

INFRASTRUCTURE

CORROSION AWARENESS DAY 2019

What you should know about corrosion

Durability of Concrete: Health and Safety Related Issues

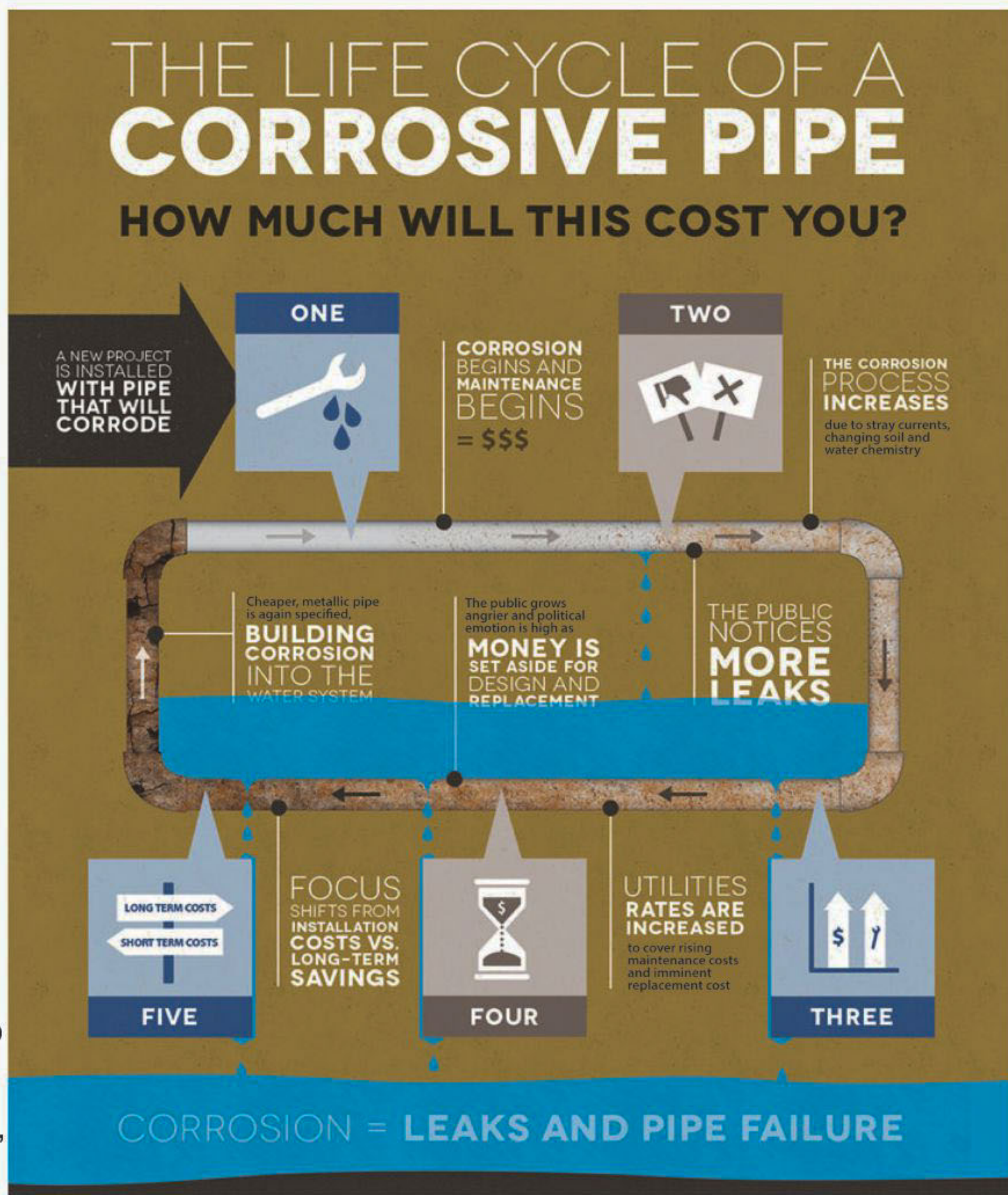
HOW IT OCCURS
Corrosion is degradation of the properties of materials due to interactions with their environment. It results in loss of function of the component or system. Most metals are susceptible to corrosion.

There are various types of corrosion based on the nature of attack as well as the type of environment to which the material is exposed. The corrosion product we see most commonly is the rust which forms on the surface of steel.

HOW IT AFFECTS OUR EVERYDAY LIFE
Corrosion is a massive deteriorating problem. It is way more damaging than you might think. Corrosion is everywhere. It is in the pipes that bring us water in our home; it destroys vehicles; it attacks tracks and bridges.

Though the cost of corrosion is high, we generally pay little attention to it except in high risk areas. The segments that are most vulnerable to the cost of corrosion are associated with utilities, transportation, and infrastructure. Several studies show that the annual direct cost of corrosion to an industrial economy is

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There are also health and safety related hazards caused by corrosion such as pollution of supply water, collapse of buildings and factories, and so on.

HOW IT CAN BE PREVENTED

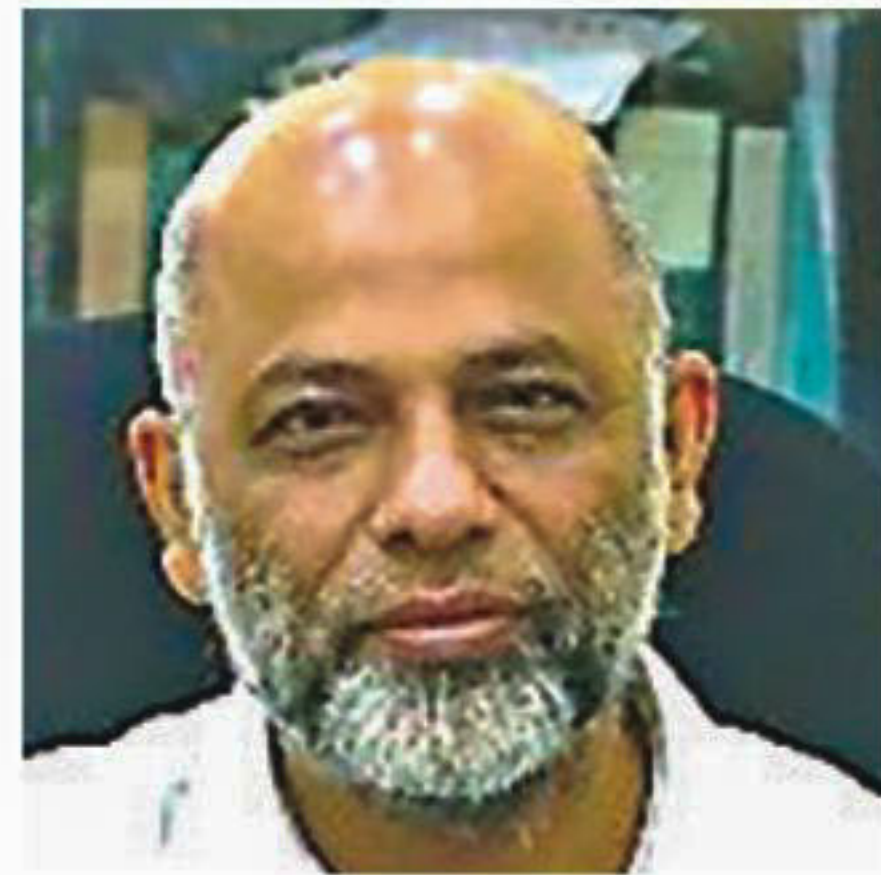
Like death and taxes, corrosion is something we hope to avoid, but ultimately it is something we must learn to deal with. Corrosion usually originates at the surface of the metal. Therefore successful corrosion control methods ranges from painting the surface of steel or galvanising it to high-tech

laser-surface melting. Corrosion can be controlled if we educate ourselves regarding this issue. It requires long-term thinking about the life-cycle of a structure. Mass awareness about corrosion will make a major impact in preserving environment and resources, as well as protecting ourselves and our fellow human beings.

DR MD TAREK UDDIN

Concrete is a widely used construction material all over the world. Buildings, bridges, tunnels and all of our infrastructures are mostly made of concrete. We may plan a structure for a 50 to 100-year service life. But for many reasons, concrete structures may deteriorate before their expected service life comes to an end. Deterioration of structures may lead to casualties and may also damage equipment, vehicles, and other properties. For example, a concrete chunk may fall on someone when he/she is sleeping in bed, working in office, sitting under the roof of a school or walking under a bridge. It may also fall on vehicles when they pass under a bridge, tunnel, etc. Reports on such accidents can be found regularly in our daily newspapers. For example, two teachers and four students were injured as chunks of ceiling plaster fell on them in a classroom of a government primary school in Brahmanbaria's Nabinagar upazila on April 11, 2019. We need to understand the reasons behind this problem and take countermeasures to avoid such casualties.

Concrete is said to be the heaven for steel because steel in concrete is protected against corrosion due to the high alkaline nature (pH of which is more than 13) of concrete. But, atmospheric carbon dioxide causes reduction of alkalinity of concrete and therefore steel bars in concrete start to corrode. Corrosion of steel bars can also start due to chlorides in the marine environment. When steel transforms into rust, it increases in volume up to 6 to 8 times. For example, if 1cm³ of iron is transformed into rust, its volume will increase to 6-8cm³. Due to the increase in volume, cracks will form over the concrete surface. With the formation of more rust, the crack will gradually become wider and finally lead to falling



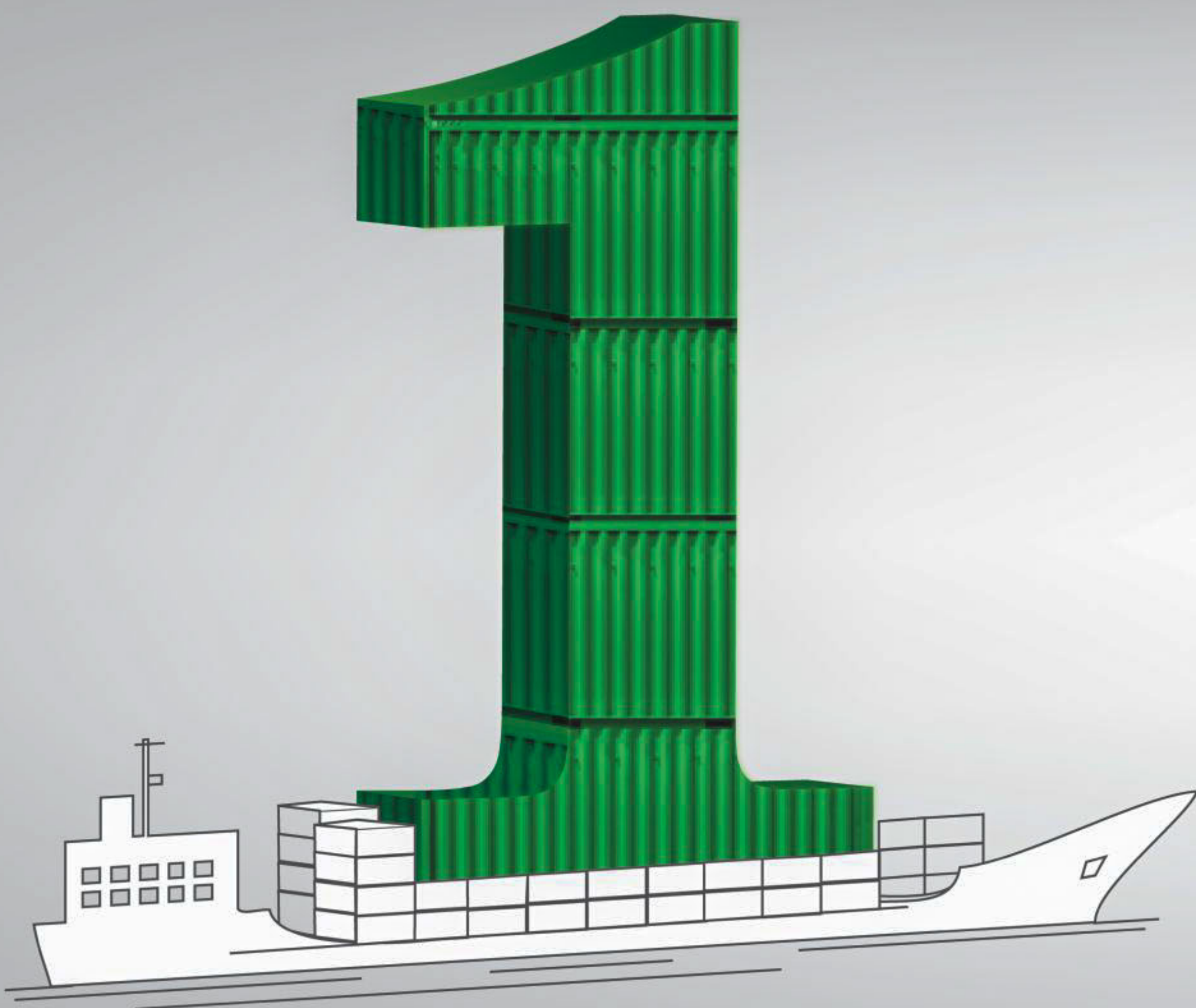
of concrete. The weight of a small chunk of concrete, such as 5 inch by 5 inch by 1 inch will be about 1kg. If it falls from a height of 10ft on our body, it can cause significant casualties. It can also damage our industrial instruments, vehicles, and other properties. Considering health and safety reasons, we need to take this issue very seriously.

When we observe cracks on the surface of concrete, the reasons behind this observation should be investigated. If cracks formed after several years of construction and cracks run along the reinforcement, these symptoms indicate that the cracks are formed due to the formation of rust over the steel bars. If we hear a dull sound after striking the surface of concrete by a hammer, it indicates formation of a significant amount of rust. It also indicates the possibility of falling of concrete chunks at any moment. The load carrying capacity of a structure may also be reduced. In such a situation, it is necessary to consult with an expert for necessary steps regarding repair or retrofitting of the structure.

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Spalling of concrete from the soffit of the slab of a school building.



THE EXPORT LEADER

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