

DESCRIPTION

SINUOUSLY BENT HANDRAIL AND EVACUATION ROUTE PROVIDED WITH SAME SINUOUSLY BENT HANDRAIL

Technical Field

[0001] This invention relates to a evacuation path (road or stair for evacuation) with a steep slope that provide people safe and easy evacuation at night.

Technological Background

[0002] Though people shall evacuate for higher places as nearby hills or mountains in case large tsunami is supposed to come, common roads 36 (drawing 1) toward top of them generally curve gently and it takes much time to reach the height that would be safe from tsunami, and so in some cases evacuation might not be done in time.

[0003] Especially, it may take much more time for aged people and physically handicapped people to reach to the enough height that tsunami would not reach to. Also there is a possibility that may take extra time for people in the area that locates far from the starting point for higher places shown as road 36 to reach to the height.

[0004] Thus, there are proposals to construct some shortest paths10 (drawing 1) at nearby hills and mountains toward higher places that keep certain distances in the area where large tsunami is supposed to come. However, those shortest paths10 are tend to be steep and it is hard for aged people or physically handicapped people to go up. Some

might lose their footing and slip down at night on the steep paths.

[0005] Though there is an idea that said paths10 can be lighted up through the night, paths10 are not usually used and it would mostly result in waste of electric power and also it might bring security issues as they are not monitored all the time.

[0006] In case large tsunami is supposed to come, evacuation order will be announced through regional publicity loudspeaker or loudspeaker van. However, the poor quality of sound or wrong directivity of loudspeaker may cause the difficulty to catch contents exactly and some may miss the evacuation order.

[0007] Even though people failed to get the evacuation order through regional publicity loudspeaker or loudspeaker van, they might be able to know the necessity of evacuation by seeing outside situation and behavior of other people in the daytime, but it might not be possible to know that at night time. Therefore, any other way is needed for night time notification.

[0008] And even though most people understood the evacuation order through regional publicity loudspeaker or loudspeaker van, visitor from outside the area and new comer can only know how to get to the paths10 are by following other people. However, at night it might not be possible or hard to find the flow of people and the direction of paths10 in the dark, which make the evacuation very difficult.

Prior art documents

[0009] Prior Publication 1 : Japanese Patent Laid-Open No. 2007-227105

Summary of the Invention

Problems to be solved by the Invention

[0010] The problems to be solved by this invention are, that the high dangerousness of evacuation at steep slope in the night time and that only the announcement by loudspeaker cannot deliver the evacuation order surely, and that people who are not acquainted with the area do not find the direction for starting point of paths¹⁰ and are under big difficulty on evacuation.

Means for Solving the Problem

[0011] This invention is mostly characterized in constructing handrails along the evacuation structure and that installing lighting systems in or nearby said handrails, and that the lighting system being turned on by the shake of earthquake in order that they make the evacuation to higher place as nearby hills and mountains easier and safer at night.

[0012] Further detailed, this invention is characterized in that it is consist of handrails that are constructed along the shortest evacuation paths to higher place as nearby hills and mountains, lighting system installed in or nearby the said handrails, power supply for said lighting system and the control unit that turn the lighting system on through said power supply by the shake of earthquake.

[0013] Though handrails are considered as being consist of the horizontal bar that is set

with given height and similar inclination angle as an evacuation path and the vertical bar that support said horizontal bar at given space, other structure will do so long as that can be held with hands and can lift and support bodies.

[0014] And handrails just need to be constructed along the evacuation paths and can be aside of or in the center of the evacuation paths. Evacuation paths refers evacuation roads and evacuation stairs. Shortest evacuation paths are not limited to be geometrically straight toward the evacuation point but can include some serpentine forms.

[0015] As a lighting system, LED, fluorescent light, mercury lamp and incandescent lamp will do. Lighting system can be installed in the vertical bar or the horizontal bar. In this case, lighting system are preferred to be installed on behind bars, or to light up the surface of path or stairs to prevent from being dazzled.

[0016] Power supply is available both directly from electric wire of the electric power company and by a storage battery. While the storage battery can be charged by electric power company through electric wire, solar power generator, wind power generator and small water power generator near the evacuation path will be fittingly.

[0017] Control unit has the earthquake shake sensor and is set to turn the light on at particular seismic intensity (e.g. seismic intensity 5) or more. Other than by the earthquake shake sensor, lighting system can be turned on by manually and also can be turned on by being remote controlled from a distance.

Advantageous Effects of the Invention

[0018] The evacuation handrail in this invention has an advantageous effect of making it easier to walk on the evacuation paths, easier to climb and enables people to evacuate to higher place rapidly and safely.

[0019] As the evacuation handrails in this invention light up the evacuation paths, it provides an effect that people can visually recognize the place and direction where evacuation paths are from a distance and let them know the necessity of evacuation and show them clearly the way to go.

[0020] The evacuation handrails in this invention when its lighting system is being remote controlled, also provides an effect that lighting system are remote controlled to turned on and in addition, give a tsunami warning to people in the way other than the loudspeaker regardless of the scale of the earthquake, or presence or absence of the shake (Chilean Tsunami was not the one caused by an earthquake).

[0021] The evacuation handrails in this invention when its lighting system is being manually operated, also provides an effect that lighting system can forcibly be turned on and let people evacuate rapidly and safely even in case the control unit had not worked in right with the given level of shake.

[0022] The evacuation handrails in this invention, as not usually turning its lighting system on through the nights, also provides effects of saving electricity and prolonging the life of the lighting system.

[0023] The evacuation handrails in this invention, as not usually turning its lighting system on through the nights, said paths are usually dark at night and are hardly be some people's gathering places and may lessen worrying about public security around

there.

Brief Description of the Drawing

[0024] <drawing 1> Drawing 1 is a figure that shows geographical relation between evacuation paths and houses in the area that might be hit by tsunami.

<drawing 2> Drawing 2 is a figure of evacuation handrails on the evacuation paths.

Preferred Embodiment

[0025] The aim to let people in the area where large tsunami might hit evacuate to higher places at night quickly and safely, has been put into practice without wasting electricity expense or issues for public order.

Example 1

[0026] Drawing 1 is a figure that shows geographical relation between evacuation paths and houses in the area that might be hit by tsunami and drawing 2 is a figure that shows evacuation handrails on the evacuation paths. In these drawings, 10 is for evacuation paths and 12 is for evacuation places at nearby hills and mountains. Evacuation paths 10 are constructed from residential area toward evacuation places 12 with shortest routing. In the evacuation path 10, steep slope is equipped with stairs

14 and gentle slope is constructed as a road.

[0027] Evacuation handrail 16 is installed beside and along evacuation paths 10.

Evacuation handrail 16 is consist of the horizontal bar 18 that is set with given height and similar inclination angle as an evacuation path 10 and the vertical bar 20 that support horizontal bar 18 at given space. Though wavy shape is provided for horizontal bar 18 so that it could be easy for people to grip, straight shape will do at gentle slope. Also evacuation related information as elevation and location could be transcribed in braille on the vertical bar or horizontal bar for visually impaired person.

[0028] Lighting system 22 is installed around the bottom of vertical bar 20 of evacuation handrail 16. Though LED is used for lighting system 22, fluorescent light, mercury lamp and incandescent lamp can take place. Lighting system 22 is preferred to be installed on behind bars, or to light up the surface or stairs to prevent from being dazzled.

[0029] Power supply is connected to lighting system 22 via control unit 24. Vibration sensor (not shown in the drawing) for earthquake is installed in the control unit 24 and it can turn the lighting system 22 on at a given seismic intensity (e.g. seismic intensity of 5). Other than turning on by vibration sensor, manual system switch 26 will also turn the lighting system 22 and remote control system 28 set at disaster prevention center of cities, towns and villages will turn the lighting system 28 on. Voice guidance of evacuation instruction upon lighting up will also be available.

[0030] Power supply is available both directly from electric wire of the electric power company 30 and by a storage battery 32. While the storage battery 32 can be charged by electric power company 30 through electric wire, generator 34 as solar

power generator, wind power generator and small water power generator near the evacuation path 10 will be fittingly.

[0031] While above described in detail in case that handrails are installed beside the evacuation paths, said handrails of this invention is expected to effect as same in case they are installed beside evacuation stairs. Also just the wavy shaped evacuation handrails of this invention without lighting system will help a lot for aged people and physically handicapped people.

[0032] Namely, handrails are in many cases installed beside stairs and slopes for the convenience of passenger or to help aged people and physically handicapped people. Handrails of this kind are popular with the structure for example, of some pole braces at given spaces on which straight shaped tubular handrails are mounted with brackets according to the slope.

[0033] Those who go up stairs or slopes will grip the said straight shaped tubular handrails and go up on foot together, and by pulling the handrails toward themselves and bodies rise by reaction, and so it can lessen the burden when going up stairs or slopes compared to do that only on foot. By using handrails, people can go up stairs or slopes easily.

[0034] However, straight shaped tubular handrail had problems that compared to firm grip, weak grip of aged or physically handicapped people brought the slip of hands and difficulty in pulling handrails and raising themselves well and straight shaped tubular handrail has not been working good enough as an assisting equipment for them to go up stairs and slopes.

[0035] Though people need to pull handrails hard toward the body when going up steep stairs and slopes, straight shaped tubular handrail is easy to slip in their hands and hard even for those who are not aged or physically handicapped to pull it well and could not lessen the burden when going up stairs or slopes only on foot compared to do it with firm grip.

[0036] While people go down stairs or slopes by gripping handrails with their hands and supporting their bodies, straight shaped tubular handrail is hard for aged or physically handicapped people with weak grip to grip it well and they had to go down stairs or slopes while feeling scary as hands might slip on it and when they become unbalanced and hands slipped and might result in not being able to support their bodies well.

[0037] As straight shaped tubular handrails had some defects, the rod or tubular handrails bent in a wavy form in this invention should be effective as a handrail of well gripped and hard to slip. The handrails for evacuation paths structure in this invention has excellent functions that enable hands to be caught on a bent part and hard to slip on the part and provide a firm grip on the handrail to support bodies well and let them go up and down the stairs and slopes easy and safe way.

Explanation of References

[0038] 10 evacuation paths

12 evacuation place

- 14 stair
- 16 evacuation handrail
- 18 horizontal bar
- 20 vertical bar
- 22 lighting system
- 24 control unit
- 26 manual system switch
- 28 remote control unit
- 30 electric power company
- 32 storage battery
- 34 electric generator
- 36 road

CLAIMS

- [Claim 1]** Handrails that are installed along the evacuation paths, lighting system that are installed on or beside the said handrails, power supply that provide electricity to the said lighting system and evacuation handrails characterized by being equipped with control unit that turn the lighting system on by providing electricity from said power supply to the said lighting system when sensing more than certain level of vibration that are set in advance.
- [Claim 2]** Evacuation handrails listed in Claim 1 that are characterized by above handrails being consist of the horizontal bar and the vertical bars that support said horizontal bar and above lighting system is installed on vertical bar or horizontal bars.
- [Claim 3]** Evacuation handrails listed in Claim 1 or Claim 2 that are characterized by above horizontal bar in wavy shape.
- [Claim 4]** Evacuation handrails listed in Claim 1 or Claim 2 or Claim 3 characterized by being equipped with manual system switch that turn above lighting system on manually.
- [Claim 5]** Evacuation handrails listed in either of Claim 1 to 3 characterized by being equipped with remote control unit that turn above lighting system on by remote control.
- [Claim 6]** Evacuation paths that are equipped with evacuation handrail listed in either of Claim 1 to 5.