Authority and others. These authorities are committed individually to conserving the forest cover as well as the biodiversity of the country. In addition, there is the Department of Archaeology to safeguard the historic remains and the built heritage of the



**A street in Colombo Fort**

country. In spite of these authorities with the backing of the legislation is committed to the conservation of the assets of the country, we hear daily of environmentally detrimental activities in national parks and protected areas, clearing of forest lands, ad hoc resettlement of people in forested lands, elephant corridors, and other habitats of endangered fauna and flora; wetlands are filled daily for 'development', environmental degradation of ecologically sensitive areas with municipal and industrial waste and wanton vandalism sometimes, in the name of conservation, and treasure hunting in historic areas.

In land use planning the authorities should, in collaboration with the implementing agencies of the relevant regulations, should take following steps to help mitigate such disasters.

- \* Physically mark the identified boundaries of these areas on ground and set down the strategic guidelines for their protection on notice boards at the points of entry from all access points to create public awareness.

- \* Provide gazetted boundaries for buffer zones for these reservations with strictly controlled development proposals. Boundaries of these buffer zones also must carry notices sign posted for easy identification of the boundaries as well as their functional importance to create awareness on their significance. On the ground these buffer zones shall be defined by following permanent and obvious markers in the landscape such as roads, railways, and established field boundaries. Where manmade boundaries are not available, other readily available ones such as streams and rivers can be used.

- \* Control all human interventions in these buffer zones with necessary legislation, approval guidelines for interventions including infrastructure development, monitoring systems and severe penalties for offenders and those who aid and abet them. These guidelines should be applicable

to all irrespective of social, political, or other status. They should also be considered non-bailable offences like those who violate the Antiquities Ordinance.

\* These buffer zones can be important areas for traditional practices, cultural values, rights, and involvement of local/indigenous communities in protection, and use and management round protected areas. Thus, the social buffer zone thus created will provide a sense of belonging to local indigenous or other population groups and local organisations to form a barrier, control and monitoring system between the conservation area and its surroundings.

\* A buffer zone can be managed as an area for research to develop approaches for sustainable use of resources, for ecosystem restoration, education, and training, as well as carefully designed and controlled tourism and leisure activities.

\* The degree of legal protection to buffer zones varies. In most cases where buffer zones are outside the protected area, they fall under the institutional control and jurisdiction of authorities other than those responsible for management of the protected area. This is where the land-use planning authority should join hands with the statutory authority of the reservation to decide on the uses for the area, their detailed approvals, and continuous monitoring of the activities because they need to be linked on the other side with areas fragmented by existing settlements, roads and areas marked for urban expansion.

\* The Planning Authority must insist on the submission of an Environmental Impact Assessment as well as a Socio-Cultural Impact Assessment Report on any infrastructure or other development proposals. These would be carried out by selected independent consultants but paid for by the project proponents. This enforcement should be applicable to both the state and the private sector.

\* There should be a monitoring authority for each site/area comprising of representatives from each of the statutory authority, local community representatives, District Secretary, Tourism Authority, non-political NGOs, Law Enforcing Authorities, and others. This would be similar to Galle Heritage Society looking after the interests of Galle Fort.

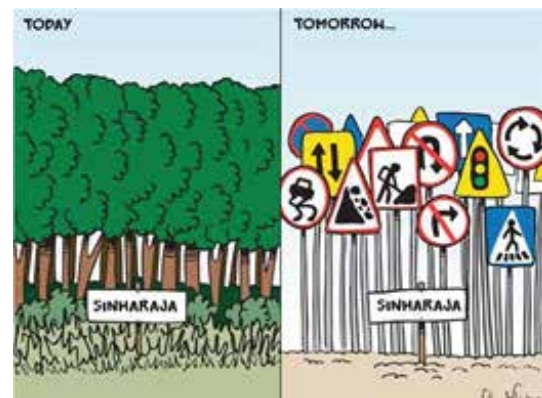
\* Evolve tighter controls on sand mining and quarries in not only on the selection of sites based on the proposed development plans, but also the methodologies used, neighbourhood precautions

and 'Safety at Work' regulations adopted during the operations. The Authorities should also provide the guidelines for the developer to follow on completion of the operations, without leaving such lands blighted.

\* There should be an immediate stoppage of 'slash and burn' agriculture, in any of these identified special areas. If there is an essential need for such activity, the developer should undertake developing a forest of selected trees in a similar land area assigned by the authorities for forestry at the developer's cost and the two projects must go hand in hand. The ownership of such development shall be vested with the state but cared for by the investor with no extra cost to the state.



**City Development Then and Now**



**Sinharaja Forest -Today and Tomorrow**

*A message conveyed in Daily Mirror weekly cartoons published in 2020*

\* The penalties for violation of any of the regulations set out should be strict enough for the offender to feel the pinch – such as confiscation of the company and/or personal properties and wealth and/or long-term prison sentences. These penalties should be applicable to those who aid and abet since it is a crime created against mankind too. They will be treated as unbailable offences as already practiced under the Antiquities Ordinance.

\* The state must also provide maximum publicity for the offenders and those who aid and abet them to discourage future repetitions of such offences.

The Urban Development Authority has already provided a comprehensive document on the guidelines for development in Western Province Wetlands which is approximately 20% of the land area of the country. It outlines the permitted uses for developers and the guidelines for such development. One of the serious drawbacks in this is the lack of a monitoring system for any development work carried after obtaining the initial Certificate of Completion on the original proposal. The area is too sensitive for such loose arrangements and hence, they need to put in place an effective implementation mechanism and monitoring introduced to combat such violations of the given regulations. In addition, other parties to the development such as the consultants, contractors, and users also must take responsibility for such offences because they are expected to advise the developer on such legal standings.

Sri Lanka being an island nation is protected all-round with the mangrove forest forming a unique wetland ecosystem inhabiting the edge of land and sea (lagoons included) and rooted and thriving in seawater. In addition, these mangroves provide natural infrastructure and protection to nearby populated areas by preventing erosion and absorbing storm surge impacts during extreme weather events such as hurricanes. They are also important to the ecosystem, too. Their dense roots help to bind and build soil. They also stabilize shorelines, preventing erosion and protecting the land, and the people who live there, from waves and storms. Thus, the land use planners could incorporate in their plans proposals for adaptable uses whilst conserving these natural treasures we are endowed with. These development guidelines should be extended to the designated buffer zones. Both the conservation areas and the buffer zones should be physically marked on site and prominently displayed with suitable signboards to discourage any encroachments as has been discussed elsewhere.

Historic sites, whether in an urban setting or beyond, provides a sense of belonging to the local community and provides a sociocultural identity of the people. Thus, these sites have an important role to play in land use planning. The Antiquities Ordinance and its implementing authority, the Department of Archaeology, based on the dates of construction. But the list of such buildings and

monuments is incomplete. The planning authorities should go beyond this definition to recognise historically important to the nation as well as to the local community, historic landscapes in urban settings, groups of buildings that blends in a historic area, sites that relate to historic events and personalities should also be protected from unsympathetic interventions as well providing the suitable settings for them to stand out by providing clear guidelines for neighbourhood developments. Furthermore, these buildings and sites that are so recognised should be identified on site in addition to the Gazette notifications and other documents. The buffer zones that come under the Antiquities Ordinance should also be physically marked on site, even in urban settings.

National Physical Planning Department has gone on record to say that there has been rapid urbanisation in the recent past. In 2012, 18.5% of Sri Lanka was urbanised. This figure has now gone up to 46% an increase of 27.5% in less than 12 years. Thus, Urban Planners, Urban Designers and the Architects have a responsibility to counter the effects of global warming, pollution, and other anti-social effects on the community by raising the standards of design. Perhaps they can take a leaf from our traditional designs in preparing garden cities. Roads must not be limited to hard paving and tarred finishes.



### Life cycles of cities – should we emulate other countries?

They need to be lined with trees to make walking comfortable in a hot humid climate such as ours. Large scale developments, whether they be state or private owned, should incorporate blue green landscape designs in their settings. In addition, public open spaces should be provided with recreational facilities for all sections of the public. Providing facilities for open air leisure activities such as ball games for younger generations, adolescents and family groups is as important for community life socially as well as health wise, as walking footpaths for the elderly. With increase in the population in these areas, it is important that the local authorities should provide environmental

infrastructure facilities such as solid waste, sewerage and wastewater disposal systems are developed. Social infrastructure facilities such as schools, health facilities, utility shopping facilities, open air play areas within the residential zones need to be prioritised in sustainable urban area development.

In addition, at a micro-level there should be amendments to the existing regulations where green buildings are a must and not an option. Green Building guidelines should recognise not only the engineering services provided for the building but also planning, design, orientation, choice of materials, colours, and other finishes. The suppliers should also be encouraged to provide environmentally friendly materials for use in buildings. The design team should consider landscaping to make the development blue green with the possibilities of using the land area left from the building, vertical facades and at least a part of the roof leaving the balance for solar panels, for such greening. The developers shall be called upon to develop an improved social responsibility towards not only the present community, but also for the future generations, when preparing their briefs for developments. Thus, such a complete change of the outlook from the entire design team on the social responsibility, environmental technology, materials science, architectural design, and real estate market evaluation will result in a multidisciplinary approach for energy-efficient buildings and a positive impact on the people's livelihoods, homes, public and private infrastructure, health conditions and economic conditions.

Sustainable design should not be seen only as a technical fix, a matter of paying the right consultant enough money to make sure the building ticks enough boxes, or of buying the most innovative piece of cooling technology. It should rather be integrated into the art of architecture. The ideal is that it should help buildings 'be all round better, longer lasting, more pleasurable, and more beautiful' as Allison Brookes, the architect declared. Slightly more radically, the profession needs to reconsider its value systems such as what is considered good or bad.

A study of traditional approaches to all aspects of the building industry in Sri Lanka provides good examples of harmonising the built environment with nature. It would inspire those involved in the industry on the multidisciplinary approaches of our ancestors in safeguarding what we inherited and expected to safeguard for the future generations. The study would not only reveal the principles

of design and development but also the methodology adopted in negotiating climatic conditions and providing comfortable living environments with the use of strategic planning to blend with nature and the environmentally friendly building materials. In addition to calling for blue green environments in planning, our cities should not be developed with only heat trapping materials like asphalt, cement, glass, and steel to create 'an urban heat island effect' that will increase city temperatures by at least 2-3°C than the suburbs. These surfaces absorb - rather than reflect - the sun's heat, causing surface temperatures and overall ambient temperatures to rise. In addition, the orientation of the building matters in tropical conditions. In the western coastal belt in Sri Lanka, there is much demand for apartment buildings that face the sea. Little do they realise that the rise in temperature in these buildings in the afternoon does not go down for a good two hours after sunset. Can this be the technical reason why our ancestors did not face their houses to the West?

The professional institutes associated with the industry should take the initiative and lean on the authorities and the legislative bodies for a change in attitudes and bring in the necessary legal recognition for a Green Industry to include not only the guideline and regulations but also an effective monitoring methodology and suitable strict deterrents for violations of the principals involved in these thoughts. They owe it to the society they serve as well as for the future generations of mankind.

The contractors and the workmen also have their own responsibilities in this effort by making a clear assessment and management of social risks and impacts. In addition to the collective responsibilities, they are committed to the cause of keeping the workplaces clean by minimising the waste, periodical removal of debris and garbage and avoiding any provisions for mosquito breeding. They should adhere to the working conditions as laid down by the Ministry of Labour as well as the Construction Industry Development Authority. In addition to eradicating mosquito breeding in building sites, they should also take into consideration, the 'Safety at Work' for both the workmen at site and the neighbourhood owners, occupiers, and users. One of the commonest issues that arise from such development is noise pollution that disturbs the neighbourhood. When operating heavy equipment, one needs to be mindful of the area you are working in and any obstacles you may



encounter. Overhead power lines should be de-energized, or if that's not possible, establish barriers to avoid contacting them. If digging the ground, make sure that all underground sewer, water, and electrical service lines, have been to avoid damaging them. It is of particular concern is the use of heavy machinery at site. The site personnel should always be wearing their personnel protective equipment such as gloves, safety glasses, sturdy boots, and hard hats. When loading and unloading equipment at the site, make sure it is done at level ground to avoid rollovers when getting it on or off the truck or trailer. Ideally, these areas need to be cordoned off with barriers to keep workers from accidentally getting near operating equipment. If moving or operating equipment near workers, use a spotter, radio, or hand signals to communicate, to keep the blind spots clear. This is especially important when backing up. The equipment will have backup alarms, but they often go unheeded on construction sites due to their prevalence. Whenever possible, workers should be kept out of areas where heavy equipment is in operating. Operators should be aware of their swing radius, especially when working in tighter spaces, to avoid hitting other workers, bystanders, vehicles, or equipment in the vicinity.

Operating tower cranes at site bring added risks that need to be taken care of. Risk factor of using most of the other heavy equipment is limited to within the boundaries of the building site. But the use of tower cranes, especially in urban settings extends these risks to the adjoining public areas such as roads and public spaces as well as the neighbouring premises. When a tower crane is not in use, the boom or jib is left to swing freely like a weathervane in the wind, or there can be a danger that crane may collapse during the high winds. When left free swinging or in use, the jib of the crane may swing over the premises of neighbouring land. This may even amount to an act of trespass unless the person on whose land the crane is fixed, obtains prior consents from the neighbouring landowners.

One of the important cases on tower cranes was decided in 1996 in the District Court of Colombo when the contractor sought an enjoining order against the neighbour of one of their development sites from acting against the former for extending the jib of the tower crane over adjoining site. The court ordered the plaintiff to get an insurance policy in a sum of Rupees Two Hundred Million to cover any or all be caused to the Defendant's property, to any building, person, or

property there on in addition to a rent of Rupees Five Million as a licence fee for the operation of the crane over the Defendant's air space for the entire construction period. The order by the judge was based on Anchor Brewhouse Case of 1987 in London. Even though there was no actual damage done to the defendant's property or persons, the risk was there and hence the judgement. This is to be noted by the clients, consultants, contractors and even insurers dealing with these situations. It is not just another third-party insurance cover. "Prevention is Better than Cure"!

Thus, rapid urbanisation has its negative aspects both from the point of view climate change and risks in the construction methodology practised. The stakeholders have the capacity to rise above these challenges with multi-disciplinary collaboration for a sustainable built environment. Let us, the construction industry personnel take the initiative and provide carbon-neutral buildings, tree lined streets and useful and eco-friendly blue-green reservations to entice the legislators to promote the country's resources and direct investments to enhance current and future potential of meeting human needs, biodiversity, and happy, safe and healthy lifestyles in Sri Lanka.

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‘... Rivers do not drink their own water.  
Trees do not eat their own fruits.  
Sun does not shine on itself; and  
Flower do not spread their own fragrance  
for themselves.

Living for others is a rule of nature.  
We are born to help each other.  
No matter how difficult it is...  
Life is good when you are happy; but,  
Better when others are happy  
because of you. ...’

—Pope Francis —

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# 11<sup>th</sup> World Construction Symposium 21 & 22 July 2023 Colombo



Since 2012, each year the World Construction Symposium has been bringing together academics, researchers, industry practitioners and students to Colombo from all over the world to share their knowledge, experience and research findings in the area of sustainable built environment through a wide range of activities such as Keynote address, Technical Sessions, Industry presentations and Panel Discussions.

The Symposium is the premier Construction related conference in Sri Lanka and is looked forward to by the Sri Lankan academics and industry practitioners. The Symposium will be promoted extensively nationally and internationally through government, private sector and other related authorities and organizations including Sri Lankan missions abroad, foreign missions in Sri Lanka, related government agencies, Chambers of Commerce and Industry Associations. In addition, our International Partners, Sponsors and Supporters will also promote the Conference through their own networks.

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**“Accelerating Sustainability  
in the Built Environment: Policies,  
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**1<sup>st</sup>**  
**World Construction  
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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.*

**2<sup>nd</sup>**  
**World Construction  
Symposium,**

*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.*

**3<sup>rd</sup>**  
**World Construction  
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*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.*

**4<sup>th</sup>**  
**World Construction  
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*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.*

**5<sup>th</sup>**  
**World Construction  
Symposium,**

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

**6<sup>th</sup>**  
**World Construction  
Symposium,**

*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.*

**7<sup>th</sup>**  
**World Construction  
Symposium,**

*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.*

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**World Construction  
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*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.*

**9<sup>th</sup>**  
**World Construction  
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*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.*

**10<sup>th</sup>**  
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*10th World Construction Symposium on the theme "Sustainability and resilience in the built environment Changed Perspectives" held during 24 - 26 July 2022, Online.*



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# Sri Lankan Student Harnesses AI to Revolutionize Education: A Remarkable Achievement

- By Shanika Gamage -

In a remarkable display of talent and innovation, a Sri Lankan university student, Dilum Liyanage, has made significant strides in the field of artificial intelligence (AI) by creating a groundbreaking web page and computer app, Scholalify. This pioneering platform employs AI technology to revolutionize education in Sri Lanka, catering to school students, university students, teachers, and individuals across various disciplines. Dilum's extraordinary accomplishment deserves recognition and encouragement, with the government and authorities urged to support such visionary students and attract investors to this promising endeavor.



## A Revolutionary Solution for Sri Lankan Education

Scholalify, accessible via the web page <https://www.scholalify.com> and a computer app, is an AI-powered educational tool designed to enhance learning in Sri Lanka. Dilum, a student of Computer Science at The University of Amorial, Canada, and a graduate of Royal College, Colombo, conceived this platform with a focus on enabling independent learning in subjects like A-Level Biology, Mathematics, and more.

This innovative platform boasts a comprehensive selection of over 25 subjects, each accompanied by a Chat GPT AI Chatbot capable of providing answers. Remarkably, Scholalify's AI capabilities allow it to engage in conversations in Sinhala, Tamil, and English, making it accessible to a diverse range of users. It caters to various disciplines, including biology, mathematics, technology, commerce, and arts, ensuring a comprehensive educational experience.

A standout feature of the Scholalify app and website is its ability to collaborate with university students in Sri Lanka, helping solve specific problems. With over 200 university students joining the Scholalify community, users have the added advantage of selecting the best-suited teacher from this pool of talented individuals.

## Dilum's Journey: A Story of Dedication and Achievement

Dilum's journey is a testament to his dedication and passion for education and technology. After successfully passing his GSE Advanced Level in Mathematics in 2018, he secured admission to the Faculty of Engineering at the University of Peradeniya. However, driven by a desire to explore further opportunities, he selflessly gave up his place to another deserving student. Dilum then embarked on a scholarship program at The Memorial University of Canada, making him the first Sri Lankan student to create an app and web page utilizing AI technology while pursuing his degree.





## A Call for Support and Recognition

Dilum's groundbreaking achievement in developing Scholalify highlights the immense potential of AI in transforming education in Sri Lanka. It is imperative that education experts and authorities recognize and appreciate the exceptional talent displayed by Dilum. Moreover, it is crucial that steps be taken to provide more value to education in the country, fostering an environment that nurtures the ingenuity of gifted students like Dilum.

Encouragingly, the government and authorities are urged to lend their support to Dilum's initiative. By fostering an ecosystem that encourages innovation and entrepreneurship in education, Sri Lanka can position itself as a leader in AI-powered learning solutions. Additionally, attracting investors to this promising project would fuel further advancements and ensure the sustainability of Scholalify.

## Congratulations, Dilum Liyanage!

In conclusion, we extend our heartfelt congratulations to Dilum Liyanage for his remarkable achievement in creating Scholalify, an AI-driven education platform that has the potential to revolutionize learning in Sri Lanka. Dilum's dedication, vision, and technical expertise have resulted in a groundbreaking solution that benefits students, teachers, and individuals across various disciplines. It is our hope that the government, education authorities, and investors will recognize the immense value of Dilum's creation and rally behind this inspiring student and his remarkable project. By doing so, immense value of Dilum's creation and rally behind this inspiring student and his remarkable project. By doing so, Sri Lanka can pave the way for a future where technology and education intersect to create transformative learning experiences for all.





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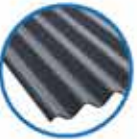
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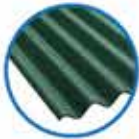
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# What happens next in the SL Construction Industry,



*up close and personal discussion  
with the Secretary of Ministry of Urban Development and Housing,  
**Mr. W.S. Sathyananda.***

Sathyananda Wijesekara Subasinghe is a highly esteemed Sri Lankan civil servant who has been actively involved in government service for more than 24 years. Presently, he serves as the Secretary to the Ministry of Urban Development and Housing, where he oversees urban planning, development, construction, and housing initiatives. Sathyananda's commitment to public service and wealth of experience continues to significantly contribute to Sri Lanka's development and administration.

- By Shanika Gamage -



In recent years, Sri Lanka's construction industry has experienced remarkable growth and development, becoming a vital pillar of the nation's economy. With ambitious infrastructure projects, urbanization initiatives, and a growing demand for real estate, the sector has been a key driver of employment and economic prosperity. However, as with any industry, the construction sector faces its fair share of challenges and uncertainties that require careful navigation and strategic planning.

To shed light on the future of the Sri Lankan construction industry and gain insights into the government's vision and strategies, we had the privilege of sitting down with the esteemed Secretary of Urban Development, Mr. W.S. Sathyananda, a prominent figure in the country's urban planning and infrastructure landscape. With his deep understanding of the sector and hands-on experience, the Secretary offers valuable perspectives on the trajectory of the industry and the steps being taken to ensure its sustained growth and success.

Join us as we delve into the Secretary's vision, uncover the key trends and strategies driving the industry, and gain an in-depth understanding of what happens next in the Sri Lankan construction sector.

### **Q1: What are the current trends and challenges in the Sri Lanka construction industry?**

**A:** The construction industry in Sri Lanka, like many others worldwide, faced significant challenges due to the Covid-19 pandemic and subsequent economic downturn. The dual impact of these crises caused a slowdown in construction activities, leading to a difficult situation for industry stakeholders. This was further exacerbated by the departure of a substantial number of professionals and workers from the construction sector, as economic uncertainties prompted individuals to seek opportunities abroad.

However, recent developments in the country have sparked a glimmer of hope for the construction industry. A notable contributing factor has been the downward trend in bank interest rates, which has facilitated easier access to financing for construction projects. This has provided a much-needed impetus for developers and investors to initiate new construction ventures and revive stalled projects.

Furthermore, the easing of import restrictions and the stabilization of building material prices have contributed to a positive outlook for the construction industry. The availability of affordable and quality building materials is crucial for project feasibility and profitability, enabling construction companies to plan and execute projects more effectively.

Looking ahead, the construction industry in Sri Lanka is projected to experience a resurgence and continue its growth trajectory over the forecast period. With a projected Compound Annual Growth Rate (CAGR) of 7.6% from 2023 to 2027, the industry is poised for steady expansion. This growth is expected to translate into increased construction output, with the industry's current value of LKR 1535 billion forecasted to reach LKR 2058.3 billion by 2027.

While the construction industry is on a path to recovery, the momentum varies across different sectors. Sectors such as transport, renewable energy, housing, industrial zones, and tourism are gradually regaining their pace, presenting opportunities for new projects and investments. However, it is important to note that larger sectors such as infrastructure and real estate are still in a state of relative stagnation, requiring concerted efforts and supportive measures to reignite growth.

### **Q2: How has the COVID-19 pandemic impacted the construction sector in Sri Lanka, and what measures has the government taken to address these challenges?**

**A:** During the Covid-19 pandemic, the construction industry faced immense challenges in ensuring the safety of workers while keeping projects operational. However, through careful planning and strict adherence to health protocols, the industry swiftly adapted to the new normal.

Isolation measures were implemented, with individual work zones established to enable physical distancing. Rigorous sanitation protocols, including handwashing stations and disinfection of tools, were put in place. Personal protective equipment was provided, and health screenings became routine.

Collaboration between industry associations, government agencies, and health authorities

was crucial in developing comprehensive guidelines and providing necessary training. The industry showcased resilience and adaptability, prioritizing worker safety while supporting economic recovery.

As the situation continues to evolve, the construction industry remains vigilant, adjusting practices to align with the latest health guidelines. Through their commitment to worker well-being and efficient risk management, construction sites have demonstrated their ability to contribute to economic growth in challenging times.

### **Q3: What are the major infrastructure projects planned or underway in Sri Lanka? How do they contribute to the development of the country?**

**A:** The Ministry of Urban Development and Housing is currently engaged in collaborative efforts with esteemed financial institutions such as the Asian Infrastructure Bank (AIIB), Asian Development Bank (ADB), and the European Investment Bank (EIB) to execute strategically significant projects.

One of the key projects in progress involves the construction of 5,500 housing units for underserved settlements and the redevelopment of liberated lands on a Public-Private Partnership (PPP) basis. This endeavor, supported by the AIIB, aims to provide housing solutions to marginalized communities and contribute to the sustainable development of these areas.

Additionally, the Ministry is working in partnership with the ADB to expedite the Greater Colombo Wastewater Management Project (GCWMP) and with the EIB to accelerate the Greater Colombo Water and Wastewater Management Improvement Investment Program (GCWMIIP). These initiatives are critical for enhancing the wastewater and water management systems in the Greater Colombo area, promoting environmental sustainability, and fostering a healthier living environment for residents.

The significance of these three ongoing projects extends beyond their individual scope. They serve as catalysts for expediting various other development initiatives in the Colombo city and its suburbs, including the highly anticipated Port City Project.

Moreover, the Government is actively pursuing the recommencement of the Japan

International Cooperation Agency (JICA) funded light rail transit project and the ADB funded KV line upgrading project. By streamlining approval processes and curtailing delays, the Government aims to fast-track the implementation of these vital transportation infrastructure projects.

Efforts are also underway to resume the construction of middle-class housing schemes, which had been temporarily halted due to the sharp rise in construction material costs since March 2022. With the recent decline in construction material prices and the removal of import restrictions, the Ministry anticipates initiating the sale of housing units with appropriately revised pricing.

Recognizing the significance of the Power and Energy Sector, the Government has focused on attracting substantial investments. To this end, long-term contracts have been signed between the Government and reputable companies in the petroleum distribution sector for the importation, distribution, and sales of petroleum products. These agreements create opportunities for upfront investments in the construction sector, both in the short-term and mid-term.

Furthermore, the Government is actively involved in several green energy projects in the Northern Province, particularly in Mannar, with the support of the Government of India. These projects aim to harness renewable energy sources, promote sustainable practices, and contribute to the overall development of the region.

### **Q4: Could you highlight any initiative or policies the government has implemented to attract local and foreign investment in the construction industry?**

**A:** The local construction industry in Sri Lanka boasts a substantial number of companies, indicating a competent and capable workforce ready to undertake projects. However, to stimulate further growth and drive the industry to new heights, foreign investment projects are crucial. These foreign investments play a pivotal role in kickstarting construction endeavors across various sectors, ranging from infrastructure development and tourism to mineral extraction, industries, energy, ports, and more.

Recognizing the significance of foreign investments, the Sri Lankan Government has taken proactive measures to attract

international investors. Establishing a dedicated National Agency for Public-Private Partnerships (NAPPP) is one such initiative aimed at expediting the preparation of local projects for private sector investments. This forward-thinking approach creates a streamlined framework for collaboration between the public and private sectors, enabling faster project implementation and encouraging foreign investors to actively participate in the construction industry.

The establishment of the NAPPP serves as a catalyst for accelerating the entire project lifecycle, from conception and planning to procurement and execution. By providing a centralized platform, the agency ensures efficient coordination among various stakeholders, expedites regulatory processes, and facilitates smoother project implementation. This translates into a shorter timeframe for projects to become available for private sector investments.

The current initiatives undertaken by the NAPPP hold great promise for the construction industry in Sri Lanka. By fast-tracking project preparation, the agency is creating a favorable environment for private sector investments, paving the way for an influx of foreign capital and expertise. This infusion of foreign investment will not only invigorate the construction sector but also foster economic growth and job creation, benefiting the country.

The initiatives of the NAPPP are poised to yield tangible results within a relatively short period. The expedited preparation of local projects, coupled with the enhanced ease of doing business and investor-friendly policies, will attract foreign investors to the construction industry. The availability of diverse investment opportunities, spanning various sectors such as infrastructure, tourism, mineral extraction, industries, energy, and ports, further amplifies the attractiveness of the Sri Lankan market.

With the support of the NAPPP and the robust participation of foreign investors, the construction industry in Sri Lanka is primed for significant expansion. The influx of foreign investment projects will create a ripple effect, generating employment opportunities, fostering knowledge transfer, and

driving technological advancements in the local construction sector. This synergy between local expertise and foreign capital will contribute to the country's overall development and position Sri Lanka as an attractive destination for construction investment.

#### **Q5: What steps are being taken to promote sustainable and environmentally friendly practices in the construction sector?**

**A:** In the modern era, the relentless pursuit of satisfying human requirements through the construction of buildings and structures has resulted in an alarming array of irreversible environmental damages. The unchecked consumption of non-renewable resources has taken a toll, compelling us to reassess our practices and adopt sustainable solutions.

Enter the concept of green buildings, a paradigm that aims to minimize the adverse effects of global warming while enhancing the quality of living standards. At its core, green building emphasizes the effective utilization of resources such as water, energy, land, and raw materials throughout the entire life cycle of a construction project. From the sourcing of raw materials to construction, maintenance, and eventual disposal, green building practices prioritize environmental sustainability and social well-being.

Recognizing the global shift towards sustainable practices, the need for environmentally friendly buildings in Sri Lanka has become increasingly apparent. In response, the Ministry of Environment took the initiative to introduce the National Green Building certification for buildings, subsequently passing on the role of enforcement to the Urban Development Authority. Collaborative brainstorming sessions involving relevant professional bodies played a pivotal role in crafting the guidelines and processes necessary for the certification.

In a significant milestone for the green building movement in Sri Lanka, the certification was officially gazetted in 2021. The inclusion of the certification as a regulation applies to buildings exceeding a floor area of 1000 m<sup>2</sup>. This milestone solidifies the commitment to transform conventional buildings into green buildings, thereby advancing the sustainable green concept.

The implementation of the National Green Building certification heralds a new era of environmentally conscious construction practices in Sri Lanka. By adhering to the certification guidelines, building stakeholders can contribute to mitigating environmental impact, reducing carbon footprints, and conserving valuable resources. This comprehensive approach ensures that the construction industry plays a vital role in promoting a greener and more sustainable future.

Moreover, the benefits of green buildings extend beyond environmental preservation. These structures offer enhanced indoor air quality, better thermal comfort, and improved occupant health and well-being. The adoption of sustainable building practices also leads to long-term cost savings through reduced energy consumption and operational expenses.

As the movement gains momentum, stakeholders in the construction industry are increasingly recognizing the value of green building practices. Architects, engineers, developers, and contractors are aligning their strategies with sustainable principles to meet the demands of an evolving market and responsible development. This shift towards greener construction is not only a response to regulatory requirements but also a proactive commitment to creating a built environment that harmonizes with nature.

#### **Q6: How is the government addressing the issue of housing shortage in Sri Lanka, particularly in urban areas?**

**A:** First and foremost, the government has placed a strong emphasis on the development of affordable housing solutions. Through collaborative efforts with public and private sector entities, the government is striving to provide accessible and affordable housing options for low-income and middle-income segments of society. This includes the implementation of housing schemes specifically tailored to meet the needs of urban dwellers, ensuring that housing is within reach for those who need it most.

Furthermore, the government has encouraged and facilitated public-private partnerships (PPPs) in the housing sector. By leveraging the expertise and resources of private entities, the government aims to expedite the construction of housing projects and bridge the housing gap in urban areas.

These partnerships enable the efficient utilization of resources, innovative design approaches, and streamlined project management, resulting in the timely delivery of quality housing units.

To facilitate the development of housing projects, the government has taken steps to streamline regulatory processes and improve ease of doing business. This includes the establishment of dedicated authorities and regulatory bodies to oversee the planning, approval, and implementation of housing projects. By reducing bureaucratic hurdles and enhancing transparency, the government aims to attract more investments in the housing sector and accelerate the construction of much-needed housing units.

In addition to affordable housing initiatives, the government has also focused on urban regeneration and redevelopment projects. This involves the revitalization of existing urban areas, the transformation of underutilized or dilapidated buildings, and the creation of vibrant, sustainable communities. Through careful urban planning and strategic interventions, the government seeks to optimize land use, enhance infrastructure, and improve the overall livability of urban areas.

Furthermore, the government recognizes the importance of integrated housing and urban development strategies. This entails not only the construction of housing units but also the provision of essential amenities and services such as healthcare facilities, schools, transportation networks, and recreational spaces. By adopting a holistic approach, the government aims to create well-planned, inclusive urban environments that cater to the diverse needs of residents.

The government is also exploring innovative financing mechanisms to address the housing shortage. This includes exploring options such as microfinance, mortgage guarantee schemes, and rent-to-own models to facilitate affordable housing solutions for individuals and families in urban areas. By diversifying financing options and making housing more accessible, the government aims to empower individuals to fulfill their dream of owning a home.

#### **Q7: Are there any plans to improve the regulatory framework and streamline the approval processes in the construction industry?**

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**A:** The commitment of the Presidential Secretariat to enhance Sri Lanka's position on the Ease of Doing Business Index is driving comprehensive efforts across eight thematic areas. One of the key focuses of this endeavor is the Construction Industry, which plays a pivotal role in the country's economic growth. To streamline and expedite the approval process in this sector, the Construction Industry Development Authority (CIDA) has taken significant strides under the guidance and support of the Ministry of Urban Development and Housing.

Recognizing the need for a simplified and efficient approval system, the Ministry is actively collaborating with CIDA to pave the way for a more business-friendly environment. Through meticulous planning and robust implementation strategies, remarkable progress has already been achieved. The dedicated efforts of the ministry and CIDA have yielded tangible results, with approval times significantly reduced. Looking ahead, the full implementation of the system in the coming months holds great promise, as it is anticipated to further streamline the approval process and bring down the timeframe to an impressive three weeks.

In addition to expediting approvals, the Ministry of Urban Development and Housing is driving the development of a National Construction Industry Database. This crucial initiative, mandated under Section 55 of the Construction Industry Development Act No. 33 of 2014, aims to establish a comprehensive digital platform. The envisioned database will serve as a centralized hub, gathering and monitoring data related to the demand and supply of construction materials. This valuable resource will empower stakeholders across the construction industry with accurate information for informed decision-making processes.

By harnessing the power of digital technology, the National Construction Industry Database will revolutionize how the industry operates. It will facilitate real-time tracking of construction material demands, allowing for proactive planning and resource allocation. Moreover, this database will serve as a vital tool for policymakers, investors, and industry professionals, empowering them with reliable data to guide their strategic decisions. With a centralized platform in place, the industry will witness enhanced transparency, improved efficiency, and greater collaboration among stakeholders.

The Ministry's proactive approach and unwavering commitment to fostering a favorable business environment for the construction industry underscores its dedication to driving economic growth and attracting investments. By simplifying the approval process and establishing the National Construction Industry Database, the government is nurturing an ecosystem that promotes innovation, efficiency, and sustainable development. These initiatives align with Sri Lanka's broader vision of positioning itself as a prime investment destination, marked by ease of doing business, streamlined processes, and a vibrant construction industry.

#### **Q8: What role does the Ministry of Urban Development play in ensuring the growth and development of the construction sector?**

**A:** The construction industry in Sri Lanka holds significant importance, accounting for approximately six to seven percent of the country's GDP. In the past, it experienced remarkable growth, contributing substantially to the overall economic development. However, like many other sectors, the construction industry has faced challenges during the current economic crisis, resulting in a decline and negative growth. Nonetheless, as the economy gradually recovers, we can anticipate the industry regaining its momentum and returning to its customary growth trajectory.

Yet, our focus extends beyond merely restoring the construction industry to its pre-crisis state during the process of economic normalization. Our objective is to establish a construction sector that actively contributes to the economy, taking center stage in the nation's development. In this regard, the role of fiscal and monetary policies becomes paramount. Factors such as the prices of construction materials and bank interest rates hold great significance, and we have consistently presented recommendations in these areas. Encouragingly, the government has responded positively, and we anticipate further interventions concerning prices and interest rates from relevant authorities.

Presently, the export of construction services lacks a concentrated drive and formal recognition as a distinct export sector. The achievements made thus far can be largely attributed to the commendable efforts of a few private sector companies. Consequently, the Ministry of Urban Development and Housing is actively collaborating with the Ministry of Foreign Affairs and the Export



Development Board (EDB) to formalize the recognition of construction services as a separate export sector. We are optimistic that the Central Bank and the Department of Census and Statistics will undertake prominent measures to appropriately reflect export revenues from the construction industry in their publications. Moreover, the Ministry is dedicated to expediting the implementation of the international transaction reporting system (ITRS), which will provide enhanced facilitation in this endeavor. With the engagement of the Ministry of Foreign Affairs, Sri Lankan embassies overseas will play a proactive role in promoting the export of construction services while facilitating connections between the Chamber of Construction Industry (CCI), business chambers, and embassies in respective countries. This concerted effort aims to generate an additional \$0.5 billion in income for the country by 2025, providing a buffer for construction agencies to withstand external shocks.

**Q9: How does the government support the professional development and capacity building of construction industry professionals in Sri Lanka?**

**A:** The Construction Industry Development Authority (CIDA) places great emphasis on enhancing the competency of middle-level management in the construction industry. To achieve this objective, CIDA offers an extensive array of approximately 100 training programs specifically tailored to meet the diverse needs of professionals in the sector. These programs are designed to equip construction contract companies with the latest knowledge and skills necessary to train their human resources effectively.

Through these training initiatives, CIDA ensures that construction professionals have access to cutting-edge knowledge, enabling them to stay abreast of industry trends, emerging technologies, and best practices. The dynamic nature of the construction industry demands a flexible and responsive approach, and CIDA is committed to meeting the evolving needs of this field.

One crucial aspect emphasized by CIDA is the promotion of health and safety (H&S) policies within the construction industry. Recognizing the importance of creating a safe working environment, CIDA provides comprehensive training programs focused on H&S practices. These programs aim to instill a culture of safety consciousness among construction professionals, ensuring that all

stakeholders prioritize the well-being of workers and adhere to the highest standards of occupational health and safety.

In addition to H&S training, CIDA actively supports the implementation of the National Vocational Qualification (NVQ) framework for construction professionals. The NVQ system provides a standardized approach to assess and certify the competencies of individuals in the construction industry. By encouraging professionals to obtain NVQ qualifications, CIDA enhances their career prospects and contributes to raising the overall quality of construction services in Sri Lanka.

To further enhance professionalism and accountability, CIDA also plays a pivotal role in issuing identity cards to qualified construction professionals. These identity cards serve as official recognition of their expertise and competence, enabling clients and stakeholders to identify and engage with skilled individuals who meet industry standards.

**Q10: What prospects and opportunities do you see for the Sri Lanka construction industry? Are there any specific areas that the government aims to focus on.**

**A:** The Sri Lanka construction industry holds promising prospects and opportunities, even amidst the current period of contraction. One notable development is the increasing interest of large-scale construction contracting firms in exploring the possibility of exporting construction services. This forward-looking approach demonstrates the industry's resilience and adaptability, as it seeks new avenues for growth beyond domestic borders.

Recognizing the potential in exporting construction services, the government acknowledges the significance of diversifying revenue streams and expanding market reach. Even as the economic crisis subsides, the government remains committed to supporting construction companies in their endeavors to enter international markets. Steps are being taken to actively consider and provide the necessary support requested by these companies to facilitate their export initiatives.

By venturing into the global market, the Sri Lankan construction industry can tap into new opportunities and showcase its expertise on an international platform. This not only

helps in creating additional revenue streams but also enhances the reputation and credibility of Sri Lanka's construction sector globally.

Moreover, the government aims to focus on specific areas that hold immense potential for growth and development. These areas include infrastructure development, tourism, mineral extraction, industries, energy, and port-related projects. By prioritizing these sectors, the government aims to stimulate economic growth, attract foreign investments, and create employment opportunities within the construction industry.

Additionally, the government is keen on bolstering the ease of doing business in the construction sector. Efforts are underway to simplify and streamline the approval process for construction projects, ensuring a more efficient and transparent environment. By reducing bureaucratic hurdles and enhancing the ease of doing business, the government aims to attract more investments, both domestic and foreign, into the construction industry.

Overall, the future of the Sri Lanka construction industry holds immense potential, with opportunities for expansion and diversification. Through strategic initiatives, support for exporting construction services, and targeted focus on key sectors, the government envisions a thriving and globally competitive construction industry that contributes significantly to the country's economic growth and development.

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As I bid farewell to Mr. Sathyananda, I couldn't help turning towards the high-rise view of the city from "Suhurupaya" and wonder how the Sri Lanka construction industry has demonstrated resilience and adaptability in the face of the Covid-19 pandemic and the economic downturn. Looking ahead, the industry is poised for growth and development with initiatives focused on streamlining processes, promoting green building practices, and recognizing construction services as a formal export sector. The government's commitment to infrastructure development and the establishment of key initiatives such as the National Construction Industry Database and the National Agency for Public-Private Partnerships will further propel the industry forward. With a collective vision and dedication, the construction industry in Sri Lanka is poised to create a brighter and more prosperous future, driving economic growth, and improving the quality of life for all.

# Leadership towards Sustainability in the Sri Lankan Construction Industry - **CIOB Green Awards**



The Ceylon Institute of Builders (CIOB) is launching an awards program to recognize exceptional leadership towards sustainability in the Sri Lankan construction industry. These awards highlight the CIOB's commitment to promoting sustainable practices and driving positive change. They aim to honor individuals, organizations, and products/systems that have demonstrated outstanding innovation in advancing sustainability. By embracing sustainable practices and making significant contributions to environmental preservation, social responsibility, and economic resilience, these awardees have reshaped the industry's landscape. Participation in the awards provides professionals, organizations, and product/system developers with a platform to showcase their expertise and commitment to sustainable development. The selection process will be thorough, transparent, and impartial, with a panel of expert judges evaluating applications

against predefined criteria tailored to the Sri Lankan construction industry. The CIOB invites all those who have made remarkable strides in sustainability to submit their expressions of interest. Through this recognition, participants have the opportunity to inspire others, promote the adoption of sustainable practices, and further innovation and collaboration in the industry.

The awards will be presented on 22nd July 2023 at the Awards night of the 11th World Construction Symposium held during 21–22 July 2023, in Colombo. WCS is the annual conference advocating and promoting sustainable construction. Encouraged by the renowned successes of the 1st World Construction Symposium in 2012 and successive World Construction Symposia from 2013-22, the Ceylon Institute of Builders (CIOB) the premier professional organization of building and construction professionals in Sri Lanka together with University of Moratuwa (UOM) organize this flagship venture for the 11th time this year.

*CIOB plans to celebrate the remarkable achievements and transformative impact of sustainable leadership in the Sri Lankan construction industry.*

Evaluation committee members are **Prof. A.K.W. Jayawardane (Chairman), Prof. Chitra Weddikkara, Dr. Tissa Meepe, Dr. Ashan Asmone and Eng. Saliya Kaluarachchi**

# **CIOB** **Green Awards**

Evaluation Committee



**Prof.**  
**A.K.W. Jayawardane**  
**Chairman**



**Prof.**  
**Chitra Weddikkara**  
**Member**



**Dr.**  
**Tissa Meepe**  
**Member**



**Dr.**  
**Ashan Asmone**  
**Member**



**Eng.**  
**Saliya Kaluarachchi**  
**Member**

As the world grapples with the challenges of climate change and environmental degradation, sustainable construction has emerged as a vital solution for creating a more environmentally friendly and resilient future. Sustainable construction aims to minimize the negative impacts of building projects on the environment while maximizing their positive contributions. From reducing carbon emissions to preserving natural resources, sustainable construction practices are transforming the way we build, design, and operate buildings. This article explores the rise of sustainable construction, highlighting its key principles, benefits, and innovative approaches to building a sustainable future.

## Building a Sustainable Future:

By Shanika Gamage

# The Rise of Sustainable Construction



*“Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” – Gro Harlem Brundtland*

### 1. The Principles of Sustainable Construction:

Sustainable construction encompasses various principles that guide the design, construction, and operation of buildings.

#### These principles include:

- a) **Energy Efficiency:** Energy-efficient buildings minimize energy consumption and reduce greenhouse gas emissions. They employ strategies such as efficient insulation, energy-efficient appliances, natural lighting, and renewable energy systems.
- b) **Resource Conservation:** Sustainable construction focuses on preserving natural resources by using recycled and renewable materials, reducing waste generation, and implementing efficient water management systems.

c) **Indoor Environmental Quality:** Buildings designed with occupants' well-being in mind prioritize indoor air quality, thermal comfort, noise reduction, and access to natural light, improving occupants' health and productivity.

d) **Lifecycle Assessment:** Sustainable construction considers the entire lifecycle of a building, from construction to operation and eventual demolition. This approach ensures that environmental impacts are minimized at every stage.



## 2. Benefits of Sustainable Construction:

The adoption of sustainable construction practices brings several benefits to individuals, communities, and the environment.

### **These include:**

a) **Reduced Environmental Impact:** Sustainable construction significantly reduces carbon emissions, minimizes waste generation, and conserves natural resources. This results in a smaller ecological footprint and a healthier planet.

b) **Energy and Cost Savings:** Energy-efficient buildings consume less energy, leading to substantial cost savings for both homeowners and businesses. Investments in energy-saving technologies and renewable energy systems often pay for themselves in the long run.

c) **Improved Indoor Comfort:** Sustainable buildings prioritize occupant comfort by offering better indoor air quality, temperature regulation, and natural lighting. This leads to healthier, more productive environments.

d) **Enhanced Resilience:** Sustainable construction practices improve a building's resilience to natural disasters and climate change impacts. These practices include designing for flood resistance, incorporating green infrastructure, and utilizing durable materials.



### 3. Innovative Approaches to Sustainable Construction:

The rise of sustainable construction has given rise to innovative approaches and technologies that push the boundaries of traditional building practices.

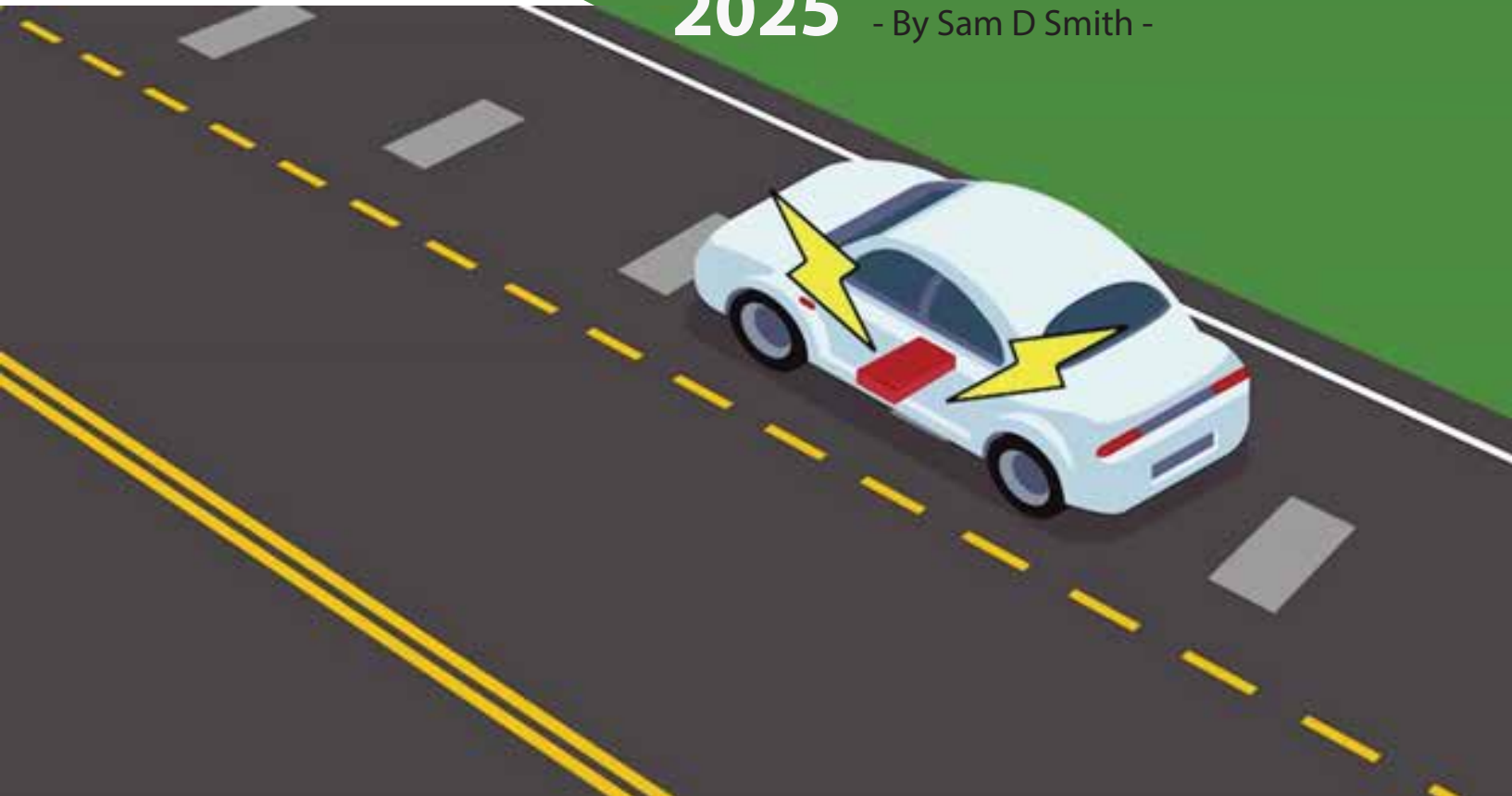
#### **Some notable examples include:**

- a)** Green Building Certifications: Green building certification systems, such as LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method), provide frameworks for assessing and recognizing sustainable buildings. These certifications encourage the adoption of sustainable construction practices and raise awareness among developers and stakeholders.
- b)** Passive Design Strategies: Passive design strategies harness natural elements like sunlight, wind, and shade to minimize energy consumption. Techniques such as passive solar design, natural ventilation, and daylighting are incorporated to optimize energy efficiency without relying heavily on mechanical systems.
- c)** Green Roofs and Vertical Gardens: Green roofs and vertical gardens are innovative ways to incorporate nature into the built environment. They provide numerous benefits, including improved air quality, reduced urban heat island effect, stormwater management, and biodiversity enhancement.
- d)** Prefabrication and Modular Construction: Prefabrication and modular construction techniques promote sustainability by reducing waste, improving construction efficiency, and enhancing quality control. These methods allow for the use of sustainable materials and facilitate the incorporation of energy-saving features.

Building a sustainable future requires a fundamental shift in the way we design, construct, and operate buildings. Sustainable construction practices offer a compelling solution by minimizing environmental impacts, reducing energy consumption, and improving occupant well-being. From energy-efficient

# Sweden To Open World's First Permanently Electrified Road For EV Charging On The Move In 2025

- By Sam D Smith -



With plans to electrify over 1,800 miles of highway, Sweden leads the way with the world's first permanently electrified road.

Sweden has decided it will make history, opening the world's first permanently electrified stretch of road in 2025. The electric road system (ERS) will enable EVs to recharge on the move, enabling greater distances to be traveled between charge station visits.

The highway chosen is the E20, located in the middle of Sweden's major cities, Stockholm, Gothenburg, and Malmö. It'll be the first part of a greater plan that envisages over 3,000 kilometers (1,864 miles) of Swedish roads getting the electric treatment. There's just one small problem, though: they haven't yet settled on which type of electric road the first motorway will feature.

Sweden has been a pioneer in electrified road testing and has already trialed three leading solutions. In 2016, a two-kilometer (1.2-mile) stretch of road in Gävle, central Sweden, was opened that used overhead electric lines to allow heavy vehicles to recharge via pantographs



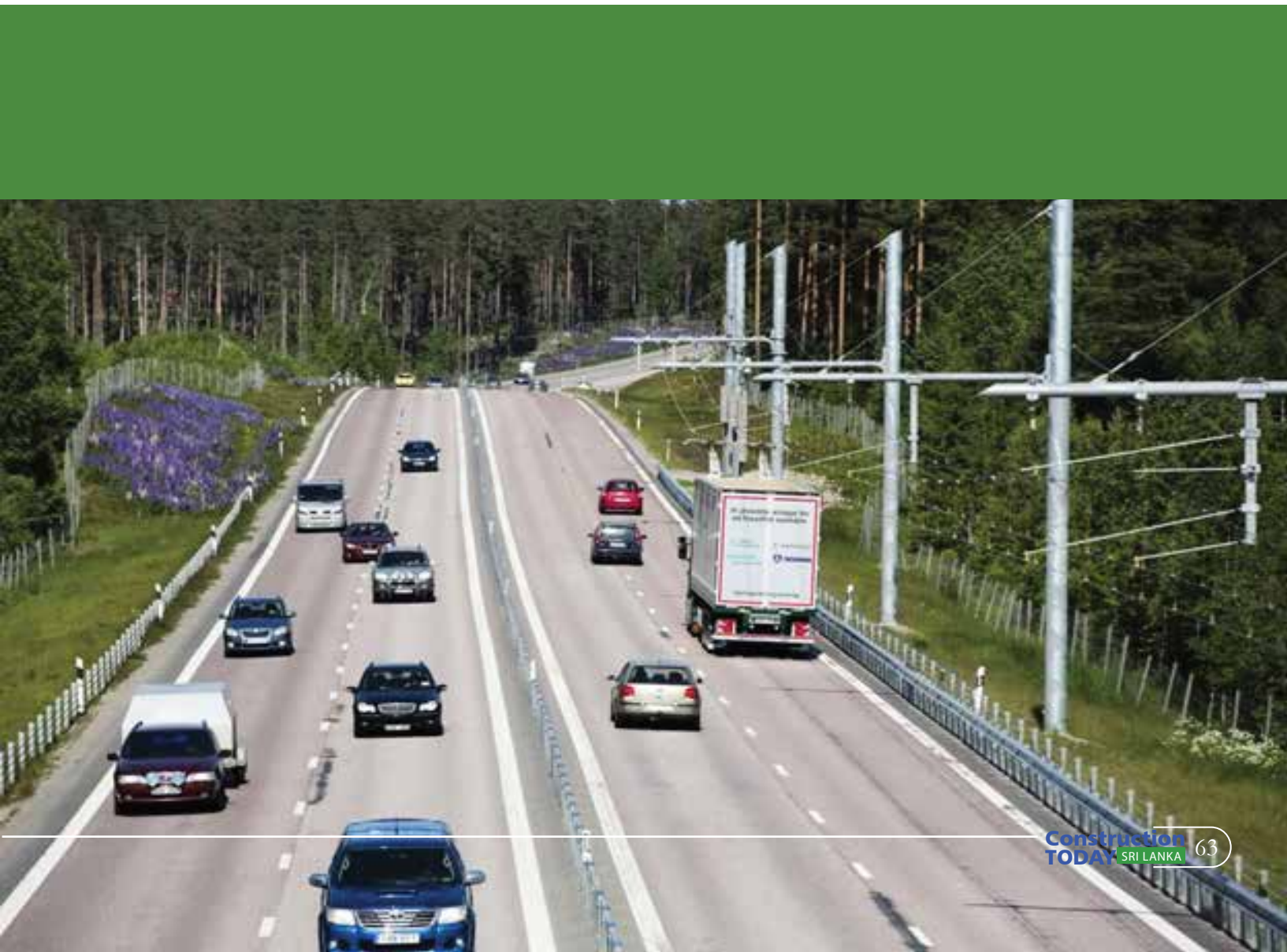
- similar to an electric train or a tram. Later, a 1.6-kilometer (0.9-mile) stretch of road in Gotland was electrified using charge coils positioned beneath the asphalt. In 2018, Trafikverket introduced the world's first charging rail on a two-kilometer (1.2-mile) stretch that allowed electric trucks to lower a moving arm that picked up power.

While the use of overhead power lines is exclusively for trucks, there could be some advantages for those who own private cars if an inductive under-road charging system is implemented. This tech works much like Qi wireless charging in mobile phones. A pad or plate is embedded under the road, and electric vehicles that are equipped with a receiving coil are recharged as they pass over it. Such offerings have also been trialed in Germany and Michigan.

You don't have to own an EV to understand how convenient the ability to charge on the go would be. Not only would the technology extend the usable range of an electric vehicle, but it could also lead to cheaper EVs thanks to smaller batteries.

According to researchers, only 25 percent of the Swedish road network would need to be electrified to present the most efficient option. Euro News reports that Sweden has partnered with Germany and France to share experience and research findings, while the UK, U.S., and India are also doubling down on their efforts to construct electrified roads.

Courtesy : carsoops.com



# Is Lean the new Green?

## Towards Sustainable, Efficient, and Safe Construction Practices



Dr. Ashan Senel Asmone

Green building construction has cemented itself in the mainstay of our construction industry today due to the clients, contractors and consultants committed towards sustainability. In a similar vein, lean construction has gained significant attention in the construction industry in the recent years due to its shared goals of sustainability, efficiency, and safety. Lean construction focuses on waste reduction, productivity, and continuous improvement, while green construction emphasizes environmental impact reduction and sustainability.

If we explore further, lean construction and green construction both share common principles. Lean construction seeks value maximization, waste reduction, and continuous improvement, while green construction aims to minimize resource consumption, reduce pollution, and prioritize environmental stewardship. In this sense, both green and lean construction are inching towards minimizing resource utilization and waste generation; an amicable approach towards achieving sustainable development. Both approaches prioritize safety as a fundamental aspect of construction practice, recognizing the importance of protecting workers and stakeholders from health and safety hazards while promoting a culture of safety.

Working towards their intended objectives, lean and green construction brings about changes to the construction practices in favourable and beneficial ways. Hence, an opportunity to integrate lean principles with the current advent of green construction practices needs to be explored. To that end, lean construction can be integrated with green construction by incorporating waste reduction, streamlined workflows, and efficient resource utilization from lean principles, along with energy efficiency, sustainable materials, and responsible waste management from green strategies, resulting in a construction process that is both environmentally responsible, efficient, and safe.

Safety management is an integral aspect of both lean and green construction. The intersection of these practices prioritizes worker safety and site well-being. Lean principles bring about proactive planning, risk assessment, and effective communication, helping to reducing potential safety hazards. Green construction further enhances safety by promoting sustainable and environmentally friendly materials that are safer, promotes waste reduction and efficient site management. The integration between lean and green practices fosters a culture of resource optimization, safety, and encourages continuous improvement.

Although beneficial, implementing lean construction alongside green construction can itself be riddled with challenges in the current construction industry. Challenges such as mindset and culture shift, complexity of integration, cost considerations, supply chain integration, and measurement and evaluation are to be expected. Effective project management, clear communication channels, and integrated project delivery methods can facilitate the integration process, while engaging with industry bodies such as the CIOB, supplier assessments, and green procurement criteria can ensure integration of all stakeholders in the construction value chain.

The integration of lean construction and green construction offers a path towards sustainable, efficient, and safe construction practices. By combining their principles, the construction industry can work towards achieving its targets of waste reduction, energy efficiency, responsible resource utilization, and enhanced safety performance. The integration between lean and green practices aligns productivity with environmental responsibility, delivering landmark construction projects. In that light, lean construction may be seen as the new green, as it embraces sustainable practices and drives efficiency, productivity, and safety in the construction industry. Proactive planning, streamlined workflows, effective communication, worker engagement, and continuous improvement are among the key elements that contribute to the successful integration of lean and green construction approaches to our construction practices.

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**“SATHUTA” wins  
“NATIONAL CONSTRUCTION  
EXCELLENCE AWARD - 2020**

**FOR  
“POST GRADUATE INSTITUTE OF  
MEDICINE,  
UNIVERSITY OF COLOMBO”**



The Post Graduate Institute of Medicine is an institute affiliated with the University of Colombo, dedicated to providing specialized training for medical doctors. With an annual registration of nearly 1000 students, it currently accommodates over 4000 students.

Recognizing the need to expand its existing infrastructure, a proposal was developed to construct a new building that would house all the academic activities of PGIM. This proposed building would be situated on a 120 perches allocated land located at Number 85, Rodney Street, Welikada, Narahenpitiya, Colombo 5.

Following a competitive bidding process, Sathuta Builders (Pvt) Ltd was selected as the design and build contractor for the project, with a contract value of 1.4 billion rupees and a projected timeline of 30 months. The envisioned construction involved an 8-storey building, purposefully designed to accommodate all the academic requirements of PGIM. This included various lecture theatres, conference rooms, laboratories, offices, a 300-seat auditorium, a server room, a library, and a canteen, among other facilities.

Emphasizing sustainability, the design and

construction incorporated numerous green features. The central air conditioning system employed water-cooled chillers, variable speed drives, and eco-friendly refrigerants to minimize energy consumption. Additionally, specific areas of the building were designed to maximize natural lighting and ventilation. Notably, the third-floor canteen has an open-spaced layout with natural plants, providing a stress-free dining area and showcasing the beautiful skyline of Colombo.

The project's success was attributed to the implementation of cutting-edge techniques and state-of-the-art technologies. A new, advanced ELV system and multimedia setup were installed in the 300-seat auditorium, while specialized gypsum-based materials were utilized to achieve the desired acoustic features.

The project faced numerous challenges, primarily due to its location and complexity, as it was situated within a residential area. However, meticulous management of working hours ensured minimal disruption to the surroundings.

Through the collaborative efforts of "Sathuta" and its design partners, the project was successfully completed within the designated contract period.

**“The construction of the Post Graduate Institute of Medicine included an 8-storey building with lecture theaters, laboratories, a 300-seat auditorium, and an open-roofed canteen. Sathuta Builders (Pvt) Ltd, as the design and build contractor, successfully completed the project within the specified budget of 1.4 billion rupees and the scheduled period.”**



# Chairman, SATHUTA

*R M Sunil Rathnayake*



I am delighted to share this message on the occasion of Sathuta Builders (Pvt) Ltd being honoured with the "National

Construction

honoured with the "National Construction Excellence Award - 2020," the highest recognition for a construction company in Sri Lanka. This accolade celebrates our exceptional performance in constructing the "Post Graduate Institute of Medicine, Colombo."

Our success is primarily attributed to our qualified, dedicated and experienced staff at Sathuta. Our approach to excellence in construction is based on ISO systems for Quality (ISO 9001), Health and Safety (ISO 45001), and Environmental Management Systems (ISO 14001). We value their commitment to meeting the quality, time, and cost targets for our construction projects.

As one of the few construction companies in Sri Lanka with the prestigious CIDA CS2 grading for Building Construction, Sathuta Builders remains devoted to delivering construction projects with excellence, ensuring maximum satisfaction for both government and private sector clients. Rest assured; we will continue to provide you with the finest services from Sathuta Builders (Pvt) Ltd.

## The Company

Sathuta Builders (Pvt) Ltd is a leading construction company in Sri Lanka, holding the highest CIDA CS2 grading and accreditations for ISO 9001:2015, ISO 45001:2018, and ISO 14001:2015. As part of the esteemed Sathuta Group, we are associated with two other companies:

- Sathuta Ready-mix (Pvt) Ltd, specializing in the production and supply of ready-mixed concrete.

- Sathuta International (Pvt) Ltd, engaged in the export of horticultural and floricultural products.



As a government-registered main contractor, Sathuta Builders possesses the capability and capacity to undertake diverse construction projects, including buildings, highways, bridges, water supply, and irrigation projects. We have also been the recipients of many national awards, including the "Best Main Contractor of the Year" (2018) awarded by UDA, as well as the "National Award for Construction Excellence" (2009, 2011) and the "National Award for Construction Merit" (2013) presented by CIDA.

With a history spanning nearly 45 years, Sathuta Builders has earned a reputation as one of the most trusted names in the industry. Our consistent adherence to the tagline, "The right solution, whatever the challenge", is a testament to our commitment to delivering exceptional results.

## Present Operations



Despite the challenging circumstances brought about by the Covid pandemic and the subsequent economic crisis in the construction industry, Sathuta Group has swiftly adapted and implemented measures to ensure the well-being and job security of our workforce while prioritizing client satisfaction. Our highly experienced management team maintains a strong grip on performance, making informed decisions based on data-driven forecasts.

With our company's vision to be the most prominent, most reliable and most environmentally responsible construction firm in Sri Lanka, Sathuta Builders is committed to addressing one of the greatest challenges facing the global construction industry: the climate crisis. We have implemented a range of environmentally focused protocols based on the ISO 14001 standard across our organization. Through careful monitoring, we manage our carbon footprint and take proactive steps to reduce it wherever feasible. Additionally, we are actively pursuing green certifications for our projects, further cementing our commitment to sustainable practices.

## History

Sathuta Builders has its roots dating back to 1979 when Mr Sunil Rathnayake founded it as a small construction firm under the Accelerated Mahaweli Development Programme. During its early years, the company primarily focused on water projects, buildings, and roads in the North Central, Northwestern, and Central Provinces. Despite encountering challenges along the way, by 2001, Sathuta Builders had established itself as a leading construction firm with a wide range of projects spanning the entire country.

Since then, Sathuta Builders (Pvt) Ltd has been actively contributing to the country's development through its participation in numerous projects. We were among the pioneers in successfully completing major low and middle-income housing projects in the suburbs of Colombo, showcasing our commitment to addressing the country's housing needs.

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## Company Resources

Our company's most valuable asset is its human resources. We have a team of experienced and qualified professionals including engineers, architects, quantity surveyors, finance experts, safety managers, and other staff who oversee a well-trained in-house workforce. Additionally, we maintain collaborative relationships with external partners, enhancing our collective expertise.

Sathuta Builders (Pvt) Ltd has an extensive fleet of machinery and equipment, providing us with the capability to handle projects of any nature. Our inventory comprises various site equipment, including tower cranes, mobile cranes, backhoes, excavators, rollers, and trucks, as well as ready-mix concrete equipment. This comprehensive resource allows us to tackle diverse project requirements effectively. We also maintain several warehouses throughout the country where we store materials and consumables essential for our projects. The availability of in-house machinery, tools, and materials enables us to swiftly mobilize for new projects adhering to the needs of our valuable clients. without the need for external hires. ■



Rodney Street Development Project of Post Graduate Institute of Medicine, University of Colombo



Design, Investment and Construction of 718 Housing Units in 3 Blocks for URP-CC in Dematagoda



Design and Construction of Animal Science Building Complex, University of Peradeniya



Design and Construction of Proposed Faculty of Medicine for Wayamba University of Sri Lanka.



Design and Construction of 7 Storied New Building for the Faculty of Art University of Peradeniya



Construction of Police hospital Expansion Project in Narahenpita



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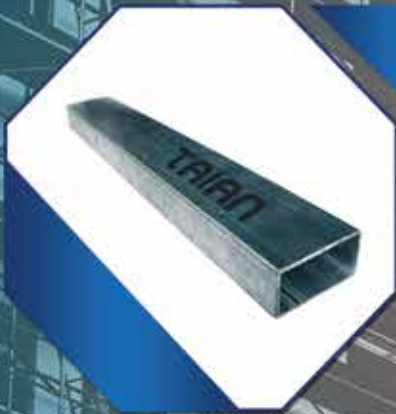
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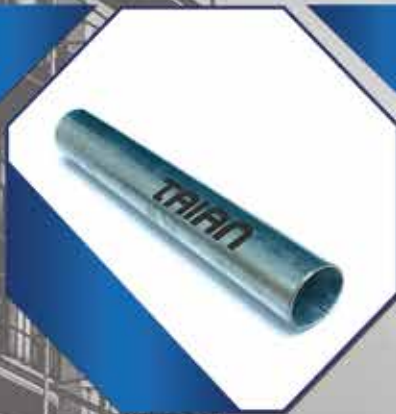




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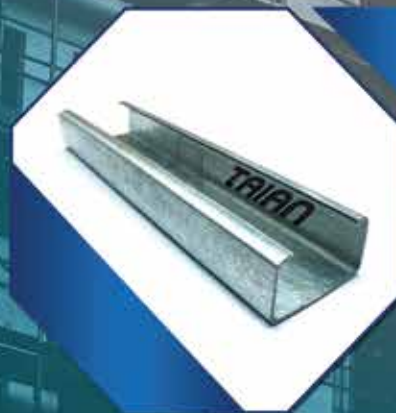
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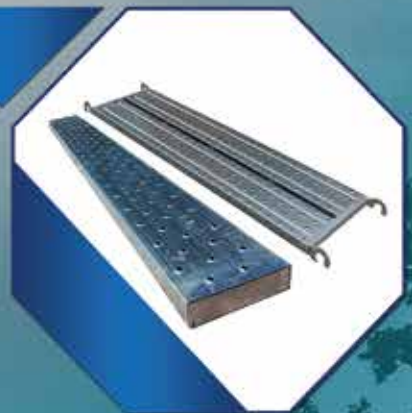
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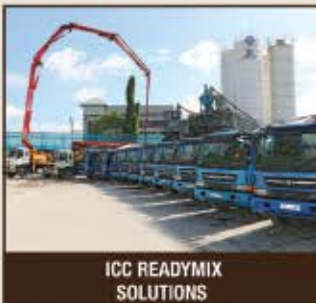


TRANSPORTING THE PPVC MODULE



FIT OUT WORKS

## OTHER ENGINEERING SOLUTIONS



ICC READYMIX SOLUTIONS



ICC ACOTEC PRECAST WALL PANEL SOLUTIONS



ICC PREFINISHED TIMBER FLOORING SOLUTIONS



ICC DURRA ACOUSTIC SOLUTIONS

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