

ASSESSMENT OF OCCUPATIONAL HAZARDS AND DEVELOPMENT OF ENGINEERING EQUIPMENT TO SUPPORT HEALTH WORKERS AGAINST COVID-19

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THE PRESENTATION WAS MADE TO EXPLAIN THE OCCUPATIONAL
HAZARDS AND DEVELOPMENT OF ENGINEERING EQUIPMENT TO
SUPPORT HEALTH WORKERS AGAINST COVID-19

OCCUPATIONAL HAZARDS

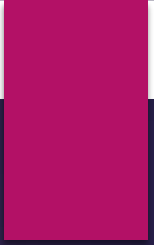
AN OCCUPATIONAL HAZARD IS A HAZARD EXPERIENCED IN THE WORKPLACE. OCCUPATIONAL HAZARDS CAN ENCOMPASS MANY TYPES OF HAZARDS, INCLUDING CHEMICAL HAZARDS, BIOLOGICAL HAZARDS (BIOHAZARDS), PSYCHOSOCIAL HAZARDS, AND PHYSICAL HAZARDS. OCCUPATIONAL HAZARD AS A TERM SIGNIFIES BOTH LONG-TERM AND SHORT-TERM RISKS ASSOCIATED WITH THE WORKPLACE ENVIRONMENT AND IS A FIELD OF STUDY WITHIN OCCUPATIONAL SAFETY AND HEALTH AND PUBLIC HEALTH. SHORT TERM RISKS MAY INCLUDE PHYSICAL INJURY, WHILE LONG-TERM RISKS MAY BE INCREASED RISK OF DEVELOPING CANCER OR HEART DISEASE.

TYPES OF HAZARDS

- **CHEMICAL HAZARDS:** THERE ARE MANY CLASSIFICATIONS OF HAZARDOUS CHEMICALS, INCLUDING NEUROTOXINS, IMMUNE AGENTS, DERMATOLOGIC AGENTS, CARCINOGENS, REPRODUCTIVE TOXINS, SYSTEMIC TOXINS, ASTHMAGENS, PNEUMOCONIOTIC AGENTS, AND SENSITIZERS.
- **BIOLOGICAL HAZARDS:** BIOLOGICAL AGENTS, INCLUDING MICROORGANISMS AND TOXINS PRODUCED BY LIVING ORGANISMS, CAN CAUSE HEALTH PROBLEMS IN WORKERS. INFLUENZA IS AN EXAMPLE OF A BIOHAZARD WHICH AFFECTS A BROAD POPULATION OF WORKERS.
- **PSYCHOLOGICAL HAZARDS:** PSYCHOSOCIAL HAZARDS ARE OCCUPATIONAL HAZARDS THAT AFFECT SOMEONE'S SOCIAL LIFE OR PSYCHOLOGICAL HEALTH.
- **PHYSICAL HAZARDS:** PHYSICAL HAZARDS ARE A SUBTYPE OF OCCUPATIONAL HAZARDS THAT INVOLVE ENVIRONMENTAL HAZARDS THAT CAN CAUSE HARM WITH OR WITHOUT CONTACT. PHYSICAL HAZARDS INCLUDE ERGONOMIC HAZARDS, RADIATION, HEAT AND COLD STRESS, VIBRATION HAZARDS, AND NOISE HAZARDS.

How to Prevent Occupational Hazards



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- IDENTIFY THE RISKS AT YOUR WORKPLACE
 - REDUCE NOISE AT YOUR WORKPLACE
 - TRY TO REDUCE ENVIRONMENTAL STRESS
 - CONDUCT REGULAR CHECKS AND MOCK DRILLS

WHAT IS CORONA VIRUS?

CORONAVIRUSES ARE A GROUP OF RELATED VIRUSES THAT CAUSE DISEASES IN MAMMALS AND BIRDS. IN HUMANS, CORONAVIRUSES CAUSE RESPIRATORY TRACT INFECTIONS THAT CAN RANGE FROM MILD TO LETHAL. MILD ILLNESSES INCLUDE SOME CASES OF THE COMMON COLD (WHICH HAS OTHER POSSIBLE CAUSES, PREDOMINANTLY RHINOVIRUSES), WHILE MORE LETHAL VARIETIES CAN CAUSE SARS, MERS, AND COVID-19.

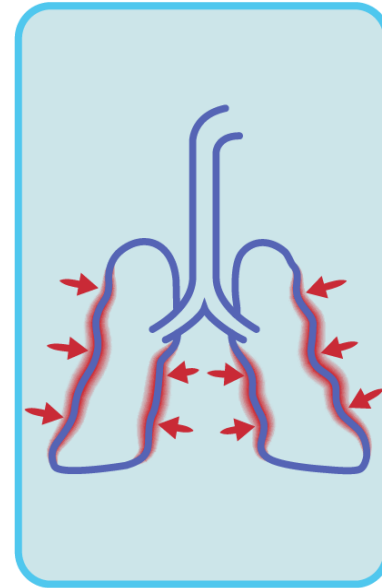
HOW DID THE OUTBREAK START?

ON DECEMBER 31, 2019, THE WORLD HEALTH ORGANISATION'S (WHO) CHINA OFFICE HEARD THE FIRST REPORTS OF A PREVIOUSLY UNKNOWN VIRUS BEHIND A NUMBER OF PNEUMONIA CASES IN WUHAN, A CITY IN EASTERN CHINA WITH A POPULATION OF OVER 11 MILLION.

WHAT STARTED AS AN EPIDEMIC MAINLY LIMITED TO CHINA HAS NOW BECOME A TRULY GLOBAL PANDEMIC. THERE HAVE NOW BEEN OF CONFIRMED CASES AND 82,195 DEATHS, ACCORDING THE JOHN HOPKINS UNIVERSITY COVID-19-BOARD

Symptoms of Corona Virus

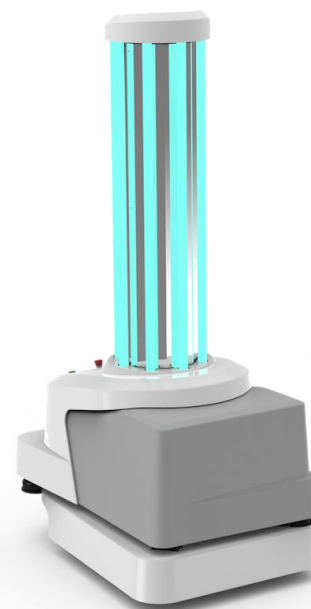
- . Fever
- . Cough
- . Shortness of breath



EQUIPMENT TO SUPPORT HEALTH WORKERS AGAINST COVID-19

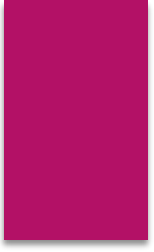
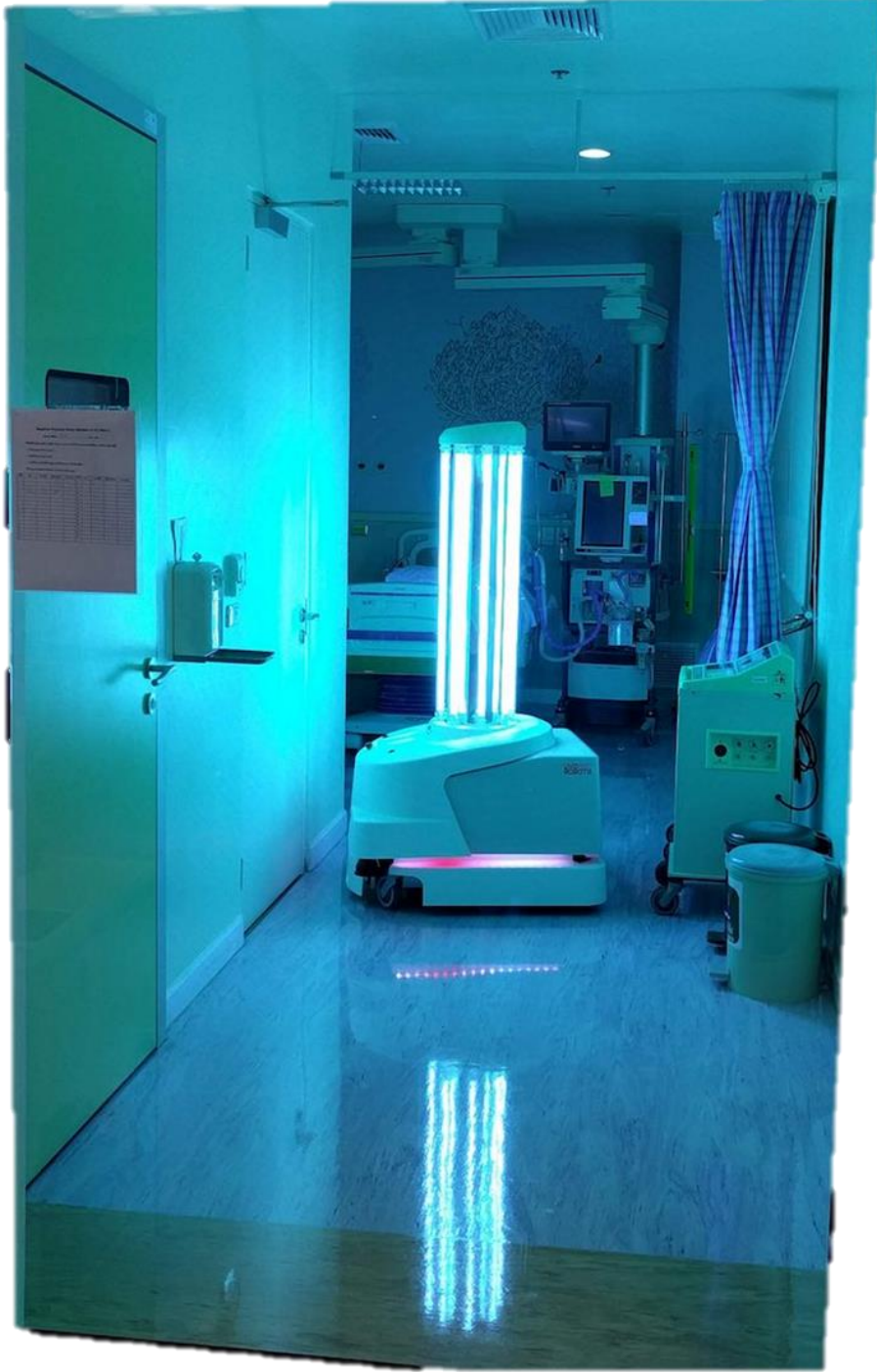


The UV Disinfection Robot



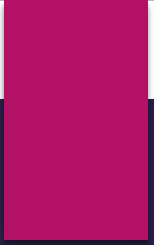
THE ULTRAVIOLET DISINFECTION ROBOT

THE UVD ROBOT IS USED AS PART OF THE REGULAR CLEANING CYCLE, AND AIMS AT PREVENTING AND REDUCING THE SPREAD OF INFECTIOUS DISEASES, VIRUS, BACTERIA, AND OTHER TYPES OF HARMFUL ORGANIC MICROORGANISMS IN THE ENVIRONMENT BY BREAKING DOWN THEIR DNA-STRUCTURE. THE ROBOT IS SAFE, RELIABLE AND ELIMINATES HUMAN ERROR. FURTHERMORE, IT IS USER FRIENDLY AND IS DESIGNED TO BE OPERATED BY EVERY-DAY CLEANING STAFF.



HOW IT WORKS

UVD ROBOTS ARE ROBOTS THAT ARE ABLE TO DISINFECT PATIENT ROOMS AND OPERATING THEATERS IN HOSPITALS. THEY'RE ABLE TO DISINFECT PRETTY MUCH ANYTHING YOU POINT THEM AT—EACH ROBOT IS A MOBILE ARRAY OF POWERFUL SHORT WAVELENGTH ULTRAVIOLET-C (UVC) LIGHTS THAT EMIT ENOUGH ENERGY TO LITERALLY SHRED THE DNA OR RNA OF ANY MICROORGANISMS THAT HAVE THE MISFORTUNE OF BEING EXPOSED TO THEM. THE ROBOT CONSISTS OF A MOBILE BASE EQUIPPED WITH MULTIPLE LIDAR SENSORS AND AN ARRAY OF UV LAMPS MOUNTED ON TOP. TO DEPLOY A ROBOT, YOU DRIVE IT AROUND ONCE USING A COMPUTER. THE ROBOT SCANS THE ENVIRONMENT USING ITS LIDARS AND CREATES A DIGITAL MAP. YOU THEN ANNOTATE THE MAP INDICATING ALL THE ROOMS AND POINTS THE ROBOT SHOULD STOP TO PERFORM DISINFECTING TASKS.



AFTER THAT, THE ROBOT RELIES ON SIMULTANEOUS LOCALIZATION AND MAPPING (SLAM) TO NAVIGATE, AND IT OPERATES COMPLETELY ON ITS OWN. IT'LL TRAVEL FROM ITS CHARGING STATION, THROUGH HALLWAYS, UP AND DOWN ELEVATORS IF NECESSARY, AND PERFORM THE DISINFECTION WITHOUT HUMAN INTERVENTION BEFORE RETURNING TO RECHARGE. FOR SAFETY, THE ROBOT OPERATES WHEN PEOPLE ARE NOT AROUND, USING ITS SENSORS TO DETECT MOTION AND SHUTTING THE UV LIGHTS OFF IF A PERSON ENTERS THE AREA.

THE GOAL OF THE UVD ROBOTS WAS TO HELP HOSPITALS PREVENT THESE INFECTIONS IN THE FIRST PLACE.

CONCLUSION

THE ABSOLUTE BEST WAY OF DEALING WITH THE CORONAVIRUS PANDEMIC IS TO JUST NOT GET CORONAVIRUS IN THE FIRST PLACE.

AT THE TOP OF THE LIST OF THE PLACES TO AVOID RIGHT NOW ARE HOSPITALS, BECAUSE THAT'S WHERE ALL THE REALLY SICK PEOPLE GO. BUT FOR HEALTHCARE WORKERS, AND THE SICK PEOPLE THEMSELVES, THERE'S REALLY NO OTHER OPTION. TO PREVENT THE SPREAD OF CORONAVIRUS (AND EVERYTHING ELSE) THROUGH HOSPITALS, KEEPING SURFACES DISINFECTED IS INCREDIBLY IMPORTANT, BUT IT'S ALSO DIRTY, DULL, AND (CONSIDERING WHAT YOU CAN GET INFECTED WITH) DANGEROUS. AND THAT'S WHY IT'S AN IDEAL TASK FOR AUTONOMOUS ROBOTS.



THANKS FOR YOUR
ATTENTION
AND
STAY SAFE