

BIOCHEMICAL HAZARD DETECTION SYSTEM AND METHOD

FIELD OF THE INVENTION

5 The present invention relates to an application of a biochemical detector to sense biological hazards. It involves the use of the biochemical detector, installed on vehicles to monitor the atmospheric conditions.

BACKGROUND OF THE INVENTION

10 Acts of terrorism using biological agents have become more common. For example the use of poisonous gases by terrorists has resulted in the loss of many lives. In 1995, Japan suffered from the release of toxic fumes in a subway station. The nerve agents called the Sarin had resulted in a major mass casualty
15 incident.

 Biological attacks are subtle and may go unnoticed until symptoms occur in the population. Biological hazards can be odorless and colorless resulting in the general public inhaling unknowingly. Inhaling some toxic agents can cause
20 blindness, lungs damage, disfigurement and most severely, death. All places where the public might gather are vulnerable to terrorism acts involving the use of biological hazards.

 Mobile reconnaissance system including chemical detectors are frequently
25 found in armored vehicles and are used for the detection of warfare agents and toxic substances in the field. However, armored vehicles are generally not used except in war zones. During peacetime, they are not prominent, especially in an urban environment. In addition there is a practical limitation in terms of the number of these vehicles that can be deployed.

Thus, there is a need for a biochemical detection system utilizing existing vehicles. In particular there is a need for a system that uses vehicles that travel over a wide area and that are used every day.

5 SUMMARY OF THE INVENTION

It is an object of the present invention to provide a biological hazard detection system that overcomes the above disadvantages or at least provides the public or industry with a useful choice.

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Accordingly in a first embodiment the present invention can be said to consist in a 1. A method of detecting a biological hazard comprising the steps of:

mounting a biochemical detection system connected to a communication system in a plurality of vehicles, said biochemical detection system consisting of:

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a biochemical sensor,
a microcontroller, and
a battery pack;

monitoring said biological detection system in said plurality of vehicles from a control room via said communication system; and

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providing a warning if a least one of said biological detection system in said plurality of vehicles detects a biological hazard.

Preferably said step of monitoring said biochemical detection system in said plurality of vehicles from a control room via said communication system
25 includes monitoring the status of each said biochemical detection system.

Preferably said vehicle is provided with a location detection system and the step of providing a warning includes providing the location of where the biological hazard was detected.

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Preferably the step of providing a warning includes notifying the relevant authorities.

Preferably said vehicle is part of a public transport fleet.

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Preferably said vehicle is a taxicab.

Preferably said step of providing a warning includes warning the driver of said vehicle wherein said biochemical detection system that detected said biological hazard is mounted.

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Preferably said step of providing a warning to other vehicles, which have said biochemical detection system installed.

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Preferably including the steps of:
detecting the failure of said biochemical detection system; and
warning of said failure.

Accordingly in a second embodiment the present invention can be said to consist in a system for detecting a biological hazard comprising:

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a biochemical detection system connected to a communication system mounting in a plurality of vehicles, said biochemical detection system consisting of:

a biochemical sensor,
a microcontroller, and
a battery pack;

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means for monitoring said biochemical detection system in said plurality of vehicles from a control room using said communication system; and

means for providing a warning if a least one of said biochemical detection system in said plurality of vehicles detects a biological hazard.

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Preferably said means for monitoring said biological detection system in said plurality of vehicles from a control room using said communication system includes means for monitoring the status of each said biological detection system.

Preferably said vehicle is provided with a location detection system and said means for providing a warning includes means for providing the location of where the biological hazard was detected.

Preferably said means for providing a warning includes means for notifying the relevant authorities.

Preferably said vehicle is part of a public transport fleet.

Preferably said vehicle is a taxicab.

Preferably said means for providing a warning includes means for warning the driver of said vehicle wherein said biochemical detection system that detected said biological hazard was mounted.

Preferably including means for providing a warning to other vehicles, which have said biochemical detection system installed.

Preferably including:

means for detecting the failure of said biochemical detection system; and
means for warning of said failure.

The invention may further be said to consist in any alternative combination of parts or features mentioned herein or shown in the accompanying drawings. Known equivalents of these parts or features which are not expressly set out are nevertheless deemed to be included.

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BRIEF DESCRIPTION OF THE DRAWINGS

Disclosed embodiments and methods of utilizing the invention will be further described, with reference to the accompanying figures, by way of example only and without intending to be limiting, wherein;

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Figure 1 is a diagram illustrating the present invention,

Figure 2 is a diagram of the vehicle of the present invention with the biochemical detection system mount in the vehicle, and

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Figure 3 is a flowchart of the process of the present invention.

DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENTS

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Referring to Figure 1 the biochemical detection system of the present invention will be described. To monitor the environment biochemical monitors 102 are mounted in a vehicle 101. In the preferred embodiment of the present invention the biochemical monitors 102 are mounted in taxis or other vehicles used in public transport such as buses or trains. The vehicles of the present invention are normal road going vehicles and are not specially designed military vehicles. Using taxis has the advantage in that they are on the road a large number of hours in a given day in some cases 24 hours a day and they travel to a large number of different places frequented by the public. The biochemical

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detection system mounted in the vehicle will monitor the environment for biological hazards.

Referring to Figure 2 the biochemical detection system 206 is mounted
5 203 in a vehicle 201. The biochemical detection system 206 includes a
biochemical detector sensor pack 204. The biochemical detector sensor pack 204
is used to detect the biological hazards present in the surrounding. The
biochemical sensor pack includes standard biochemical sensors as are know in
the art. In the preferred embodiment at least the detector sensor pack 204 is
10 mounted on the roof 203 of the vehicle 201 so as to be better exposed to the
surroundings. The whole biochemical detection system 206 may be mounted the
roof 203 of the vehicle 201.

The biochemical detection system 206 includes a micro-controller 205, the
microcontroller 205 communicates with the biochemical sensor pack 204. If the
15 biochemical sensor pack detects the presence of biochemical agents it signals the
microcontroller 205. The biochemical detection system 206 is connected to a
communication system 212 also mounted in the vehicle. The communications
system 212 allows the biochemical detection system 206 to communicate to a
control system 210 in a control room. The biochemical detection system 206
20 may also be able to communicate with a location identification system 211
preferably GPS mounted in the vehicle and when notifying the control room of a
detected hazard include a location indicator

The biochemical detector system 206 includes a power source 208 and
25 may include a backup power source 209. Further the system may be connected
to the vehicles 201 power system. Both the main and backup power systems are
charged by the vehicles power system. The system may include means to
communicate with the driver of the vehicles such as LCD screens, indicator
lights or speakers.

The control room of the preferred embodiment preferable includes a computer system programmed to communicate with the vehicle of the present invention. The communication system is preferably wireless. The control room also preferable has communication systems to communicate with emergency response teams system to automatically raise an alert.

The communication system used between the vehicle and the control room may be a system already in use such as the communication system used between Taxis and their control room. An example of such system is the Integrated Transport Management System used in Singapore taxis. The control system of the present invention may then be linked or integrated with the taxi control room.

Referring to Figure 3 the process of monitoring using the present invention is described. When the vehicle engine starts 201, it provides power to the biochemical system, which contain the biological sensor and micro-processor. In the preferred embodiment this process starts 202 the monitoring. In an alternative embodiment the system may monitor continuously whether or not the vehicle provides power. The sensors continuously monitor 203 the environment for biological hazards. To detect such an agent, the microprocessor continuously 205 compares 204 the voltage level of the sensor pack with a set threshold. If the voltage is below the set threshold, it could be due to a substance present in the environment that is harmless. Thus the control room is not alerted.

If the voltage level is above the threshold 206, the communication system is activated 207 and the information will be sent 208 to the main control station and the vehicles in the surrounding area via the communication system. The driver of the vehicle that detected the hazard will also be alerted 208 that biological hazards are present so that the driver can take appropriate measures for protection including assisting any passengers in the vehicle. The control room system can then raise an alarm 209 and emergency workers notified 210 to carry

out aboveground rescues safely and perform the necessary action to clear the harmful agent.

In addition to receiving notification the control room computer system can communicate with the biochemical detection system 206 to monitor whether or
5 not the biochemical detection system 206 is working correctly and notify the driver of the vehicle and the repair services of the need to repair the biochemical detection system 206.

The foregoing describes the invention with reference to the disclosed embodiment. Alterations and modifications as will be obvious to those skilled in
10 the art are intended to be incorporated within the scope of the invention as defined in the accompanying claims.

CLAIMS

1. A method of detecting a biological hazard comprising the steps of:
mounting a biochemical detection system connected to a communication
5 system in a plurality of vehicles, said biochemical detection system consisting of:
a biochemical sensor,
a microcontroller, and
a battery pack;
monitoring said biological detection system in said plurality of vehicles
10 from a control room via said communication system; and
providing a warning if a least one of said biological detection system in
said plurality of vehicles detects a biological hazard.

2. A method of detecting a biological hazard as claimed in claim 1 wherein
15 said step of monitoring said biochemical detection system in said plurality of
vehicles from a control room via said communication system includes
monitoring the status of each said biochemical detection system.

3. A method of detecting a biological hazard as claimed in claim 1 or claim 2
20 wherein said vehicle is provided with a location detection system and the step of
providing a warning includes providing the location of where the biological
hazard was detected.

4. A method of detecting a biological hazard as claimed in any one of claims
25 1 to 3 wherein the step of providing a warning includes notifying the relevant
authorities.

5. A method of detecting a biological hazard as claimed in any one of claims
1 to 4 wherein said vehicle is part of a public transport fleet.

6. A method of detecting a biological hazard as claimed in claim 5 wherein said vehicle is a taxicab.

7. A method of detecting a biological hazard as claimed in any one of claims 1 to 6 wherein said step of providing a warning includes warning the driver of said vehicle wherein said biochemical detection system that detected said biological hazard is mounted.

8. A method of detecting a biological hazard as claimed in any one of claims 1 to 7 wherein said step of providing a warning to other vehicles, which have said biochemical detection system installed.

9. A method of detecting a biological hazard as claimed in any one of claims 1 to 8 including the steps of:

detecting the failure of said biochemical detection system; and
warning of said failure.

10. A system for detecting a biological hazard comprising:

a biochemical detection system connected to a communication system mounting in a plurality of vehicles, said biochemical detection system consisting of:

a biochemical sensor,
a microcontroller, and
a battery pack;

means for monitoring said biochemical detection system in said plurality of vehicles from a control room using said communication system; and

means for providing a warning if a least one of said biochemical detection system in said plurality of vehicles detects a biological hazard.

11. A system for detecting a biological hazard as claimed in claim 10 wherein said means for monitoring said biological detection system in said plurality of vehicles from a control room using said communication system includes means for monitoring the status of each said biological detection system.

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12. A system for detecting a biological hazard as claimed in claim 10 or claim 11 wherein said vehicle is provided with a location detection system and said means for providing a warning includes means for providing the location of where the biological hazard was detected.

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13. A system for detecting a biological hazard as claimed in any one of claims 10 to 12 wherein said means for providing a warning includes means for notifying the relevant authorities.

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14. A system for detecting a biological hazard as claimed in any one of claims 10 to 13 where said vehicle is part of a public transport fleet.

15. A system for detecting a biological hazard as claimed in claim 14 wherein said vehicle is a taxicab.

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16. A system for detecting a biological hazard as claimed in any one of claims 10 to 15 wherein said means for providing a warning includes means for warning the driver of said vehicle wherein said biochemical detection system that detected said biological hazard was mounted.

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17. A system for detecting a biological hazard as claimed in any one of claims 10 to 16 including means for providing a warning to other vehicles, which have said biochemical detection system installed.

18. A system for detecting a biological hazard as claimed in any one of claims 1 to 17 including:

means for detecting the failure of said biochemical detection system; and
means for warning of said failure.