

Conserving surface water is imperative now

Known to be the barometer of the ecological health of a city, water bodies also determine its climate. As experts explain, they help control humidity and temperature levels, recharge aquifers and also act as instruments of rainwater harvesting. Studies have revealed that these lakes and water bodies have become full fledged sinks for domestic sewages, effluents from industries and agricultural run off.

MD. ASDADULLAH KHAN

WITH most countries in Africa and Asia facing humanitarian crisis with the inadequate water and sanitation provision that has led to wide spread attack of cholera, diarrhea and other intestinal diseases resulting in high fatalities, the observance of World Water Day every year on March 22 has become a solemn farce.

Precisely speaking, water -- which scientists tell us finds its own level -- also happens to be the great leveller. It is fundamental to our very survival. But every summer Bangladesh in the past few years discovered that life with water shortages is increasingly becoming constrained. From being a necessity water has now become a luxury. With pipes running empty, residents especially in Dhaka and Chittagong are looking for alternative sources like tankers serviced by Wasa in extreme crisis situation.

As for the villages, the situation is far more pathetic. With shortages of water due to drying up of ponds and with no visible effort of digging fresh ponds during the last several decades other than what the affluent land lords in the villages did in their hey days, farmers year after year remain mired in their old practice of sinking tube wells deeper and deeper to reach the decreasing level of ground water.

Water, it seems is the single big crisis facing Bangladesh now exacerbated by the construction of Farakka barrage over the river Ganga in the Indian territory. Undeniably true, urban Bangladesh is screaming for water and with water table going down and down, the situation is set to deteriorate further. The demand for fresh water in Dhaka city comes to about

2100 million litre. Dhaka Wasa provides about 1800 million litre through 550 deep tube wells and four water treatment plants in different locations of the city.

Pathetically true, with no visible effort to conserve surface water, about 85 per cent of the supply requirement has to be met from underground. The first signs of population boom and water stress were most visible in the 1980s but most municipalities and city corporations focused on the immediate -- tapping ground water resources in and around the cities. Expectedly the pressure on ground water has shown up. In a word, water is being mined and pumps are being sunk 10 to 20 metres deeper every year. Desperate dwellers, not only in cities but even in villages are forced to buy water from vans ferrying it in water starved areas.

Worse, conservation has not figured in our scheme of things -- neither directly through steps like water harvesting nor indirectly through restoration of canals, lakes and water shades, that have been encroached upon by land grabbers.

It is difficult to think of Baridhara, Gulshan, Dhanmondi, Uttara, Badda, Rampura areas in Dhaka as being anything other than what it is today: a veritable jungle of residential apartment blocks teeming with schools, clinics, shopping malls and private universities. There were once lakes and canals within and running through the city zones like Segunbagicha, Purana Palatan, Narinda, Gandaria, Rampura and Bashabo.

To put a count to it, about 250 sq. km of watersheds around the city surrounded by the rivers Buriganga and Shitalakhya have either been encroached upon or dried up due to inadequate flow in the

main water bodies. Other than anything that is not noticeable, the result has been a drastic depletion in the water table, evidenced by the fact that bore wells in the city have to go deeper and deeper.

The immediate task of the utility organizations like Wasa, Rajuk and Dhaka City Corporation would be to carry out efforts to boost water table in Dhaka city and its adjoining areas. But our experiences suggest that all these organizations, because of lack of coordination cannot do it and each one of them is trying to pass the buck on the other. There should be an autonomous body for the protection, conservation, restoration, regeneration and integrated development of the lakes, watersheds, and rivers like the Buriganga, Shitalakhya, Turag and Balu and many other lost canals.

To cite an example, in the Indian city of Bangalore, such an authority constituted under the department of Environment, has been working to halt encroachment on water bodies by land grabbers. Bangalore woke up to the loss of its wetlands and got down to restoring the city's 600 odd lakes.

Our immediate task would be to identify such water bodies as well as to recover those already filled up illegally for recharging by draining out the poisonous soup and blocking the sewage lines connecting them. Such authorities should be invested with fund, responsibility and authority to clean up all such lakes in Gulshan, Banani, Baridhara, Uttara and Dhanmondi.

Needless to mention, Dhaka Wasa has to find out ways and means to lay sewage pipes and link it to treatment plants that it must construct to save the city dwellers from the growing load of pollution and sewage that will increase at least five times the present output by the year 2020 when the population will jump to 300 million as some demographic data by the World Bank sources suggest.

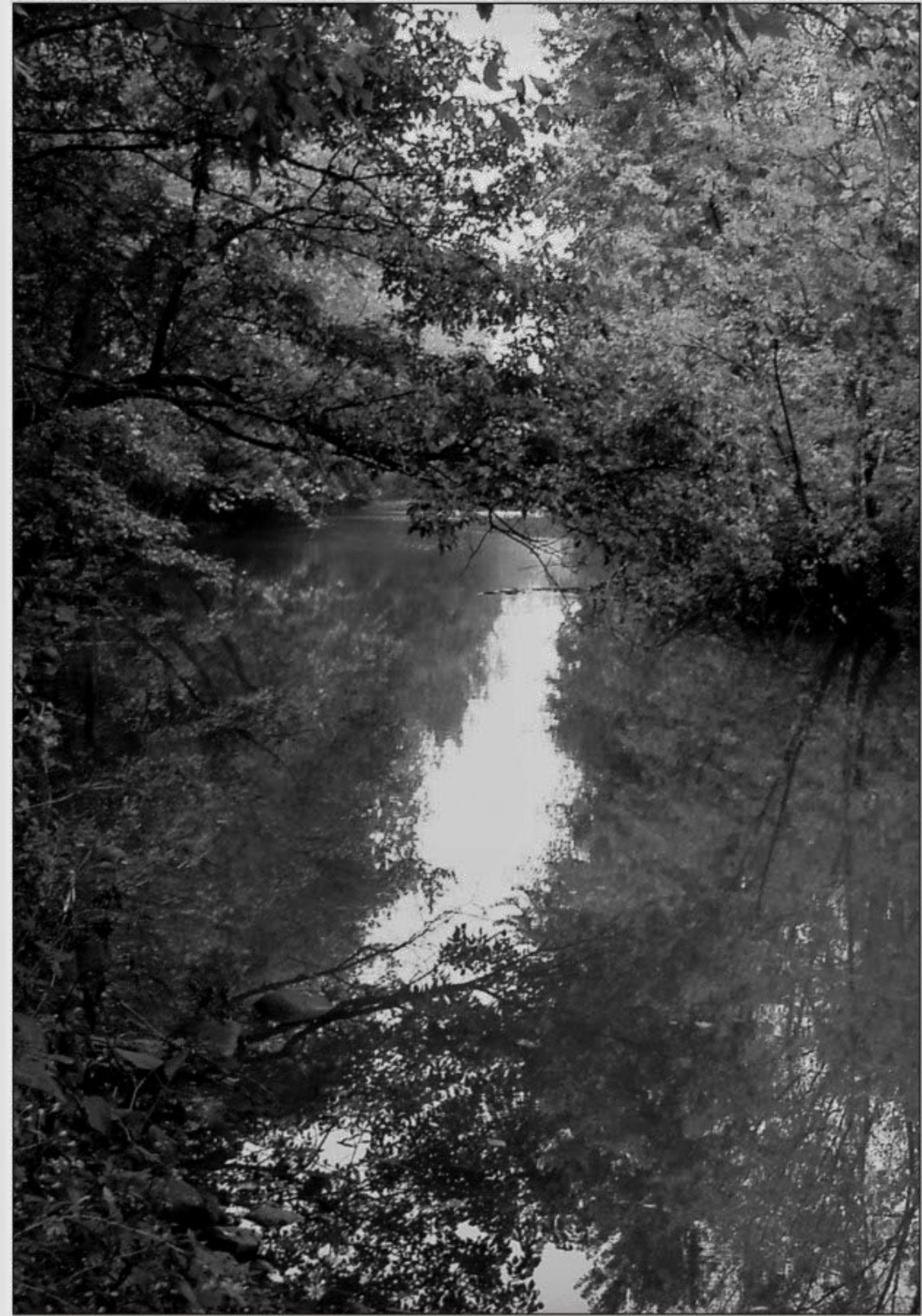
And that's the reason the World Bank experts have warned that unless measures are taken well ahead Dhaka will turn into a dead city by the year 2020.

Known to be the barometer of the ecological health of a city, water bodies also determine its climate. As experts explain, they help control humidity and

temperature levels, recharge aquifers and also act as instruments of rainwater harvesting. With a little initiative, commitment and imagination these lakes could be formed into a hydrological chain and during monsoon, surplus water from the upstream lake could be flowed into the next lake. Sadly true, rapid urbanization has led to the loss of wetlands. The biggest problem has been encroachment on and disposal of untreated sewage into the lakes anywhere and everywhere. Studies have revealed that these lakes and water bodies have become full fledged sinks for domestic sewages, effluents from industries and agricultural run off of salt and pesticides that are wrecking havoc on the ecosystem.

The process of cleaning and recharging may undoubtedly be a long drawn one. But with political will and commitment it can be done. It is worth mentioning here that under Indian government's national Lake Conservation Project, the LDA (Lake Development Authority) has cleaned up in just one year 12 odd lakes. One of Bangalore's biggest lakes -- the 50 hectare Ulsoor -- has been drained out and sewage lines have been blocked. With funds from the donor agencies other than the government itself, Bangalore water supply and sewerage board undertook the construction of pipes leading to the treatment plants. Catch water drains have been built to collect water run off. That done, the process of purifying water by using hydrophyllic plants that absorb dissolved pollutants and toxins to be undertaken.

Programmes like the ones that our neighbouring countries have taken up, the government here should now be considering to undertake with the modalities of raising external and internal funds on the lines of the World Bank aided project for integrated countrywide tank development for irrigation. Such development work can fruitfully be done when government effort combines with private initiatives. In city, with indifference, negligence and inaction galore, for instance, Uttara lake, a vast water body almost 3km in length and 300m wide, is destined to turn into a giant sewer. Raw sewage combined with toxins, effluents and garbage are being discharged into the



Water bodies must be saved.

lake indiscriminately without anybody thinking of noticing the dire consequences that pose as a serious threat to the residents, especially the children living in houses close to the lake. All such lakes, other than being an aesthetic and ecological utility, could be a source of Wasa supply water source in times of severe water crisis in city areas.

Paradoxically, on the occasion of the observance of the World Water Day, people in the country felt vastly amused when they heard some high-ups in the

administration speaking glibly in seminars and rallies about conserving the surface water to reduce too much strain on ground water that is getting exhausted fast. Precisely known to all, surface water helps aquifers being recharged. But the looming question is: where are these sources to be found if we are wilfully destroying and contaminating them?

MD. ASDADULLAH KHAN is a former teacher of physics and Controller of Examinations, BUET. e-mail: aukhanbd@gmail.com

LEST WE FORGET

FR Khan -- an architect who made us proud

He believed that there is beauty and simplicity in the structural form of a building that is natural to it from an engineering point of view. Instead of going for a preconceived architectural expression, he let the natural structural form be the architectural representation of a building.

SYED ASHRAF ALI

"A prophet is not honoured in his own country" -- so goes the proverb. It is painfully true in case of Dr. Fazlur Rahman Khan, the legendary Bangladesh-born structural engineer. His achievements are hailed by men of science all over the world, obituary references to him were made even in leading magazines like Time and Newsweek (perhaps the only Bangladeshi non-political personality to be so honoured), he was acclaimed the 'Construction's Man of the Year' and accorded Alfred E. Lindau Award (considered to be the most precious in the world of architecture), he headed the prestigious Council on Tall Buildings and Urban Habitat for years (till the end of his days), and yet very few in our country are aware of his monumental contribution, world-wide fame and recognition.

FR Khan was an outstanding civil engineer who was hailed all over the globe for innovations in high-rise building construction, especially tubular design. He earned international fame for inventing the "bundled tube" system, a structural network consisting of narrow cylinders clustered together to form a thick tower, which minimized the amount of structural steel needed for high towers and eliminated the need for internal wind bracing. He was born in Dhaka on April 3, 1929 and obtained his Bachelor of Engineering degree from Shibpur Engineering College, University of Calcutta in 1950 at the top of his class. He worked as assistant engineer for the India Highway department, and then taught at the University of Dhaka.

Qualifying for a Fulbright scholarship in 1952, he enrolled at the University of Illinois (Urban), where he completed enough credits for two Master of Science degrees, one in applied mechanics and the other in structural engineering. He obtained a doctorate in the latter and accepted an engineering position in Skidmore, Owings and Merrill, a leading and world-renowned architectural firm in Chicago. He returned briefly to his native country (then East Pakistan) and won an important position as

Executive Engineer of the Karachi Development Authority (KDA).

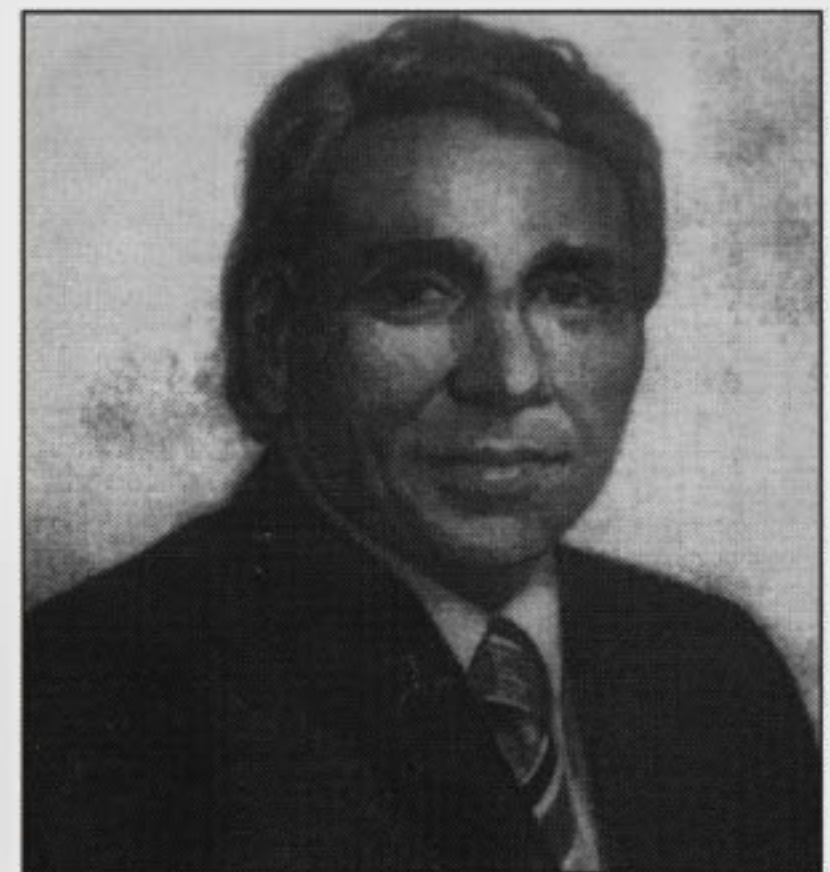
After serving KDA for more than three years (between 1957 and 1960), he came to the painful realisation that the environment in the then Pakistan was in no way congenial to the blossoming of a budding creative genius like him. Although he loved the motherland with all his heart, he was pained to find that the administrative demands in the KDA kept him from design works. He found no way out but to return to the United States where his talent and creativity would have ample opportunities to blossom in their full majesty and splendour. In 1960, he joined Skidmore, Owings and Merrill once again and remained associated with it till his last breath. He shuffled off the mortal coil while on a job-site visit to Jeddah on March 27, 1982.

It was during the early 1960s that he laid the groundwork for his later successes in the field of high-rise buildings. His 1964 ASCE paper on shear-wall-frame interaction was a milestone in the development of economical high-rise buildings in both concrete and steel.

In the tubular period, Dr. Khan also initiated the bundled design concept, with its first application in the 43-storey reinforced concrete Chestnut-Dewitt apartment building in Chicago in 1963.

The next innovation, pushing still further the economically feasible height of multistory buildings, was the application of shear-wall-frame interaction principles to tubular structures, creating the tube-in-tube concept (a phrase coined by Khan), applied first to the Brunswick Building in Chicago. This concept was soon applied to many other structures, including the 52-storey One Shell Plaza, in Houston, which was the tallest reinforced concrete building in the world at the time of its completion.

Also, in the 60s came Khan's first steel version of the tubular structure: the diagonally braced, 100-storey John Hancock Building in Chicago. It became another milestone, particularly due to the strong expression of its dominant structural feature in the architectural facade of the building.



Then came the Sears Tower using a further innovation -- bundling nine tubes into a single structural system -- with 110 stories and 1450ft height, the world's tallest building in the 1970s. Like the John Hancock, it used about half the steel needed for a conventional tubular design.

A principal feature of Khan's work was to make highly efficient exterior tubular configurations carry the lateral loads imposed on multistory buildings, rather than assigning this role to less efficient interior frames which clutter the rentable space, as had been common. The innovations introduced by Khan not only improved the rigidity of tall buildings, resulting in their superior performance, but also resulted in substantial economies over the cost of buildings designed, using traditional schemes.

Dr. Khan's startling innovations did not, however, go unchallenged. Skeptics and high-brows in many a circle criticised his innovative theories and questioned their feasibility. But the economy and effectiveness of his massive structures (among the world's tallest) silenced the critics once and for all. As a result, most of the ultra-high buildings today are built on principles introduced by him.

Dr. Khan indeed was an architect with a difference. He believed that there is beauty and simplicity in the structural form of a building that is natural to it from an engineering point of view. Instead of going for a preconceived architectural expression, he let the natural structural form be the architectural representation of a building. He was encouraged and supported in this bold effort by Bruce Graham, a dominant architectural figure at SOM. Khan and Graham jointly shaped the new skyline of many of the world's larger cities.

Khan's influence on the architecture of high-rise buildings was acknowledged by SOM with his admission, in the late 1960s, as a general partner in a firm that had here-

tofore only architect partners. Fazlur was later instrumental in the elevation of other structural and mechanical engineers to the status of partner.

In the non-high-rise category as well, a number of very remarkable projects were designed by Dr. Khan. Of these mention may be made of the suspension roof of the Baxter Laboratories building near Deerfield, Illinois; the Hajj Terminal of the King Abdul Aziz Airport (fabric suspension roof) in Jeddah, which covers an area of 105 acres; the fabric suspension roof of the Humphrey Memorial Metrodome in Minneapolis; the University in Makkah; the US Air Force Academy in Colorado Springs; and the solar telescope at Kitt Peak, Arizona.

The honours received by Fazlur Rahman Khan during his chequered life are too numerous to be mentioned here. In 1972, he was proclaimed "Construction's Man of the Year" by the "Engineering News Record" for his many accomplishments in the field of ultra high-rise buildings. In 1973, he was the recipient of the Alfred E Lindau Award for his "outstanding contributions in advancing the art of reinforced concrete construction in high buildings". He also received the Wason Medal for Most Meritorious Paper in 1971 for his publication, co-authored with Mark Fintel, on "Shock-Absorbing Soft Story Concept for Multistory Earthquake Structures". He was honoured with the coveted and prestigious post of the chairman of the Council on Tall Buildings and Urban Habitat right from its inception until his death.

FR Khan had always been both human and humane. Unlike the average run of engineers, he never found himself confined to the dull and stereotyped environment of cut and dried formulae and techniques. Even beyond his intimate understanding of the non-structural disciplines and aesthetics and his exceptional intuitive understanding of structural behaviour, Khan had a remarkable perception of the social needs of the millions who live and work in the cities. Engineering and architecture were the media through which he sought to fulfil the needs. In the ultimate analysis, it was the urge to respond to human needs and aspirations that enabled Dr Khan to make the outstanding structures and innovations that brought him recognition and honour by society and profession.

FR Khan had the remarkable ability to articulate complex concepts in simple, understandable language. In spite of the intense demand of his busy professional

life, he found time to regularly teach courses at the Illinois Institute of Technology, and to supervise graduate students. With his retiring activities, remarkable achievements and pleasant but commanding personality he inspired countless young engineers and set a standard for them to measure up against.

In 1971, when the merciless atrocity junta launched the most heinous military operation in Bangladesh, Dr Khan, in spite of his heavy commitments and preoccupations, found enough time to organize the Bangalees and their friends

in the United States into a Defense League which raised enormous funds for relief work. He also organized a strong lobby in Washington for months to urge the US authority to stop shipment of arms to the junta.

The enormous professional success did never affect the behaviour or the way of life of this great man. He remained humble, always accessible to his associates and friends, and continued his modest way of life.

Syed Ashraf Ali is former DG of Islamic Foundation Bangladesh.



Sears tower-- one of his many remarkable creations.