

EVACUATION SYSTEM FOR PEOPLE IN BUILDINGS AND TUNNELS IN THE EVENT OF UNEXPECTED FLOODING

 TECNOLOGÍA PATENTADA

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RESUMEN

Researchers at the University of Alicante have developed an innovative flood evacuation system that transforms the ceilings of buildings and tunnels into a safe escape route by means of concave cavities that retain air thanks to water pressure. The cavities allow occupants to breathe without the need for active equipment, and are connected by a rigid, textured lifeline that guides occupants to the exit, even in conditions of zero visibility.

The system is complemented by pressure valves to balance water levels between spaces, hatches accessible from the ceiling, telecommunications beacons to alert rescue teams, and signalling and lighting devices. The modular and scalable design is suitable for both new builds and refurbishments, ensuring a rapid and reliable evacuation in the event of flooding.

VENTAJAS Y ASPECTOS INNOVADORES

ADVANTAGES OF THE TECHNOLOGY

By combining the physical principles of fluid mechanics with a robust, user-centred design, this innovative technology provides a practical and reliable way of protecting people from flash floods. Its implementation can significantly reduce the risks of suffocation and disorientation, improve emergency response and meet increasingly stringent structural safety regulations.

The main **advantages** of this technology are:

1. **Ensures breathing** is maintained during floods thanks to air chambers generated by hydrostatic pressure, without the need for energy or mechanical systems.
2. Enables **evacuation "at ceiling level"** via a rigid lifeline with tactile and luminous markings, which operates even in complete darkness.
3. The textured surface of the lifeline provides a secure grip, even when wet or dirty, facilitating **survival against the current and in mud or oil**.
4. It eliminates the need to open jammed doors or wear life jackets, **reducing the risk of entrapment** and facilitating passage through flooded spaces.
5. Pressure-equalising valves between compartments balance the flow of water without requiring external power, **preventing dangerous currents and making it easier to open floodgates**.
6. Watertight beacons with telecommunications capabilities transmit the **location** and **air quality** to rescue teams.
7. The **modular design** allows for installation in both new-build and refurbishment projects, **reducing costs and response times** without altering the building's structure.
8. As a passive system, it does not rely on an external power supply nor does it incorporate electromechanical mechanisms, thereby minimising failures and **ensuring continuous operation during emergencies**.
9. **It does not require electricity** to supply air, which reduces the building's operating costs and environmental footprint.
10. It **facilitates the self-evacuation** of occupants without the need for specialised training, thereby improving community safety and confidence in disaster management.

INNOVATIVE ASPECTS

The system **transforms the roofs of flood-prone buildings into a safe evacuation route** without the need for prior training. By installing **inverted concave cavities**, water pressure compresses and traps breathable air within them, creating static shelters that require neither energy nor active maintenance.

A **rigid lifeline**, with a textured surface and tactile markers, guides occupants towards the exit, even in conditions of poor visibility.

Pressure gates and valves control the flow of water between spaces and allow people to pass through, whilst **telecommunication beacons** alert emergency teams to the presence and quality of the air.

This passive approach overcomes the limitations of airtight chambers, submersible bells and life jackets, offering greater reliability and autonomy.

APLICACIONES DE LA OFERTA

Types of companies:

1. **Construction companies** specialising in new-build and refurbishment projects for:
 - Underground infrastructure: tunnels, underground and railway stations, car parks, underground roads, industrial plants and shopping centres with underground spaces.
 - Residential, commercial and industrial buildings: basements, attics and structures at risk of flooding due to storms or hydraulic failures.
 - Critical facilities: hospitals, laboratories and data centres where operational continuity is essential.
 - Refurbishment projects: can be installed as an add-on in existing buildings without altering their main structure.
 2. **Suppliers of security solutions** for critical facilities (batteries, treatment plants, power stations, etc.).
 3. **Public authorities** and natural risk management bodies.
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COLABORACIÓN BUSCADA

We are seeking companies interested in acquiring this technology for commercial exploitation through **patent licensing agreements**, as well as organisations interested in advancing the development of the technology that have the financial resources and/or suitable facilities to design full-scale pilot trials or collaborate in any of the areas required by the project.

Company profile sought:

Companies with the technical capability to integrate security and evacuation solutions, which have experience in critical infrastructure or construction projects, and which are willing to collaborate on the adaptation and implementation of the system in various contexts (new-build and refurbishment).

The organisation must have the financial and operational resources to manage licences, collaborate on pilot trials and deploy the technology on a large scale, as well as demonstrate a proven track record of regulatory compliance in the areas of civil protection and industrial safety.
