# The Yellow Book

Orchid's Official Safety Awareness Manual, 2008

Issued in the interest of making the world a safer place for all.

**Orchid's safety manual** aims to make the world a safer place through educating people about safer practices and products – ranging from a small safety pin to a radar used for aerial and terrestrial surveillance or even our body's inbuilt intricate immunity and reflex mechanisms that tick all day long to ensure that we keep safe and sound. Because safety is more than an industrial or commercial response. It is a way of life.

# The Yellow Book

Orchid's Safety Awareness Guide, 2008

Presented by
Orchid Chemicals & Pharmaceuticals Limited
to

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# At Orchid, safety is...
## a way of life

"At Orchid, safety is not a concept but a way of life, reinforced day in and day out by little acts that make a difference in the way we work, live and cherish a safer tomorrow."

*K. Raghavendra Rao, Managing Director*

# Orchid's safety initiatives

At Orchid, when we say 'safety', we mean infrastructural safety, employee safety, environmental safety and community safety.

As a result, 'safety' enjoys a wider connotation, representing a sensitivity that goes beyond safer practices and policies to an overarching corporate philosophy.

To reinforce this sensitivity, we partnered with DuPont, international safety pioneers, resulting in a holistic 22-pronged approach to the subject.

The result is something we are truly proud of:

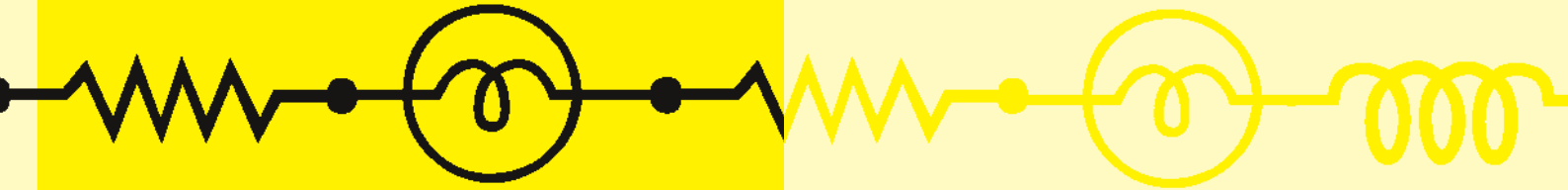
- The use of high-end technology to recycle discharge and make it toxic-free through a series of processes – a pioneering initiative in India's pharmaceutical industry
- The institution of three-tier safety committees to monitor safety initiatives, Standard Operating Procedures (SOPs), process and working standards for R&D and manufacturing units
- The discipline of round-the-clock medical care and safety training for all employees
- The meticulous dissemination of safe practices at work and home through booklets, posters and Tara
- The creation of Orchid Trust, comprising social workers, to ensure community safety
- The use of sophisticated equipment in mobile vans to monitor air quality inside and outside plants

## Safety with a human face

Tara represents Orchid's movement for a safer world. Tara – an innocent girl child – reminds someone is waiting back home, lending an emotional imperative to safe practices.

The mascot is the product of Orchidians' wish to have a symbol, reinforcing their concern for safe practices for a safer world.

Tara communicates a simple reality: that safety is important not just for us today, but for our children and their children down the ages.



# Safety is...

## peace of mind

### The fuse

After crores of material and lives have been irretrievably lost, the search for the culprit often narrows down to just two words: short circuit.

It is then that we recognise the full value of a Rs. 15 fuse – a strand of metal wire tied inside a porcelain clasp.

Works as a safety device. Enables the wire to melt. Makes a break in the current flow. Cuts off the electricity.

Tip 1

- If a circuit breaker trips, you have either a short-circuit or an overloaded circuit. To trace the cause, disconnect all lamps and appliances on the affected circuit and simply re-energize that circuit.
- If the circuit breaker trips again, then the wiring itself must be repaired or replaced.
- If the circuit is good, reconnect each appliance one at a time with caution. Resist plugging in frayed or bare cords or damaged plugs.

Tip 2

If one specific circuit interrupts repeatedly, there may be too many appliances or lamps on it. It may be necessary to add an additional circuit for appliances with heavier current drain.

General tips

Working with electricity is not hazardous as long as you obey safety rules.

- Shut off or disconnect power before handling wires.
- If you are working on the electrical service entrance, do not stand on a damp floor.
- Protect yourself by wearing rubber gloves, stand on a rubber mat or dry wood.
- When in doubt, call in an experienced electrician.
- If your entire house is without power, call your utility or local electrical contractor. You may have a problem with the service panel or wiring leading to it. During such problems, stop playing the 'Don't worry I can do it' types.

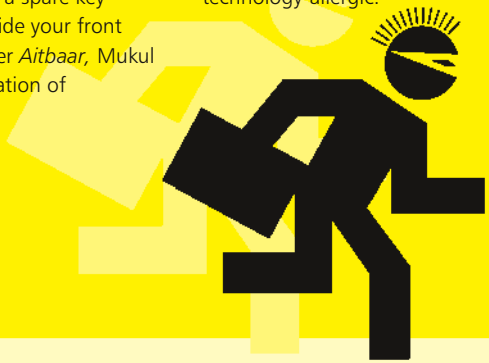
*Source: Adapted from a safety manual*

# Safety is...
## sleeping peacefully

**The cover of darkness. The blanket of silence. Just the 'right environment' for burglary.**

If you want to thwart one, consider these safety recommendations:

- It would be simplistic to state that all doors and windows must be locked securely when leaving home. But consider an unusual advice instead: keep a few lights or the radio on to give the impression that someone is actually in. Burglars do not like to keep looking over their shoulders if someone is coming.
- Avoid hiding a spare key anywhere outside your front door (remember *Aitbaar,* Mukul Anand's adaptation of Hitchcock's *Dial M for Murder*). If a burglar is dumb, he will accomplish nothing.
- Remove tell-tale traces. Burglar informers – you will be surprised how the network works – feed on clues like piling mail or newspapers on the doorstep. Kiss of death: a note on the front door saying your family will be away.
- Invest in a burglar alarm security system. Burglars are technology-allergic.





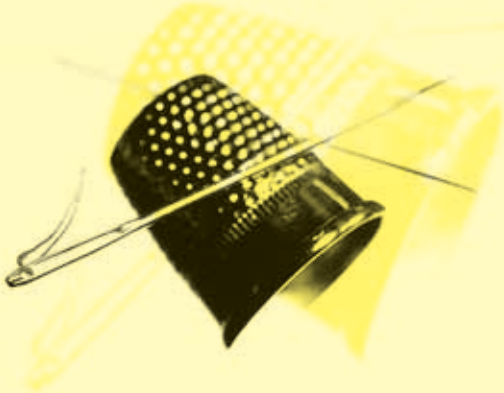
# Safety is...
## protecting your finger

**In the good old days, sewing garments was literally a "pain": the needle could hurt your finger if you were not careful. The thimble changed all that; it worked as a protective armour for the finger or the thumb.**

Early thimbles were made of whale bone, horn or ivory; natural sources also utilised Connemara marble, bog oak, or mother of pearl; rarer works utilised diamonds, sapphires or rubies. Today, thimbles are made from metal, leather, rubber, wood, glass, or china.

Not only protecting the finger, but helping accelerate sewing speed.

*Source: Adapted from www.wikipedia.org*



# Safety is...

## fearlessly enjoying the rain

**The man who was cheating on his wife was trying to cover himself most imaginatively... until he opened his metal umbrella in a secluded garden during a storm.**

The people who design buildings don't make such mistakes. They have drawn on Benjamin Franklin's seminal work with lightning shocks to protect their constructions.

Let's ride a time machine to see what Benjamin did on a fateful night of 1752. He prepared his historic electric kite by fastening two cross sticks to a silken handkerchief, which would not suffer so much from the rain as paper would have. To the upright stick was affixed an iron point. The string was, as usual, of hemp, except the lower end, which was silk. Where the hempen string terminated, a key was fastened. With this apparatus, he approached a thunder-gust and raised his kite as a thunder-cloud passed over it; no sign of electricity appeared. Suddenly he observed the loose fibres of his string to move towards an erect position. He now presented his knuckle to the key and received a strong spark. Franklin's experiment successfully showed that lightning was actually static electricity.

The painted lightning rod is a point well above the constructed structure to attract the lightning; it possesses good, earthed connection to divert the lightning energy into the ground. Result: lightning dissipation.

In lightning safety, distance and shelter represent your best protection.



| Myths | Facts |
|---|---|
| Lightning never strikes the same place twice | Lightning often strikes the same place repeatedly, especially if it's a tall, pointed and isolated object. The Empire State Building was once used as a lightning laboratory, since it is hit nearly 25 times a year. |
| If it's not raining, or if clouds aren't overhead, I'm safe from lightning | Lightning often strikes more than three miles from the thunderstorm. |
| I am safe in a car because the rubber tyres protect me. | Lightning laughs at two inches of rubber! Most cars are reasonably safe from lightning. But it's the metal roof and metal sides that protect you, not the rubber tyres. |
| If you touch a lightning victim, you'll be electrocuted. | The human body doesn't store electricity, so it's perfectly safe to touch a lightning victim for first aid. |
| If stuck in a thunderstorm, seek shelter under a tree. | Being underneath a tree increases your exposure to lightning. |
| Lightning is a sign from God | Lightning can be explained with scientific and logical reasoning. |
| Lightning only occurs during thunderstorms. | The most dangerous moments for a fatal strike is before a storm. Lightning may travel as far as 10 km nearly horizontally from the thunderhead and can occur out of the clear blue sky or at least when the day is still mostly sunny. The faster the storm is travelling, the more violent it is. Lightning can also strike after a thunderstorm. |

*Source: Adapted from Teaching Lightning Safety*

# Safety is...
## a pin made safe and useful

**A pin – used as a fastener – can be potentially dangerous.**

One, it is sharp enough to pierce immediately. Two, it is long enough to go deep.

It is quite a tribute to the brain of Walter Hunt who transformed this potential 'stay away from it' threat into a safety product. In fact, so safe that it almost always used with children right from the time they are born. What better endorsement?

It's not as if the concept eluded man for centuries. The ancient Greeks, Italians and Sicilians had got it right. Well, almost. Hunt made two crucial improvements: a spring for the tension and a clasp for the security. The difference.

The rest of the world added the stainless steel bit as a bonus.

All it took was some wire and a dash of imagination. And a number of centuries in between.

*Source: Adapted from www.inventors.about.com*



# Safety is...
## protecting your apparel

**Moths feast on clothes made from natural fibre (ah, wool!).**

Moth balls promote moth anorexia. Especially ones that contain naphthalene and para- dichlorobenzene.

Moth balls generate chemical fumes – we don't see it, but ask the moths – that smother the banqueting army. These balls sublimate, which means that under room temperature, these solid chemical compounds transform directly into toxic vapour.

A few precautions: Wash hands after use; tell children that they are not sweets (what a look-alike!).

One extended use: place on bathroom drains (sink and floor). Keeps cockroaches away.

*Source: www.home.howstuffworks.com and www.newton.dep.anl.gov*

# Safety is…
## your automotive brakes

**Automobiles would have been phased out soon after their invention had it not been for a safety device that would go on to change the product's application, and in turn, save the fortunes of an entire industry.**

### The brake

This is how it works: When you depress your brake pedal, your car transmits the force from your foot to its brakes through a fluid. Since the actual brakes require a much greater force than you could apply with your leg, your car must also multiply the force of your foot. It does this in two ways: mechanical advantage (the pedal is designed to multiply your leg force several times) and hydraulic force multiplication (force applied at one point is transmitted to another point using an incompressible fluid). The brakes transmit the force to the tyres using friction, and the tyres transmit that same force to the road to stop the car.

Modern cars also come tailored with hand brakes for additional safety, consisting of a cable directly connected to the brake mechanism on the one end, and to a lever for manual operation – hand or foot operated – on the other.

*Source: Adapted from www.familycar.com*



# Safety is…
## when you keep children at bay

**Most homes may appear safe, but they also contain a range of medicines, cleaning solutions, mosquito repellents and insecticides, which is of course not good news when you have children at home.**

You can guess the consequences if unsuspecting children pop in the wrong medicine because of the bright colour, or drink the wrong liquid – a cleaning solution looks appetizing – or even ingest the wrong insecticide.

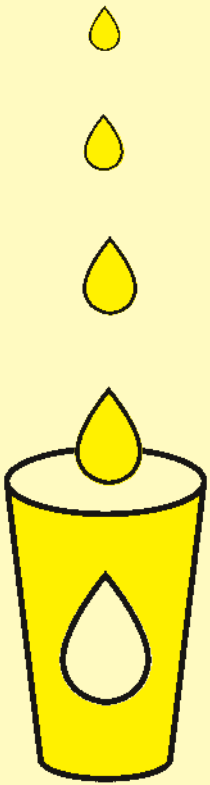
That's where a child safety lock comes in. Especially for cabinets, drawers, bottles with sensitive content. Today, child safety locks are also built into cars to prevent children from opening doors or windows during transit.

And then there is always the popular channel blocking device on television to prevent your children from watching soap, junk or 'adult' content. Particularly handy when you know that mere counselling will not work.

*Source: Adapted from www.answers.com/topic/child-safety-lock*

# Safety is...

## having water without worry



**This is intended for consumers in developing countries; countries that are still some years away from providing the confidence that water can be drunk straight from the tap (just a thought, why weren't we so fussy when drinking out of the unfiltered school water tap?).**

Enter the water purifier. The candles in a water purifier contain chlorine and iodine to kill microorganisms, dissolved salts and harmful minerals. The hi-tech purifiers come with UV technology that ensures maximum bacteria elimination by destroying the bacterial cell wall or cell membrane.

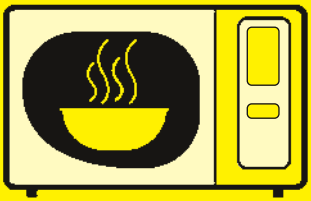
A deodorisation tank removes ions and odorants from running water through absorption, while a mesh filter segregates the suspended dust particles.

*Source: Adapted from www.wikipedia.org*



# Safety is...

## having safe food



**Microwaves were discovered quite by accident when Percy Spencer, working on an active radar set, noticed that a peanut chocolate bar in his pocket started to melt.**

As the holder of 120 patents, Spencer realized what was happening: the radar had melted his candy bar with microwaves. On October 8, 1945, Raytheon filed a patent for Spencer's microwave cooking process and in 1947, the company built the first microwave oven, the Radarange. It was almost 6 feet (1.8 m) tall and weighed 750 pounds (340 kg). It was water-cooled and consumed 3,000 watts, about three times as much as today's microwave ovens.

The lower temperature of cooking (the boiling point of water) in a micro-oven is a significant safety benefit compared to baking in the oven or frying, because it eliminates the formation of tar and char, which are carcinogenic. Microwave radiation also penetrates deeper than direct heat, so that the food is heated by its own internal water content. In contrast, direct heat can fry the surface while the inside is still cold. Pre-heating the food in a microwave oven before putting it into the grill or pan reduces the time needed to heat up the food and reduces the formation of carcinogenic char.

The safety of the product is endorsed by the fact that nearly 95% of American households own a microwave oven today.

*Source: www.wikipedia.org*

# Safety is…

## testing the burglar's patience

**The classic anti-theft response came from a bank teller who said that the biggest break-in deterrent was not necessarily the intervening physical segregation… but time.**

Time? That's right. The longer that it takes for the teller to hand over the cash, the greater the risk for the burglar. So the teller argued that it would be more prudent to invest in delaying mechanisms in addition to conventional infrastructure. The result is if the cash extracting process consumed more seconds than anticipated, the intruder was most likely to decamp impatiently with precious little …than risk overstay.

The same logic works at the residence. Let's face it…. most burglars are good at breaking locks. A lock does not discourage them; a number of locks in sequence try their patience. Because the burglar is more likely to do a quick appraisal of the number of locks he has to crack at the outset, do a risk analysis and leave when he figures out the time required to break in would be far in excess of his budget.

So consider these delaying mechanisms:

A single door is far more difficult to work on than double doors.

Better to leave the crown jewels as deep inside as possible; the prospect of cracking too many locks serves as a deterrent.

Invest in multiple locking mechanisms within a single lock.

Lock the various rooms.

If you use an imported lock, then it is entirely possible that our intruder friend has not yet done R&D on it.

A swipe card locking system that sends out a continuously impolite beep when the door is broken in could be an intruder's bad dream.

# Safety is...

## negotiating traffic with ease

**Traffic discipline needs to reconcile increasing vehicular speed on the one hand and pedestrian safety on the other.**

The zebra crossing – 40 to 60 centimetres (16 inches to 2 feet) wide – is the solution. If you walk on it, you are safe. In India, one would amend that to 'ought to be safe'.

The zebra crossing was first used (after isolated experiments) across 1,000 sites in the UK in 1949 (the original form being alternating strips of blue and yellow). A 1951 measure introduced them into law.

These crossings help pedestrians cross only at the point where these lines are provided and when the signal is in their favour at controlled crossings. A zebra crossing emphasises a pedestrian's right to cross the street – at his or her own pace – and with safety.

Lastly, there is a saying: a pessimist is one who looks on both sides before crossing a one-way street. In India, we would call such a person a pragmatist.

### Dos and don'ts of road walking

| Dos | Don'ts |
|---|---|
| Avoid walking next to the kerb with your back to the traffic. Look both ways first. | Adults should take care of their children: hold their hands firmly, strap very young children into push-chairs or use reins. |
| Wear light coloured, bright or fluorescent clothing in poor daylight. When dark, the use of reflective material (armbands, sashes, waistcoats and jackets), helps getting noticed by a factor of three. | You must not walk on motorways or slip roads except in an emergency. |
| Where there are no pedestrian crossings, watch the traffic on both sides and cross when safe. | Do not read newspapers or look at hoardings while walking on the road. You will be amazed as to the number of people who actually do! |
| Ask the traffic police for help and guidance. | Do not run after a moving bus. Avoid travelling on bus footboards. Do not mount or dismount a moving bus. |

*Source: Adapted from http://cyberabadpolice.gov.in/Traffic_1.asp and http://www.delhitrafficpolice.nic.in/guidelines-for-pedestrians.htm*

# Safety is...

## preventing catastrophes

**Thou shalt not use cellphones while driving because ...**

- It distracts and could lead to accidents. Heard of Kolkata's leading make-up artiste who walked the railway tracks while talking on his cellphone and never heard the oncoming train?

**Thou shalt not use cellphones in an operation theatre because ...**

- Interferes with medical electrical equipment
- Distracts surgeons (imagine answering to 'Darling, what will you like for dinner this evening?' when you have to declog the aorta!)

**Thou shalt not use cellphones in a petrol pump because ...**

- Static waves can ignite sparks and cause a fire (understatement) owing to the presence of petrol vapour. Won't you mind your favourite car going up in smoke, while you are telling your boss, "Don't worry, I'll be there in a minute".

**Thou shalt not use cellphones on a flight because ...**

- Electro-magnetic waves interfere with onboard communication and navigation systems. Do you want the pilot to tell you, "Throw your cell or we will throw you out into thin air!".

# Safety is... using a protective belt

**Heard of Delhi's Blueline mayhem – which claimed 96 lives in 2007 – and triggered angry protests from citizens demanding safety on roads?**

Even though most modern cars – or vehicles for that matter – are now fitted with side-guard head protection airbags for front and rear occupants, electronic brake-pressure distribution and hydraulic brakes, it is the good old seat belt that still remains one of the most effective safety devices on road.

For a simple reason: during collision, the car's momentum is transferred to the occupants. As a result, they are pushed to the steering wheel, windshield or interiors – or simply ejected from the vehicle. Result: injury through impact.

The seat belts prevent ejection. Within milliseconds, seat belt pre-tensioners tighten safety belts and help prevent belted occupants from sliding or bouncing around. They also bend during a crash to reduce the impact.

Better to escape with scratches for a few days than to be in a plaster for months.

So the next time, don't sneer at the use of the safety belt with 'What useless precautions….'

*Source: Adapted from www.directessays.com*

# Safety is...

## staying indoors and healthy

**Sick building syndrome? Never heard of it?**

**An increasing number of those who work indoors breathe yesterday's stale air, inhale each other's carbon dioxide, work crammed under a field of fluorescents and pretend it is all healthy because their workplace is air-conditioned.**

And yet they invariably complain about eye-strain, lethargy, respiratory disorders. The culprit: their sophisticated office.

Doctors indicate that the doubling of asthma rates since 1980 is a result of foul indoor air (Source: *BusinessWeek*, 12th June 2000). Indoor pollutant levels are two-five times, and on occasion 100 times, more concentrated than outdoors (Source: United States Environmental Protection Agency). In fact, 38 per cent of the world's pollution can be traced indoors. Amazing.

Modern architects are responding in two ways:

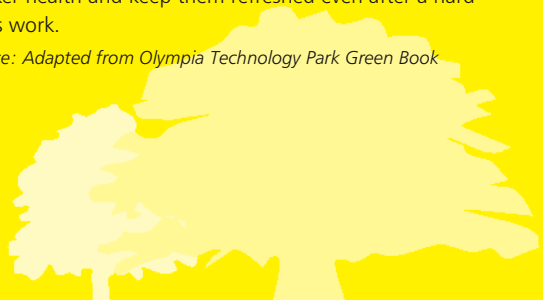
- Designing offices and homes that protect occupant health through improved air quality, lower storm water runoff and heat island effect
- Increasing the efficiency with which buildings use and harvest energy, water and materials, leading to lower long-term costs.

To encourage this green movement, the US Green Building Council has formulated the Leadership in Energy and Environmental Design (LEED), which promotes a whole-building approach across key areas: sustainable site development, water savings, energy efficiency and materials selection.

In 2005, Washington became the first US state to enact green building legislation. According to the law, all major public agency facilities with a floor area exceeding 5,000 sq. ft. are now required to meet or exceed LEED standards.

The result is that modern 'green' buildings are safer, promote worker health and keep them refreshed even after a hard day's work.

*Source: Adapted from Olympia Technology Park Green Book*



# Safety is...

## being physically protected

**It is quite interesting that for more than a century, cricket used a number of safeguards – pads, gloves, abdomen guards, thigh pads and shin guards... but not the helmet.**

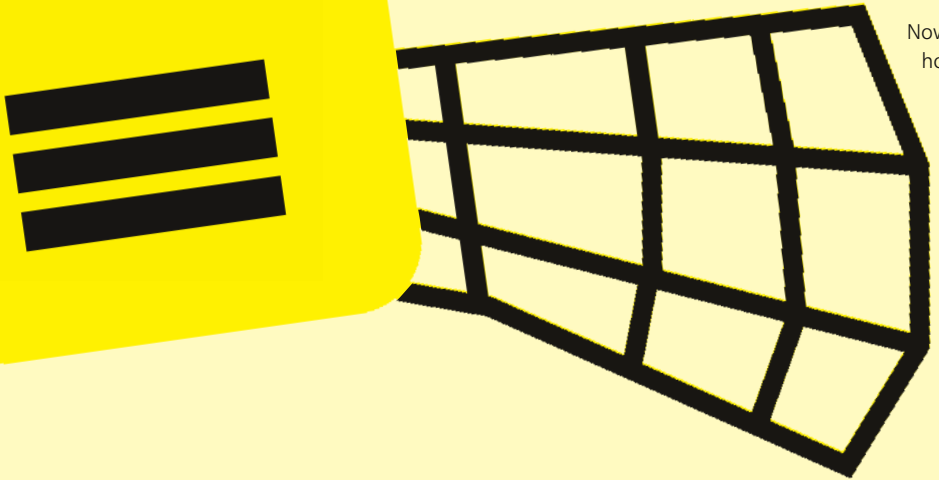
One of the reasons could well have been the cricket establishment's obsession to retain its pristine appeal. So when an improvised helmet made its appearance in the Thirties around the time of Bodyline, it was soon consigned into oblivion. It was not until the Seventies that the helmet reappeared... Mike Brearley used an improvised protection under the normal England cap that he wore. A few months later in 1978, Graham Yallop of Australia wore a protective helmet (motor cyclist style) when playing against the West Indies at Bridgetown. Soon he had a convert in Dennis Amiss of England.

Fielding without helmet very close to the batsman could prove to be dangerous: Raman Lamba, a former Indian Test player, was hit on the temple while fielding at short leg during a club match in Dhaka in 1998. He succumbed to his wounds.

Today, a helmet is an accepted safety feature; covers the whole of the skull and provides viewing space through a grill or perspex visor.

**Level of acceptance:** Worn also by wicket keepers; worn even by seven-year-olds when the ball barely rises knee high!

**Irony:** Cricket helmets are being increasingly used by two wheeler owners as well. Whether this is safe is another matter!



Now let's talk about hockey. A hockey helmet is worn by ice hockey players and field hockey goalkeepers to protect the head from potential injury. Prior to the 1980s, many National Hockey League (NHL) players did not don helmets because it was not mandatory. However, since the 1990s, wearing helmets became mandatory. The shell of a hockey helmet is made of a substance called vinyl nitrile that disperses force and absorbs the impact of hits by pucks, sticks, skates or contact with the ice, reducing chances of concussion.

The last helmetless player in the NHL was Craig MacTavish. Played helmetless until his retirement in 1997.

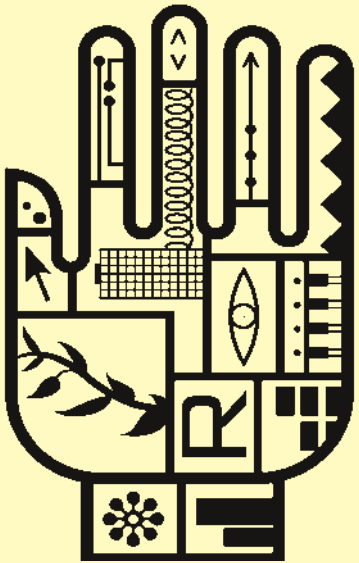
*Source: Adapted from http://en.wikipedia.org*

# Safety is...

## reading your fingerprint and eyes

**Fingerprint reading** is a tried-and-tested safety weapon used by immigration officers in a world ravaged by terrorist attacks.

The method of identification is based on a reading of the impressions made by the minute ridge formations or patterns on the fingertips. Depending on the reality that the fingerprints of no two individuals are alike. Infallible means of personal identification.





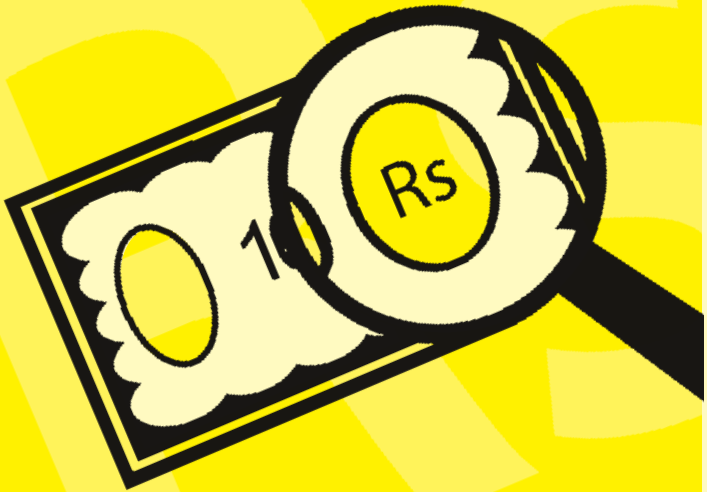
**Retinal identification** or **iris reading** remains another potent means for personal identification. The iris is so unique that no two irises are alike, even among identical twins, in the entire human population. In actuality, after identifying the iris and converting into mathematical code, the probability that two irises will produce the same mathematical code is approximately one in 10 to the 78th power. The population of the earth is approximately 10 to the 10th power. There are two types of identification methods: passive and active.

The active iris system requires the user to move back and forth so that the camera can adjust and focus on the user's iris. A user could be anywhere from six to 14 inches away from the camera. The passive iris system is different: it incorporates a series of cameras that locate and focus on the iris. The passive iris system allows the user to be anywhere from one to three feet away from the camera(s).

*Source: Adapted from www.fbi.gov*

# Safety is...

## making currency notes tamper-proof

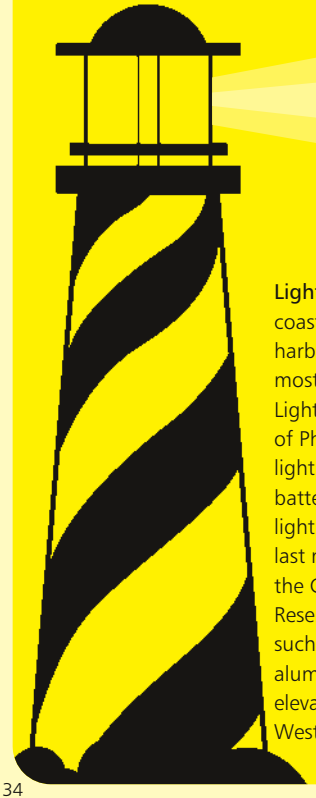



| What to do | Genuine | Counterfeit |
|---|---|---|
| Feel the paper | A new genuine note has the feel of crisp paper. | The paper tends to be a lot floppier than the real thing. |
| Hold the note up to the light | Generally most bank notes carry a watermark and thread. The thread will always appear as a solid line when viewed against the light. | The absence of a fineness of detail is often the giveaway. Some also attempt to reproduce the effect of the thread but again it is more likely to be visible when not looking at the note using transmitted light. |
| Print quality | High tonal range in the intaglio areas. | Fine details are lost with a lot of blur. |
| Magnifying glass | Print crispness maintained even under magnification. You should be able to read micro-text messages. | Absence of detail. Micro-text difficult to read. |
| UV lamp | Under ultra-violet lamp genuine currency will appear dull. | Very often counterfeiters use UV-bright paper, which glows more than original currency under UV light |
| Colour | Clear and defined colours. Metallic ink areas have a sheen. | Colours can be washed out. Colour copiers sometime copy both light greens and oranges as yellows. Metallic areas often appear without sheen. |

*Source: http://www.indigoimage.com/count/feat1.html*

# Safety is...

## smooth navigation



**Lighthouse:** Lighthouses mark dangerous coastlines, hazardous shoals, safe entries to harbours and facilitate aerial navigation. The most famous lighthouse in history was the Lighthouse of Alexandria, built on the island of Pharos in Hellenistic Egypt. Modern lighthouses usually use solar-charged batteries and have a single stationary flashing light perched on a steel skeleton tower. The last manned lighthouse built in the US was the Charleston Light constructed in 1962. Resembling an air traffic control tower, it has such modern features as a triangular shape, aluminium alloy skin, air conditioning, an elevator and the most powerful lamp in the Western Hemisphere.

**Ships:** In the good old days, ships at sea were completely isolated from the shore and other ships. Wireless telegraphers used a simple Morse code: three dots, three dashes and three dots, representing the alphabets SOS, the abbreviation for Save Our Souls – to represent what is now the commonest globally used distress signal.

**Air traffic controllers:** The ATCs coordinate the movements of thousands of aircraft, keep them at a safe distance from each other, direct them during takeoff and landing, monitor their movement during inclement weather and facilitate smooth traffic flow. Primary and secondary radar are used to enhance a controller's 'situational awareness' within his/her assigned airspace – all types of aircraft send back primary echoes of varying sizes to controllers' screens as radar energy is bounced off their skins, and transponder-equipped aircraft reply to secondary radar interrogations by giving an ID (Mode A), an altitude (Mode C) and/or a unique call sign (Mode S). Certain types of weather may also register on the radar screen. These inputs, added to data from other radars, are correlated to forecast the air situation.

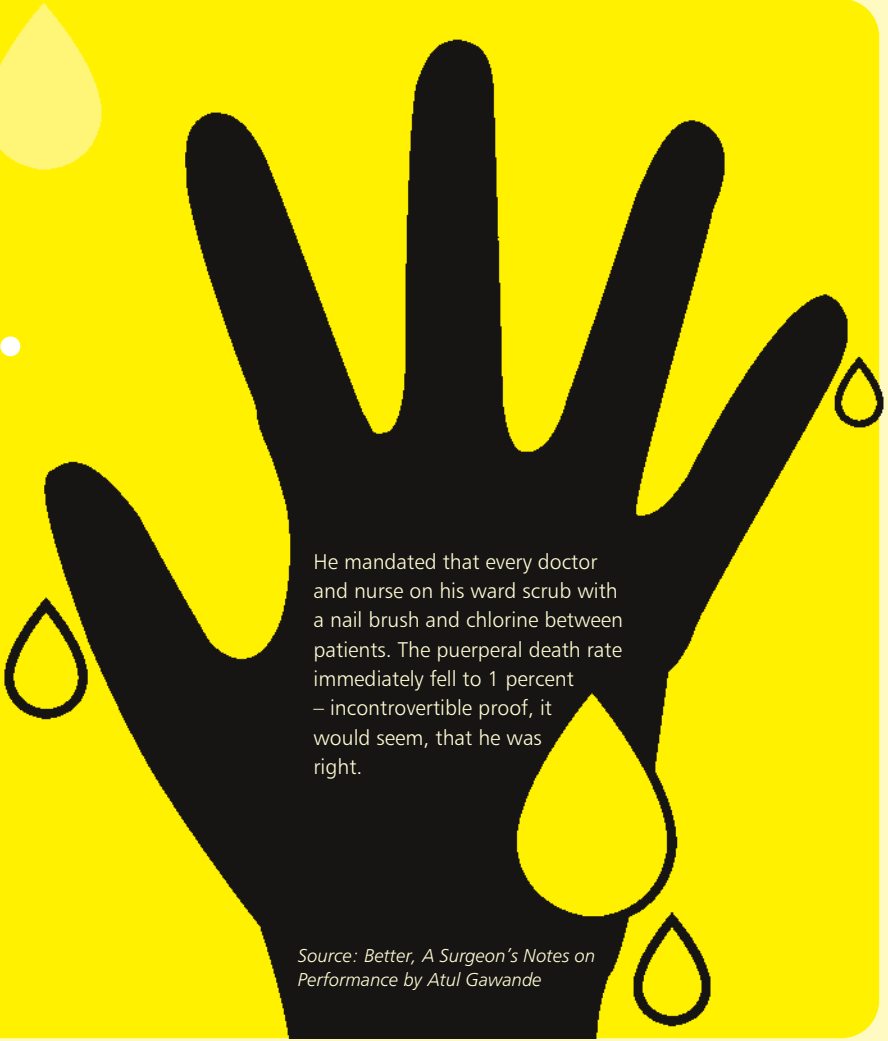
*Source: Adapted from www.boatsafe.com and http://travel.howstuffworks.com/air-traffic-control.htm*

# Safety is…

## washing hands before an operation

**In 1847, at the age of twenty-eight, the Viennese obstetrician Ignac Semmelweis famously deduced that, by not washing their hands consistently or well enough, doctors are themselves to blame for childbed fever.**

Childbed fever, also known as puerperal fever, was the leading cause of maternal death in childbirth in the era before antibiotics (and before the recognition that germs are the agents of infectious disease). Out of three thousand mothers… at the hospital where Semmelweis worked, six hundred or more died of the disease each year–a horrifying 20 percent maternal death rate.



He mandated that every doctor and nurse on his ward scrub with a nail brush and chlorine between patients. The puerperal death rate immediately fell to 1 percent – incontrovertible proof, it would seem, that he was right.

*Source: Better, A Surgeon's Notes on Performance by Atul Gawande*

# Safety is...

## protection during war

**Trench:** Trench warfare represents a form of war with static lines of defence. Trench warfare arose following a revolution in firepower without similar advances in mobility and communications. The important periods of trench warfare occurred during the American Civil War (1861–65), the Russo-Japanese War of 1904–05 and peaked on the western front in the First World War.

The trench architecture explains its safety parameters: trenches were dug in a zigzagging pattern that broke the line into bays connected by traverses; this meant that a soldier could never see more than 10 metres (30 ft) or so along the trench. The pattern ensured that the enemy would not be able to attack from the sides or cause any major damage. Consequently, the entire trench could not be enfiladed if the enemy gained access at one point; or if a bomb or shell landed in the trench, the shrapnel could not travel far. Even if enemy aircrafts were sent to gather intelligence for artillery strikes, it would be difficult to gather co-ordinates for zigzagging trenches than straight trenches.

**Bunker:** A bunker is a defensive military fortification built mostly below ground and used extensively during World War I and World War II. During the Cold War, massive bunker complexes were built to house strategic (command and control) infrastructure, government personnel and stores in case the war went nuclear.

Bunkers deflect the blast wave from nearby explosions to prevent ear and internal injuries to occupants. While frame buildings collapse from as little as 3 psi – pound per square inch –of overpressure, bunkers are constructed to survive several hundred psi, offering maximum safety against incessant bombing.

Nuclear bunkers are also built to cope with the under-pressure that lasts for several seconds after the shock wave passes and block radiation.

*Source: Adapted from http://en.wikipedia.org*

# Safety is...

## being shielded by armour

**Armour is worn to protect one's skin from swords, spears, arrows and even fire arms.**

Protective armours were worn by warriors across time. Emperors and kings of medieval India, including the Mughals, used delightfully ornamental armours during war. Rana Sangram Singh II, a Rajput king even had his protective chest plate inscribed with verses from Indian scriptures.

Earliest medieval knights preferred metallic armour comprising thousands of interlocking rings woven painstakingly by hand to form a shirt, coif, or leggings. Underneath the metallic armour the knight would wear a padded garment known variously as an 'aketon' or 'gambeson'. To this defensive equipment he added a shield, usually made of leather-covered wood and a helmet.

As the medieval arms race progressed and new, more powerful weapons were developed (such as the longbow and crossbow), chainmail became ineffective on its own. So in the Middle Ages plate armour began to appear (ca. late 13th/early 14th century), first as reinforcements to vital areas such as the chest and shoulders and finally as a complete suit (ca. early 15th century). Chainmail armour was now relegated to protecting smaller vital areas that could not be covered with plate armour, such as the groin and under the arms. The shield became smaller and even redundant. With the effective use of gunpowder weapons (ca. 15th/16th century) not even plate armour could protect the knight and the cumbersome armour gradually became ineffective.

Experimental inquiry into effective armour against gunfire continued, most notably during the American Civil War, World War I, and World War II, but it was not until the plastics revolution of the 1940s that effective bulletproof vests became available to law enforcers, military personnel, and others.

In 1965, Stephanie Kwolek, a chemist at Du Pont, invented Kevlar, trademark for poly-para-phenylene terephthalamide, a liquid polymer that can be spun into aramid fibre and woven into cloth. Originally, Kevlar was developed for use in tyres, and later for such diverse products as ropes, gaskets, and various parts for planes and boats.

In 1971, Lester Shubin of the National Institute of Law Enforcement and Criminal Justice advocated its use to replace bulky ballistic nylon in bulletproof vests. Kevlar has been the standard material since. In 1989, the Allied Signal Company developed a competitor for Kevlar and called it Spectra. Originally used for sail cloth, the polyethylene fibre is now used to make lighter, yet stronger, non-woven material for use in bulletproof vests alongside the traditional Kevlar.

*Source: Adapted from http://science.howstuffworks.com/body-armor.htm*

# Safety is...

## having a friend to fight fire

For years a fire extinguisher stands mutely on the wall and you continue to complain about compromising the aesthetics.

Then one day, it finally gets used, and saves lives.

The fire fighter can turn into a potent ally if you simply follow these simple steps:

**P**
Pull the safety pin

**A**
Aim the nozzle at the fire base from 4 to 10 feet

**S**
Squeeze the handle

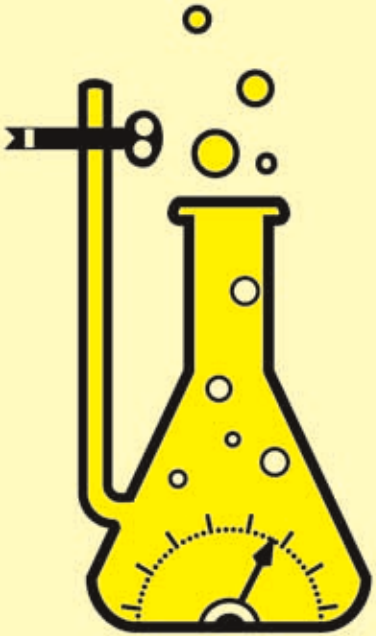
**S**
Sweep the extinguisher from side to side; aim at the fire base

There are four types of extinguishers: dry chemical, halon, water, and carbon dioxide. A carbon dioxide fire extinguisher is most effective on Class B (fire ignited by flammable liquid and gas) and C (fire ignited by electrical equipment) fires. Since the gas disperses quickly, this extinguisher is effective from 3 to 8 feet. The carbon dioxide is stored as a compressed liquid inside the fire extinguisher; as it expands, it cools the surrounding air. The cooling will often cause ice to form around the 'horn' where the gas is expelled from the extinguisher. Since the fire could re-ignite, a safety strategy could be to apply the agent even after the fire appears to be put out.

*Source: Adapted from http://www.grainger.com/production/info/fire-extinguisher.htm*

# Safety is...

## having a plan for it



**We have heard of mechanical engineering, even chemical engineering or marine engineering but what is safety engineering?**

Safety engineering is an applied science strongly related to systems engineering and system safety engineering, which assures that a life-critical system will respond as needed even when its constituent pieces fail.

The safety review is being recognised as an important risk management tool. A failure to identify safety risks and the inability to manage them can be expensive. The multi-disciplinary nature of safety engineering means that a broad array of professionals must be incorporated into accident prevention or safety engineering.

Safety engineers distinguish different extents of defective operation: a failure is "the inability of a system or component to perform its required functions within specified performance requirements", while a fault is "a defect in a device or component, for example: a short circuit or a broken wire".

The unexpected failure of a device that was operating within its design limits is a primary failure, while the expected failure of a component stressed beyond its design limits is a secondary failure.

Safety engineers also identify different modes of safe operation:

**Probabilistically safe system:**
Has no single point of failure, and enough redundant sensors, computers and effectors so that it is unlikely to cause harm (usually "very unlikely" means, on average, less than one human life lost in a billion hours of operation).

**Inherently safe system:**
A clever mechanical arrangement that cannot be made to cause harm – obviously the best arrangement, but this is not always possible. A fail-safe system is one that cannot cause harm when it fails.

**Fault-tolerant system:**
Can continue to operate with faults, though its operation may be degraded in some fashion.

These terms combine to describe the safety needed by systems: for example, most biomedical equipment is "critical", and hence often another identical piece of equipment is kept nearby, so it can be merely "probabilistically fail-safe". Train signals can cause "catastrophic" accidents (imagine chemical releases from tank-cars) and are usually "inherently safe". Aircraft "failures" are "catastrophic" (at least for their passengers and crew) so aircraft are usually "probabilistically fault-tolerant". Without any safety features, nuclear reactors might have "catastrophic failures", so real nuclear reactors are required to be at least "probabilistically fail-safe", and some such as pebble bed reactors are "inherently fault-tolerant".

*Source: Adapted from wikipedia.org*

# Safety is...

## getting out in the nick of time

**It took one individual's idea to save lives in the combat environment of Iraq.**

One of the top killers of soldiers in Iraq has not been the enemy… it had been the inability to escape from Humvees, the wheeled vehicle replacement of Army staple jeep. Each time the Humvees rolled over and landed in one of Iraq's many irrigation canals, the casualty was considerable.

This is why: when an armoured vehicle is upside down or on its side, it can sometimes take up to three soldiers to get a door open wide enough for people to get out. If the door is stuck in mud, then the verdict: impossible.

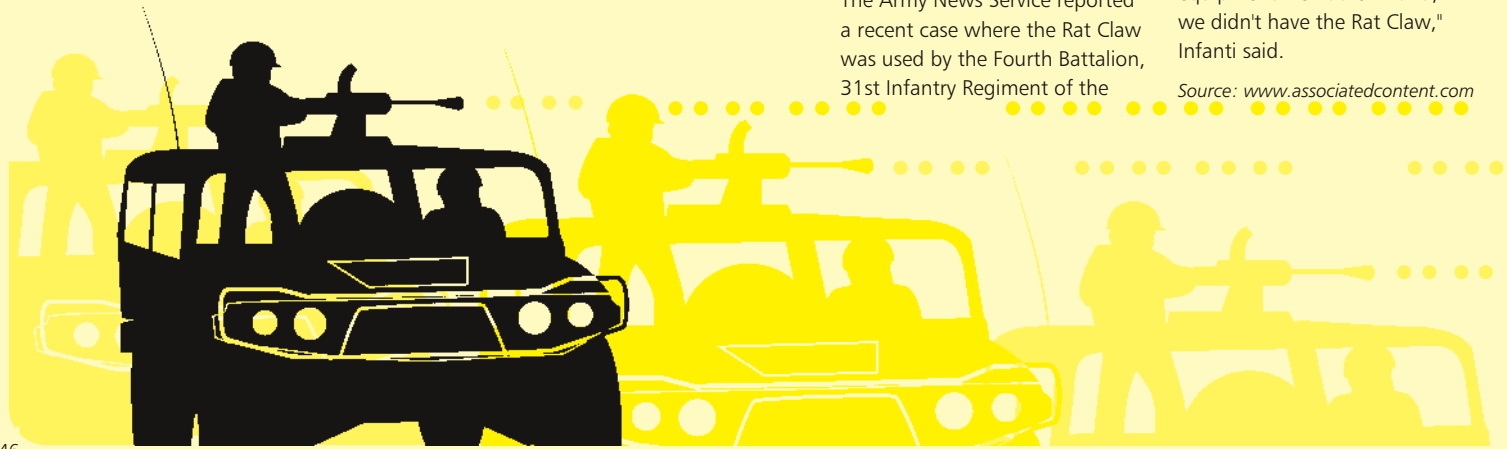
Bill Del Solar, safety officer for the Second Brigade Combat Team, developed a new device called the Rat Claw to assist those trapped. This is a flat, steel hook used to pull open a Humvee door, or if necessary, remove it completely. "If you get a little momentum, you can pull anything off," Del Solar is quoted as saying. According to the report, a typical door opening with the Rat Claw takes less than a minute; the really tough cases take up to three minutes.

The big question: how long is three minutes? Del Solar is reported as saying that the human brain can go three to four minutes without oxygen before suffering damage. "It's a reasonable amount of time for a rescue," Del Solar said in the report.

The Army News Service reported a recent case where the Rat Claw was used by the Fourth Battalion, 31st Infantry Regiment of the Second Brigade Combat Team. After a Humvee had flipped open from an improvised explosive device, soldiers used the Rat Claw to open the vehicle for the passengers to get out. One of those passengers was the battalion commander, Lieutenant Colonel Michael Infanti.

"I remember I was pinned inside the truck," Infanti is reported to have said. "Fuel was dripping on me. I was in pain, but the soldiers did extremely well and the Rat Claw worked. It took one try and I was out of the vehicle. Honestly, I don't know how they would've gotten me out with the equipment we had on hand, if we didn't have the Rat Claw," Infanti said.

*Source: www.associatedcontent.com*



# Safety is...

## when the machine stops just when you want it to

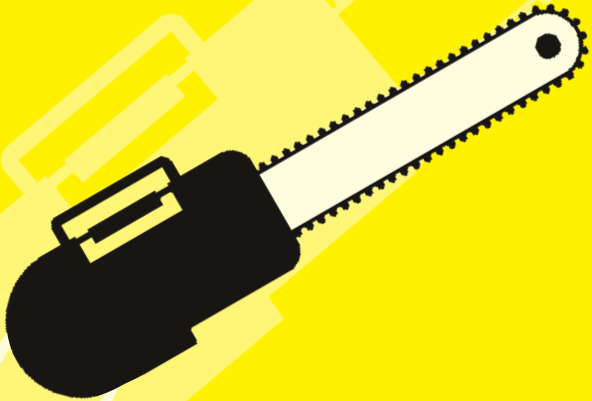
**The spinning teeth on a table-saw the blade move at about 120 m.p.h.**

**The good news:** This makes them highly effective in cutting wood.

**The bad news:** they are also very good at cutting fingers.

So the table-saw comes equipped with new sensor technology that can tell immediately when the blade comes in contact with soft human flesh.

Within a few milliseconds – yes, milliseconds – the saw blade stops and drops below the cutting surface, so that what could have been the probable loss of a finger is reduced to only a scratch.





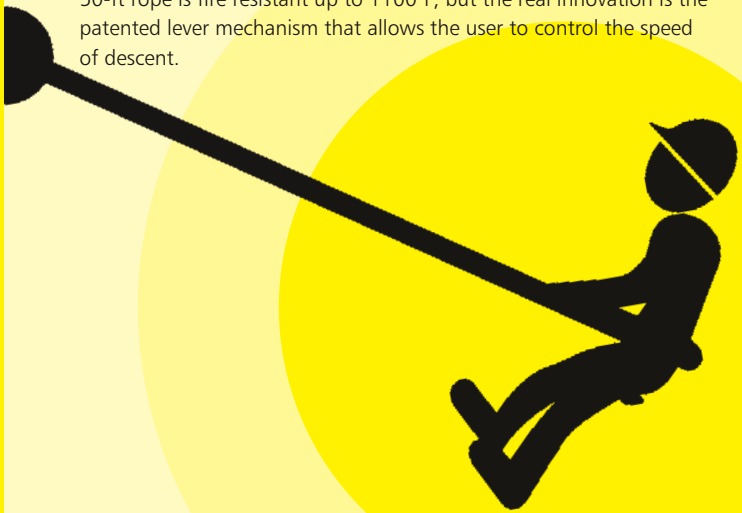
# Safety is...

## getting out of any life-threatening situation

**After two New York City firefighters jumped to their deaths from a burning building in January 2005, the FDNY set out to design a safety device to prevent its occurrence.**

**Result:** a compact, lightweight (6 lbs. including harness) personal safety system that's easy to carry and provides for a quick getaway.

The unit's forged-steel hook can penetrate brick, if necessary, to allow a firefighter to anchor himself before heading out of the window. The 50-ft rope is fire resistant up to 1100°F, but the real innovation is the patented lever mechanism that allows the user to control the speed of descent.



# Safety is...

## having nature on your side

A chameleon changes its colour as a safety reflex action when under threat of other chameleons, when attempting to mate, when needing to regulate temperature or when defending territory (reminds of a higher species, right?).

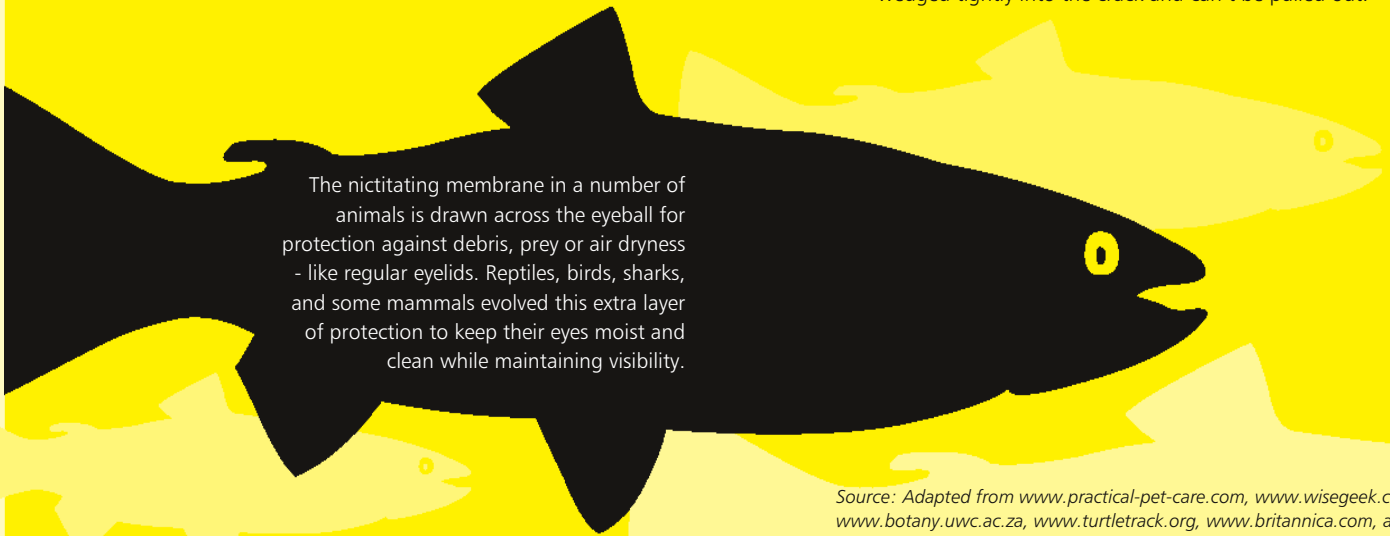
The next time you use crocodile skin as a metaphor for resistance to criticism, perhaps you may use the rhinoceros for a more suitable reference. The rhino's 15.5 cm thick protective skin is formed from layers of collagen, positioned in a lattice structure, acting as a safety shield. The collagenous – the fibrous protein constituent of bone, cartilage, tendon, and other connective tissue – dermis of the white rhinoceros forms a thick, protective armour that is highly specialized in its structure and material properties compared with other mammalian skin.

Rhinoceros skin is three times thicker than predicted allometrically (the study of the change in proportion of various parts of an organism as a consequence of growth.), and it contains a dense and highly ordered three-dimensional array of relatively straight and highly cross-linked collagen fibres. In compression, rhinoceros skin withstands average stresses and strains of 170 MPa (MPa determines force per unit area) and 0.7, respectively, before yielding. The skin armour of the rhinoceros is very well adapted to resist blows from the horns of other rhinos, as might occur during aggressive behaviour, due to specialized material properties as well as its great thickness.

A typical snail wears a calcareous shell as a protective armour. The shell is coiled in a spiral pattern around a central axis called the columella. Sometimes elaborate surface sculptures – knobs and spines – provide additional protection against predation. The knobs and spines are sharp edged and work like a knife when danger lurks.

When a porcupine is threatened, it assumes a defensive posture – head and shoulders are lowered, every quill erects, tail thrashes back and fourth – enough to scare the predator away. Quills strike the enemy, driving deep. With painful and potentially fatal impact.

A type of lizard, the chuckwalla, escapes pursuers, by crawling into a crack in a rock and inflating its body with air so that it's wedged tightly into the crack and can't be pulled out.



The nictitating membrane in a number of animals is drawn across the eyeball for protection against debris, prey or air dryness - like regular eyelids. Reptiles, birds, sharks, and some mammals evolved this extra layer of protection to keep their eyes moist and clean while maintaining visibility.

*Source: Adapted from www.practical-pet-care.com, www.wisegeek.com; www.botany.uwc.ac.za, www.turtletrack.org, www.britannica.com, and The Giant Book of Facts and Trivia, edited by Isaac Asimov*

# Safety is…

## having an octopus' weaponry

- **Ink:** An octopus can disorient a pursuer by squirting a burst of purplish-black ink.
- **Appendage regeneration:** An octopus can grow a new limb when it loses one when under attack.
- **Camouflage:** An octopus can change skin colour and texture of its skin cells in less than a second – you can read that again – to blend with its surroundings. These cells in its skin called chromatophores are under muscular control, allowing different pigments to come into view as the cell walls are stretched or squeezed. The verdict: Chameleons are dead boring compared to octopuses.

*Source: Adapted from http://nationalzoo.si.edu*

# Safety is…

## distracting the predator

When a crab sheds its legs to a predator, it works as a safety response called 'autonomy'. This is how it works: an autotomiser muscle suddenly contracts, bending the limb backwards until it breaks off at a predetermined weakened spot (the gaping hole is then covered with a protective membrane). This can distract a predator long enough for the crab to escape. The limb is gradually replaced…which explains why crabs are commonly seen with a small leg or claw.

*Source: Adapted from www.scottishshoreangler.pwp.blueyonder.co.uk/pages/crabs.htm*

# Safety is...

## looking at how we were created

### Safety barrier for your brain

In the late 1800s, German bacteriologist Paul Ehrlich found that when he injected coloured dyes into the blood stream they coloured all the organ systems except the brain. Edwin Goldman, his student, injected a dye into the fluid that surrounds the brain – the CSF or cerebrospinal fluid – and ended up staining the brain but little else. Inference: there is a membranic structure called the Blood Brain Barrier that protects things from travelling between the blood stream and brain, protecting the brain from chemicals in the blood and permitting essential metabolic function.

*Source: Adapted from online medical dictionary and www.abc.net.au/science*

### Safety reservoir for blood loss

The human spleen creates lymphocytes for the destruction and recycling of old red-blood cells. It also acts as a blood reservoir, supplying the body with blood in emergencies (bad cut for instance). Its white blood cells also trap organisms. So the next time you have a cut or a bruise, thank the spleen.



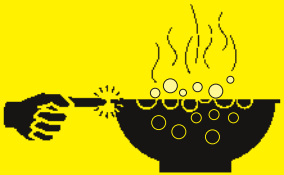
# Safety is...

## living inside an intelligent machine

**Many organs/ reflexes of the human body are excellent protective devices:**

• The **hypothalamus** that lies at the base of the brain is the body's silent metronome. It times sleep cycles, the action of the heart, breathing, digestion and other vital processes. If our body temperature drops, it prompts us to shiver – an exercise which warms us.

• Many of the human body's extraordinary reflexes serve a protective function. A finger touches a hot stove. Scores of **heat receptors** in the skin sound the alarm. Messages flash along nerve pathways. But valuable time would be lost if they had to travel all the way to the brain. Hence the **spinal cord** itself takes over. It orders instant muscular contraction and the finger is automatically pulled away. This is quite like the knee-jerk reflex which a doctor produces by tapping with a rubber hammer to test the alertness and health of nerve pathways.



• The activity of the **salivary glands** – which secrete more than a quart of fluid a day – is one of our most thoroughly studied reflexes. These little glands react if the body's water reserves drop too low and produce the sensation of thirst.

• **Eyes** have a number of protective reflexes. Pupils contract in bright sunlight to shut out excessive light that may be damaging. We blink continually: our lids act as windscreen wipers to keep the eyes clean and to lubricate them with tears.

• **Coughing** is another reflex, which sweeps the throat clean. We may complain of the annoyance of coughing, but we would face a serious problem if we didn't cough. When the cough reflex moves into action, air is sucked into the lungs and trapped by the epiglottis, the little flap valve which keeps food from going down the windpipe. At the same time the soft palate rises to close off nasal passages. With everything in readiness, the chest muscle tightens. The epiglottis then flaps open and a minor hurricane rushes from the throat, sweeping irritants before it.

• **Sneezing** is another familiar reflex. Like coughing, it is a house-cleaning operation. An irritant gets into a nasal passage. The brain sends out orders to get rid of it immediately. A series of events gets under way. As the explosion is about to take place, the brain sends further orders: shut the eyes, open the soft palate wide so that air rushes out through mouth and nose.

• **Yawning** remains another safety reflex to help us stay awake. When we are sleepy, circulation in the brain becomes sluggish and the oxygen supply is diminished. If we are to stay awake, oxygen must be increased. The yawn – and the chestful of air that goes with it – is the answer.

*Source: Adapted from Your body's built-in automation by J.D. Ratcliff in The Reader's Digest Book of the Human Body*



## Safety immunity for our body

The human body's **immune system** never tires, ticks all day long, providing wholesome safety and wellbeing. An immune system is a collection of mechanisms within an organism that protects against disease by identifying and killing pathogens and tumour cells. It detects a wide variety of agents, from viruses to parasitic worms, and needs to distinguish them from the organism's own healthy cells and tissues in order to function properly. Detection is complicated as pathogens adapt and evolve new ways to successfully infect the host organism. However, our immune system can create immunological memory through adaptation for future encounters with these pathogens. This process of acquired immunity inspired vaccination.

*Source: Adapted from http://en.wikipedia.org/wiki/Immune_system*

# Safety is...

## in the design of the igloo

**Think Eskimo, think igloo. Immediate question: what makes it melt-proof?**

The snowflakes falling outside the igloo quickly melt when they land on its roof, and provide a replacement layer of insulation. Its ongoing freezing and re-freezing transforms the snow blocks into a solid icy domed refuge. The igloo is now strong enough to withstand the weight of a massive polar bear, weighing 300-600 kgs.

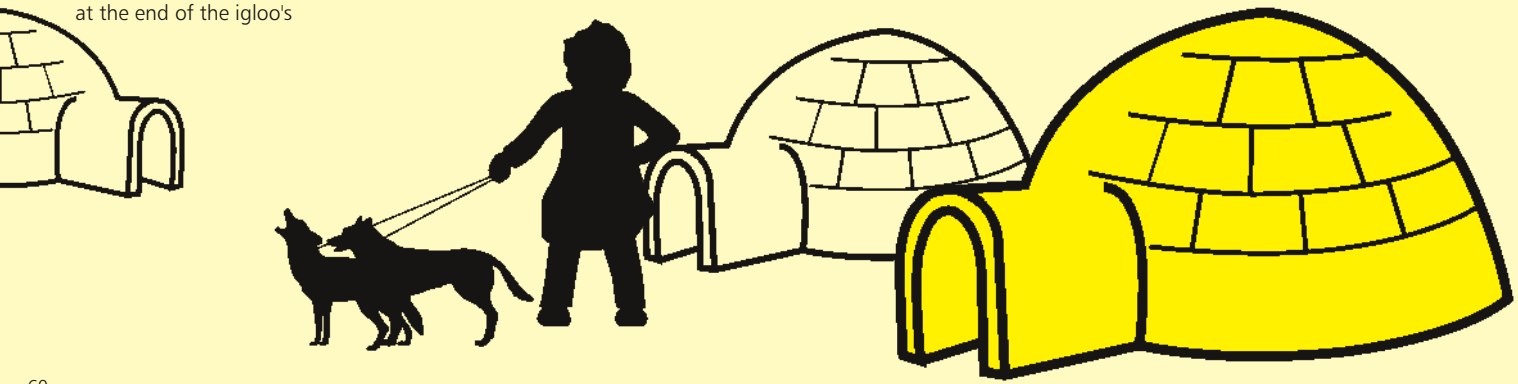
The initial freezing and re-freezing of the igloo takes place at the end of the igloo's construction. First, the men must dig a trench into a fresh snow-drift, and, using their knives, cut blocks of snow from it that are specifically shaped to face inward when fully laid out. They then lay the blocks on their edges to form a circle, cutting them to size as they go, so that the result is a narrowing spiral. They cap the igloo by dropping a keystone, or block with edges cut wider above than below, into the remaining gap in the roof. They 'grout' the gaps between blocks of snow with additional snow.

The men then call in the resident expert, the Eskimo woman, to put the finishing touches. Armed with her whale blubber lamp, she enters the structure, lights her lamp as brightly as possible, beats a hasty retreat, and seals the entrance with a block of ice. Inside the igloo, the snow on the roof begins to melt but, because of its domed design, the water melts down the sides of the igloo, and soaks the blocks of snow. When the blocks are almost completely saturated with water, the Eskimo woman returns, douses her blubber lamp, and allows the frigid outside air to rush in, transforming the fragile snow structure into one of hard, solid ice.

The igloo is now prepared to receive residents, whose body heat, combined with the warmth of one to two blubber lamps, maintain the interior temperature at approximately 55°F.

Not until the winter ends, and the exterior temperature rises, does the igloo begin to melt, but the Eskimos are long gone by then, and the faithful igloo has done its job: protecting its occupants from the harsh Arctic winter.

*Source: Adapted from www.coolquiz.com*



# Safety is...

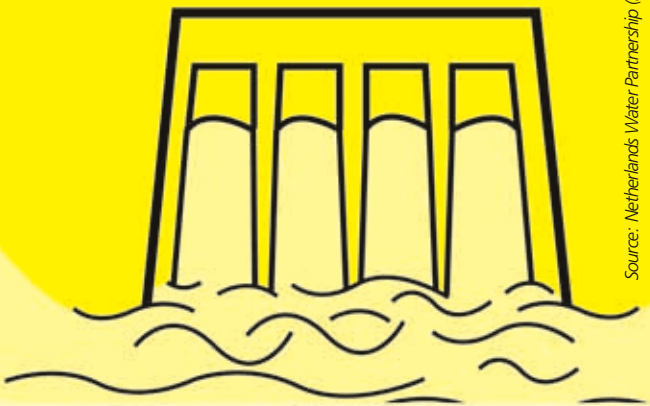
## harnessing the sea

**About a quarter of the Netherlands lies below sea level. So the Dutch built their first dykes – land walls – in the 19th century.**

The inspiration came from a lake close to Amsterdam that threatened the city's existence. So Dutch engineers built a dyke and dug canals around the lake. Through the dyke the water from the lake was pumped into the canals. The canals led the water to rivers and the sea. In the end the lake went dry and was called a 'polder'.

The Dutch perfected the art of dyke making for centuries to arrest water inflow and conserve it during droughts. This skill manifested visibly in the Delta Project (in response to the disastrous floods of 1953) that used dykes to reclaim precious land.

This skill is now finding extensive use in a world where global warming threatens to raise sea levels by 85 centimetres over the century.



*Source: Netherlands Water Partnership (NWP)*



# Safety is...

## scanning unauthorised entry

**The radar remains the sleepless vigilant of the skies and earth.**

It scans the seemingly innocuous skies and earth for airborne fixed or moving objects. In the process, it makes a country or region relatively sensitive to infiltration through prompt identification.

This is how the radar enhances aerial and terrestrial safety: it uses electromagnetic waves to identify the range, altitude, direction or speed of aircraft, ships, motor vehicles, weather formations, and terrain.

Thus radars are extensively used in the meteorological detection of precipitation, air traffic control, police detection of speeding traffic and by the military.

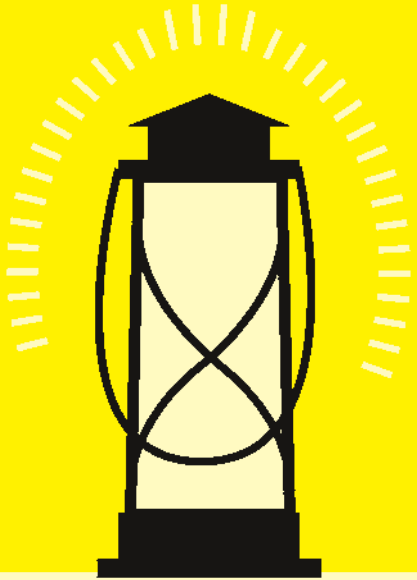
*Source: Adapted from www.radartechnology.eu*

# Safety is...

## lighting a lamp without explosion

**In the olden days, when people went underground to mine, they used candles with open flames or phosphorescent sources of light (such as rotting fish), flint or steel mills and barometers to tell if atmospheric pressure was low (when more methane seeped out of the mine).**

Small mammals or birds were used later to warn of the presence of the deadly carbon monoxide present after underground fires or explosions. Such animals are much more susceptible to gas, and will die before a human, an early warning. An alternative method of removing the methane involved igniting the gas deliberately to cause explosions, thus evacuating the mines of the majority of explosive or easily flammable material present.



And so was created the first safety lamp. This was improved upon by Sir Humphrey Davy who used a flame enveloped in wire gauze.

However, these early lamps were fragile. The gauze in the Davy lamp rusted in the moist air of a coal pit and became unsafe; the glass in the Stephenson lamp was easily broken and could then allow the flame to ignite firedamp in the atmosphere.

It was only the later designs – the Gray, Mueseler, Marsaut and other lamps – that circumvented these problems with the use of multiple gauze cylinders. However, one problem continued: the glass would become too hot and crack. It was only when toughened glass was developed did the safety lamp become a reality.

Now came another problem. The light was considered poor and it was only when electric lighting was introduced in mines around 1900 that miners could see clearly and consistently.

And finally around 1930 the helmet lamps were battery-powered so that miners could focus closely on what they were doing without seeking lighting reinforcements before proceeding further. Thereby saving lives.

*Source: Adapted from Wikipedia*

# Safety is...

## being as secure as Fort Knox


**Fort Knox is the principal gold depository of the United States.**

Amount of present gold holdings: 147.3 million ounces. In the past, the Depository has stored the Declaration of Independence, the U.S. Constitution, the Articles of Confederation, Lincoln's Gettysburg address, three volumes of the Gutenberg Bible, and Lincoln's second inaugural address. In addition to gold bullion, the Mint has stored valuable items for other government agencies. The Magna Carta was once stored there. The crown, sword, scepter, orb, and cape of St. Stephen, King of Hungary also were stored at the Depository, before being returned to the government of Hungary in 1978.

This is what keeps it secure:

- Every soldier in today's armoured force has served here at least once during his or her term of service.
- The building has been created out of granite, steel and concrete.
- The two-level steel and concrete basement vault is divided into compartments.
- The vault door weighs more than 20 tons.
- No one person is entrusted with the combination.
- Various members of the Depository staff must dial separate combinations known only to them.
- The vault casing is constructed of steel plates, beams and cylinders, laced with hoop bands and encased in concrete.
- The vault roof is of similar construction and is independent of the Depository roof.
- The outer wall of the Depository was made from granite lined with concrete. The exterior dimensions measure 105 feet by 121 feet and the attic is 42 feet high.
- To construct this impregnable complex, builders used 16,500 cubic feet of granite, 4,200 cubic yards of concrete, 750 tons of reinforcing steel and 670 tons of structural steel.
- The building is equipped with the latest modern protective devices. While it is conceivable that a well-armed and well-coordinated criminal mastermind and his army of mercenaries could be successful

in breaking into the Depository, there would be no chance of removing the gold. At each corner of the structure on the outside, but connected with it, are four guard boxes. Sentry boxes, similar to the guard boxes at the corners of the Depository, are located at the entrance gate.

- A driveway encircles the building and a steel fence marks the boundaries of the site.
- The Depository is equipped with its own emergency power plant, water system and other facilities.
- The guard force is composed of men selected from various Government agencies, or recruited from Civil Service registers.

- No visitors are permitted at the Depository. When you come to Fort Knox, you may stand outside the Depository gate and take pictures, but you may not enter the gate or tour the Depository.
- The nearby Army post provides additional protection. Anyone trying to get the gold would have to take on several armoured regiments of one the strongest fighting force on earth.

*Source: Adapted from http://www.govmint.com/knowledgebase/fortknox.aspx*



# Safety is...

## having technology on your side

**The Electronic Article Surveillance prevents shop lifting through a simple mechanism:** it uses disposable label tags or reusable hard tags attached to the merchandise. These tags – containing magnetic strips – are removed or deactivated by the clerks when the item is properly bought or checked out. But when the shoplifter walks past the detection pedestal at the store exit, comfortable in the thought that she has not been detected, there is a loud beep that draws the attention of the exit counter. The logic is simple: in her case the tag has not been deactivated and the magnetic sensor promptly reads the signals sent out by the magnetic strip.

*Source: Adapted from www.freepatentsonline.com*

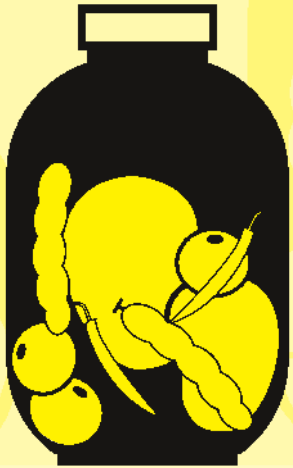
# Safety is...

## making anti-fungal pickle

**In India's ancient towns, where much of the wisdom of the ages is jealously guarded by family tradition, the one culinary secret remains the century-old pickle.**

In a fast-food-driven world where the 'throw by' date could be tomorrow, you actually have something on the evening *thali* that would have survived 70-80 years. The nimbu pickle is one of them.

Old timers in Surat spoke of the pickle in the kitchen that had been created by the great-great grandmother, handed down across generations with as much care as the family silver.



**These are the various things that kept the pickle in a pristine condition (or nearly) even 70-80 years after being made:**

- The use of vinegar and sugar as preservatives
- A cloth on the jar (*banni*) to keep out the dust and moisture
- Discouraging the use of metal spoons to extract the pickle
- A discipline of opening the jar only during the day, never at night
- Active periodic stirring to counter the thickening
- The tying of an amulet around the jar cap, and invoking divine intervention against fungal action

The result is that the pickle could well figure in people's wills from now on.

*Source : Farida Kheyroolla*

# Safety is...

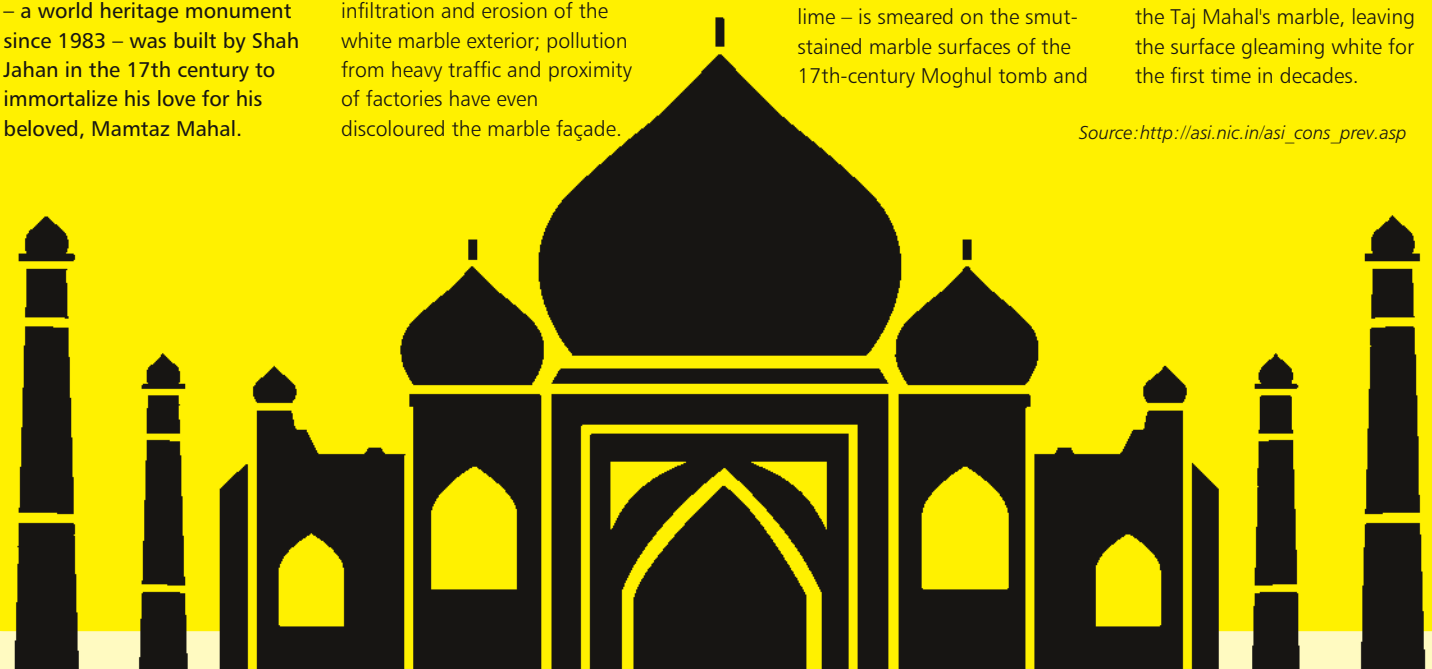
## preserving our heritage

**Few civilisations in the world can match the awesome beauty of India's priceless architectural glory, the Taj Mahal. This marble wonder – a world heritage monument since 1983 – was built by Shah Jahan in the 17th century to immortalize his love for his beloved, Mamtaz Mahal.**

But the real challenge is to preserve Taj Mahal's timeless appeal from decay: adverse climatic conditions and monsoon rains have led to water infiltration and erosion of the white marble exterior; pollution from heavy traffic and proximity of factories have even discoloured the marble façade.

The Archaeological Survey of India – responsible for the upgradation and protection of the Taj – initiated a series of measures to arrest the decay. Silicone-based products were used to prevent the growth of algae and fungi. An ancient face-pack recipe – a blend of soil (*multani mitti*), cereal, milk and lime – is smeared on the smut-stained marble surfaces of the 17th-century Moghul tomb and washed off with warm water after 24 hours. The formula – described with meticulous detail in Abul Fazl's *Ain-i-Akbari* – has such restorative qualities that it is now being exported to Italy to clean grimy monuments. Indian archaeologists were astonished to find that *multani mitti* drew black and yellow impurities from the Taj Mahal's marble, leaving the surface gleaming white for the first time in decades.

*Source: http://asi.nic.in/asi_cons_prev.asp*



# Safety is...

## a greener earth

Global carbon dioxide emissions in 2006 approached a staggering 32 billion tons. For a safer world, the following need to be done immediately:

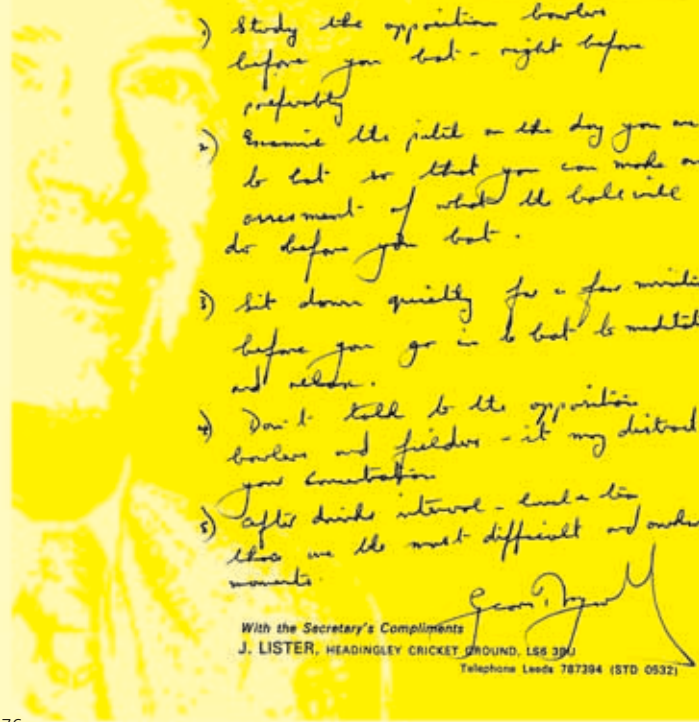
- **Turn food into fuel:** Are corn husks better than corn for producing energy? Ethanol is the alternative fuel that could finally wean the world from its expensive oil habit and turn off millions of tons of carbon emissions that go with it.
- **Get blueprints for a green house:** Control heat, air and moisture leakage by sealing windows and doors. Insulate the garage, attic and basement with natural, nontoxic materials like reclaimed blue jeans. Protect windows from sunrays with large overhangs and double-pane glass. Emphasize natural cross ventilation.
- **Change your lightbulbs:** The hottest thing in household energy savings is the compact fluorescent lightbulb (CFL), a funny-looking swirl that fits into standard sockets. CFLs cost three to five times as much as conventional incandescent bulbs yet use one-quarter of the electricity - and last years longer.
- **Ditch the mansion:** Oversize houses aren't just architecturally offensive; they also generally require more energy to heat and cool than smaller ones even after you have factored in efficient appliances.
- **Hang a clothes line:** Wash your clothes in warm water instead of hot; launder big loads instead of many smaller ones. New machines use as little as a fourth of the energy of older laundry machines. When clean, dry your clothes the natural way by hanging them on a line rather than loading them in a dryer.
- **Take another look at vintage clothes:** Not buying a shirt the second time around means you avoid consuming all the energy used in producing and shipping a new one and, therefore, the carbon emissions associated with it.
- **Work close to home:** Sitting in gridlock wastes your time and the planet's fuel. The solution: move your home next to the office. Or take the bus.
- **Pay your bills online:** Eliminate your paper trail and pay bills online. Save trees.
- **Open a window:** Open a window instead of running the AC. Adjust the thermostat a couple of degrees higher in the summer and lower in the winter. Insulate your walls and ceilings. Use the dishwasher only when it's full. Install low-flow showerheads. Wash your clothes in warm or cold water. Turn down the thermostat on the water heater. At the end of the year, don't be surprised if your house feels lighter. It just lost 4,000 lbs. of carbon dioxide.

*Source: www.time.com*

# Safety is...

## focusing on fundamentals

Geoff Boycott's advice before you open the batting.



THE YORKSHIRE COUNTY CRICKET CLUB

1) Study the opposition bowlers before you bat - night before preferably

2) Examine the pitch on the day you are to bat so that you can make an assessment of what the bowlers will do before you bat.

3) Sit down quietly for a few minutes before you go in to bat to meditate and relax.

4) Don't talk to the opposition bowlers and fielders - it may distract your concentration

5) After drinks interval - find a few words the most difficult and awkward moments.

Geoff Boycott

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