

Battery Energy Storage System (BESS)

BESS10



OPERATOR'S MANUAL

Rev 01

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INTRODUCTION

Thank you for purchasing a MAKINEX RENEWABLES product.

This manual provides information and procedures to safely operate and maintain the **BESS** *Battery Energy Storage* System. For your own safety and protection from injury, carefully read, understand, and observe the safety instructions described in this manual.

Keep this manual or a copy of it with the machine. If you lose this manual or need an additional copy, please contact MAKINEX RENEWABLES. This machine is designed and built with user safety in mind; however, it can present hazards if improperly operated and serviced. If there are any questions regarding operating or servicing of this machine, please contact MAKINEX RENEWABLES.

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DISCLAIMER

MAKINEX RENEWABLES and its affiliates take no responsibility for any damage, injury or death resulting from the incorrect or unsafe use of this product. Use of this product should be undertaken by competent persons only. It is the operator's responsibility to ensure that the following safety procedures are followed. If you are unsure, do not operate this product.

Record the model and serial numbers as well as date and place of purchase for future reference. Have this information available when ordering parts and when making technical or warranty inquiries.

ABOUT THIS MANUAL

This manual uses the following symbols to help differentiate between different kinds of information. The safety symbol is used with a key word to alert you to potential hazards in operating and owning power equipment. Follow all safety messages to avoid or reduce the risk of serious injury or death.

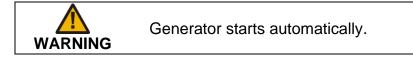
KEY TERMS

READ CAREFULLY	READ CAREFULLY – refers to <i>important information</i> that should be paid careful attention.
	CAUTION - indicates a potential hazardous situation which, if not avoided, <i>may</i> result in minor or moderate injury
WARNING	WARNING – indicates a potentially hazardous situation which, if not avoided, <i>could</i> result in death or serious injury
DANGER	DANGER – indicates an imminently hazardous situation which, if not avoided, <i>will</i> result in death or serious injury
PROHIBITED	PROHIBITED – identifies actions that should never be carried out by anyone interacting with the machine.

These safety warnings do not eliminate all possible hazards that could occur therefore it is essential to use common sense and to strictly follow any instructions to prevent accidents.

GENERAL SAFETY INFORMATION

WARNING	Read this manual thoroughly before operating your BESS. Failure to follow instructions could result in serious injury or death.
	MAKINEX RENEWBALES BESS Battery Energy Storage System is designed for professional operators only, instruct operators in care and use of the machine before use!
WARNING	Keep children away from the product at all times.

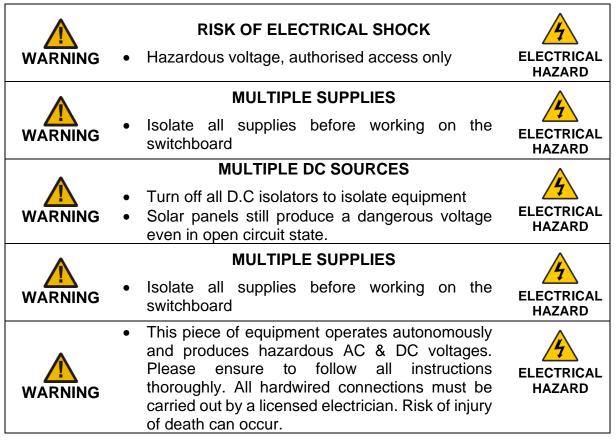


- **ALWAYS** use in a well-ventilated area.
- ALWAYS have someone alert attending the machine when required.
- ALWAYS ensure the applied load does not exceed the product rating.
- **ALWAYS** disable the product when carrying out any maintenance.
- ALWAYS test the RCBO's before use.
- ALWAYS check the product for damage before use.
- ALWAYS keep well clear of all moving parts.
- **NEVER** allow children or animals near the product.
- **NEVER** use accessories or attachments not recommended by MAKINEX RENEWABLES.
- **NEVER** alter or tamper with the internal wiring.
- **NEVER** climb or stand on the BESS.
- **NEVER** store or use the BESS in caustic environments.

POSITIONING FOR SAFE USE

- ALWAYS leave at least a 1 metre (3 foot) gap between the generator (if connected) and any surrounding building or structure.
- ALWAYS lift / drag the BESS from dedicated fork pockets / hook points on the base.
- ALWAYS ensure the BESS is on a solid, flat surface use chocks / sleepers where necessary.
- ALWAYS ensure the surrounding area is free from any material that could burn or be damaged by heat.
- **NEVER** move or tilt the BESS whilst it is switched on.
- **NEVER** cover or enclose while in use.
- **NEVER** attempt to lift or move the BESS without suitable lifting equipment.

ELECTRICITY-RELATED SAFETY PRECAUTIONS



- **ALWAYS** test the RCBOs before use.
- ALWAYS disengage the main battery breaker when performing any maintenance.
- **NEVER** try to repair electrical components if not authorised or qualified.
- **NEVER** use water or any other liquids to clean the unit while it is running.

• **NEVER** use any damaged electrical cord sets with the BESS.

FIRE-RELATED SAFETY PRECAUTIONS

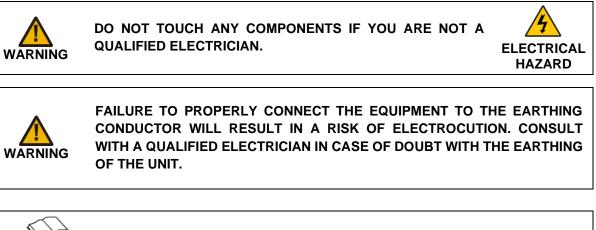
	EMERGENCY PROCEDURE	
DANGER	 In the event of fire in or around the battery system 1. Call emergency services on 000. Incident information - Fire involving lithium ion batteries. 2. ONLY IF SAFE TO DO SO: Follow shutdown procedure to turn off the battery / inverter system. 3. DO NOT attempt to extinguish the fire yourself. 4. Evacuate the area and follow instructions of the emergency response personnel. 	FIRE HAZARD

IF GENERATOR IS CONNECTED TO THE BESS:

- ALWAYS switch the engine OFF when refuelling.
- ALWAYS refuel away from any source of heat.
- ALWAYS refuel in a well-ventilated area.
- ALWAYS keep a fire extinguisher in the vicinity at all times.
- **NEVER** overfill fill the tank, fill to the level specified to allow for fuel expansion.
- **NEVER** smoke or use a naked flame while refuelling.
- **NEVER** start the engine if there is a fuel spill. Any spillage must be wiped clean and the generator allowed to dry before attempting to start the engine.
- **NEVER** leave any combustible materials on or close to the machine.

EARTHING

Earthing of electrical systems helps protect the user from electric shock or electrocution which may be caused due to malfunction or breakdown. This threat to the user is prevented by creating a path of least resistance for the electrical current to travel to the ground which inherently absorbs the over-current or short circuit.





ANY OTHER GROUNDING INSTALLATION MUST BE CARRIED OUT BY A LICENSED ELECTRICIAN AND ALL LOCAL CODES MUST BE FOLLOWED. .Y

We strongly recommend that all applicable federal, state, and local regulations relating to grounding/earthing specifications be checked and followed.

GENERAL SAFETY DECALS



PRODUCT SPECIFICATIONS

MODEL:	BESS10
INVERTER:	1 x 12 kW
BATTERY:	3 x 51.2 V, 5.12 kWh/100 Ah (Total 15 kWh)
MAX CONTINUOUS OUTPUT	12 kW
SURGE OUTPUT (10 s)	24 kW
RATED FREQUENCY	50 Hz
RATED POWER FACTOR	0.8
OUTLET SOCKETS	1 x 15A 230VAC (16A RCBO Protected) 3 x 32A 230VAC (32A RCBO Protected)
INLET (GENERATOR)	1 x 63A 230VAC (50A MCB Protected) 1 x 2 Wire Remote Run Signal Terminal
GENERATOR INPUT MAX:	8 kW/10 kVA Max Input
DRY WEIGHT	360 kg
DIMENSIONS (PACKED DOWN)	1200 x 600 x 1320 mm LENGTH x WIDTH x HEIGHT
TELECOMMUNICATION	4G & WIFI

FEATURES

Generator backup for excess power needs and extended poor weather affecting solar generation

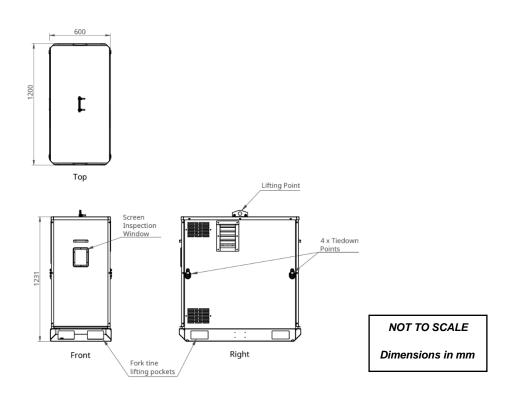
Telecommunications for full remote programming, cloud monitoring and alarms via 4G

Quick & easy deployment

Fork pockets and tie downs for transportation

IP55 electrical cabinet

Deployed:



INSTRUCTION FOR USE

WARNING	Read and adhere to all safety and operation instructions.
READ CAREFULLY	Battery Short circuit current: 7.5 kA Max DC Volts: 57.6 V
READ CAREFULLY	This BESS contains Earth Neutral Link and RCBO protection for operator safety.

BEFORE USE

Before using the product, ensure all the safety and operation instructions are read, and the following steps are performed.

PRE-DEPLOYMENT CHECKS

General Electrical checks:

- Earth stake present.
- Test RCBO's.

DEPLOYMENT

Ensure BESS is positioned away from any hazards and on a level, even surface.

BESS is to be located within 30M from dedicated SPV3 Site Sheds.



- 1. Connect power cables from the 32A outlets on the BESS to dedicated SPV3 Site Sheds (Maximum 3 x SPV3 Site Sheds).
- 2. Generator power supply cable to be connected to the 63A "Generator Inlet".
- 3. Generator remote run signal cable to be connected to the "Generator Run Signal" terminal. This is a voltage free, dry contact terminals.
- 4. Install earth stake as per local electrical regulations and connect to the "Earth" bolt on the right side of the I/O panel.

Note:

The BESS is fitted with a MEN within the unit. Do not disconnect.

Important: The site must have only one MEN, preferably in the BESS to ensure safety. A licenced electrician must ensure earthing system is as per relevant electrical safety standards.

OPERATING BESS



Read and adhere to all safety and operation instructions.

PRE-START CHECKLIST

- 1) Ensure all power supply cables to site sheds are connected.
- 2) Ensure generator (if installed) power supply cable is connected.
- 3) Ensure generator remote run wire is connected.
- 4) Ensure 'AC MAIN' and 'GEN MAIN' circuit breaker is 'OFF'.

OPERATIONAL PROCEDURE



1) Turn 'ON' Battery Isolator.



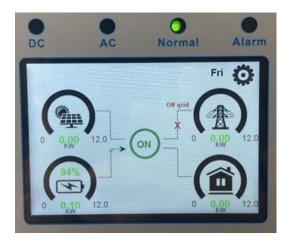
2) Turn 'ON' Main Control Switch to start-up the system.



3) Wait for the "SYSTEM ON" Green LED to turn 'ON'.



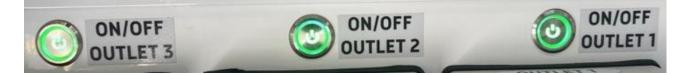
4) Wait for the Inverter 'Normal' Green LED to turn 'ON'. Once this LED is on, the inverter is outputting 230VAC.



5) Turn 'ON' all Circuit Breakers.



6) Turn 'ON' OUTLET 1, 2 and 3 Pushbuttons to output power to SPV3 Site Sheds.



SHUTTING DOWN THE HPS

 Turn off Main Control Switch and shutdown procedure to be completed. When the Main Control Switch is turned 'OFF', the 'AC MAIN' and 'GEN MAIN' Circuit Breaker will shunt trip, this is normal as part of the shutdown procedure. Only applicable in this Prototype Unit.



NOTE: To stop the HPS in an emergency, simply press the **E-STOP** button

PACKING DOWN

- 1. Shut down the BESS using the steps indicated above.
- 2. Turn off all Battery Isolator and Circuit Breakers.
- 3. Disconnect all power and signal cables after power down.

MAINTENANCE

GENERAL RECOMMENDATIONS:

Regular maintenance will improve the performance and extend the life of the BESS.

The BESS warranty does not cover items that have been subjected to operator abuse or negligence. To receive full value from the warranty, the operator must maintain the BESS as instructed in this manual, including proper storage and regular servicing.



Regular maintenance is required to ensure performance of BESS and to ensure warranty is not voided.

Should you have questions about replacing components on your BESS, please contact dealer for assistance. MAKINEX RENEWABLES dealers have access to all the special tools, technical information, parts and training required to maintain your MAKINEX RENEWABLES product in peak operating condition.

GENERAL BESS CHECKS

It is considered good practise to check the BESS before and after use, looking at:

- Condition of electrical components (especially RCBOs).
- Earthing bolts are tight.
- Any significant structural damage.
- Check power cables are not crimped or damaged.

GENERAL TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	CORRECTIONS				
	Circuit breaker tripped	Unplug all appliances from sockets and reset the circuit breaker.				
BESS IS ON BUT NO AC OUTPUT	Faulty appliance	Connect with another appliance that is in good condition.				
	Fault in generator	Contact authorised Generator Dealer / Manufacturer				
UNIDENTIFIED	Contact authorised Makinex dealer for assistance.					

BATTERY STORAGE PRECAUTIONS



After use of the BESS, follow these precautions to ensure the batteries do not drain whilst in storage or not in use.

- 1. Fully charge the BESS before putting into long term storage. The batteries will deplete over time, so it is essential they are stored with sufficient charge.
- 2. Ensure the system is completely 'OFF', Circuit Breakers are 'OFF', and Main Control Switch is 'OFF'.

TRANSPORT INFORMATION

It is important to be familiar with the rules and regulations in your state or territory regarding transporting dangerous goods (D.G.).

The BESS contains lithium-ion batteries, classified as a dangerous good by the criteria of the ADG code. UN 3480



UN number	3480
Proper shipping name	Lithium-ion batteries (limited to a maximum of 30% SoC)
Class or division	9
Label(s) / Placard Required	Miscellaneous Lithium batt

Talk to your Makinex representative for assistance and refer to the supplied Safety Data Sheet (SDS)

LIMITED WARRANTY

To take advantage of the MAKINEX RENEWABLES limited warranty, you must have maintenance performed according to the maintenance schedule by an authorised MAKINEX RENEWABLES dealer or MAKINEX RENEWABLES service technician. You are free to have your MAKINEX RENEWABLES product serviced by any suitably qualified electrician (depending on the mechanical or electrical requirement) and this will not affect your statutory warranties, however, failure by the owner to have the recommended servicing carried out by an authorised MAKINEX RENEWABLES dealer/service technician means that you cannot take advantage of the MAKINEX RENEWABLES limited warranty.

MAKINEX RENEWABLES warrants each new BESS to be free from defects in material and workmanship under normal domestic and industrial use and service for the period specified below, conditional to the limitations and exclusions printed on this page. This warranty applies only to new MAKINEX RENEWABLES products distributed by us and by our authorised MAKINEX RENEWABLES dealers.

Under the limited warranty and at MAKINEX RENEWABLES's discretion, upon evaluation, inspection and testing by a MAKINEX RENEWABLES dealer or a MAKINEX RENEWABLES service technician, MAKINEX RENEWABLES will repair and replace of defective part(s).

AUSTRALIA: Our goods come with guarantees that cannot be excluded under the ACL. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if goods fail to be of acceptable quality and the failure does not amount to a major failure.

WARRANTY: (Ex-factory/ Reseller premise)

MAKINEX RENEWABLES warrants to the original purchaser:

- Frame and all Electrical components will be free of defects in material and workmanship for a period of one year from the original date of purchase.
- Batteries 10 years limited warranty;
- Inverter 5 years;

WARRANTY EXCLUSIONS

This warranty does not cover the following repairs and equipment:

NORMAL WEAR

This warranty does not cover repair when normal use has exhausted the life of a consumable part.

INSTALLATION, USE, AND MAINTENANCE

This warranty will not apply to parts and/or labour if this BESS is deemed to have been misused, neglected, involved in an accident, abused, loaded beyond the BESS's limits, modified and installed improperly.

OTHER EXCLUSIONS

This warranty excludes:

- Maintenance services cost.
- Expedited freight costs.
- Cosmetic damage such as paint, decals, etc.
- Problems caused by accidents, improper storage, handling and shipping.
- Failures due to acts of God and other force majeure events beyond the manufacturer's control.
- Problems caused by parts that are not from the original manufacturer.

OWNER'S RESPONSIBILITY UNDER LIMITED WARRANTY:

Strict adherence to the maintenance checks and with **proof of scheduled maintenance history** is required by an authorised agent or qualified electrician. It is the consumer's responsibility to deliver the machine in question to our service premises or to the premises of our appointed agent at the consumer's expense for replacement or repair as applicable. Maintenance services are not covered under warranty.

Claim Procedure:

- Contact MAKINEX RENEWABLES by phone or email informing us of your machines problem or defect.
- Once the extent of the claim has been assessed, we retain the right to compensate the consumer for such defect, or repair (parts & labour), or replace the machine under warranty.
- All warranties will be carried out by MAKINEX RENEWABLES authorised staff or appointed agents at a premise to be determined by the Manufacturer.
- It is the responsibility (and cost) of MAKINEX RENEWABLES or our appointed agent to return the machine to be repaired or replaced under warranty to the consumer- this is valid for domestic territories only (e.g. Australian units will be delivered within Australian territories and European units will be delivered within its designated country's territories).
- Where the specific warranty component (e.g. Inverter) is under a Manufacturer's warranty other than MAKINEX RENEWABLES, the consumer can either contact MAKINEX RENEWABLES or the applicable manufacturer for repairs where such warranty was registered with that manufacturer at purchase.
- Warranty calls will only be carried out by our representatives and not via client's choice of repairer. We will not accept back charges for any work not carried out by our representatives or accept any charges due to equipment being un-operational for any reason even during its warranty period.

CONTACT INFORMATION

For sales, service, warranty and parts for all MAKINEX RENEWABLES products; please refer below.

	SALES, SERVICE, SPARE PARTS & WARRANTY
	SALES
AUSTRALIA	TEL 1300 795 953 or +61 2 9460 8071 WEB www.makinex.com.au
	SERVICE, SPARE PARTS & WARRANTY
	EMAIL service@makinex.com.au

Or your nearest MAKINEX distributor

We have very knowledgeable, experienced staff to assist you with help and advice.



APPENDICES

APPENDIX A – RISK ASSESSMENT

	PRODUCT RISK / HAZARD ASSESSMENT TABLE									
Product Name:	BATTERY ENERGY STORAGE SYSTEM	Assessment Carried Out By:	Rui Li							
Manufacturer:	MAKINEX RENEWABLES	Document Revision Number:	1.0							
Operator Competency:	As per User Manual	Date:	08-03-2024							

No:	TYPE / NATURE OF RISK or HAZARD				RISK LEVEL		CONTROL ACTION			
1	ENTANGLEMENT Hair, clothing, gloves, etc. may become entangled in moving parts of equipment	1.1	Loose clothing, hair and rags entangled in moving parts.	4	VERY UNLIKELY	3	MINOR	3	LOW	Always switch the unit off before carrying out maintenance or inspections. Keep access doors closed and stand clear during operation.
2	CRUSHING Due to unexpected movement, falling loads, plant collapse, contact with moving parts of equipment	2.1	Crush from plant tipping	3	UNLIKELY	2	MAJOR	2	MEDIUM	Ensure unit is placed on even, level surface
3	CUTTING, STABBING OR PUNCTURING Contact with sharp objects, contact with moving parts, disintegration or ejection of equipment parts	3.1	No Hazard							
4	SHEARING Between two moving parts of the equipment or between a fixed object and moving part	4.1	Pinch/Shear of body parts from contact with access doors	4	VERY UNLIKELY	4	NEGLIGIBLE	3	LOW	Ensure hands and limbs are clear when closing doors.
5	STRIKING Struck due to uncontrolled movement, disintegration or ejection of equipment parts	5.1	Striking from a failure of wing support	4	VERY UNLIKELY	3	MINOR	3	LOW	Ensure struts are correctly installed and secured
6	ELECTRICAL Contact with live wires, overload of circuits, damaged or poorly maintained equipment	6.1	Electrocution due to exposed/damaged wiring	3	UNLIKELY	2	MAJOR	2	MEDIUM	Frequent inspection of wiring and connections Make sure connections are covered, and wiring is managed away from common operation areas

No:	TYPE / NATURE OF RISH	C or H	IAZARD	LIKI	ELIHOOD	CON	NSEQUENCE	RIS	SK LEVEL	CONTROL ACTION
7	EXPLOSION Gases, vapours, liquids, dust or other substances, triggered by the operation of the plant	7.1	Fire or explosion when refuelling	3	UNLIKELY	2	MAJOR	2	MEDIUM	Switch the unit off before refuelling, carrying out maintenance or inspections.
	or by material handled by the plant	7.2	Fire or explosion from damaged batteries	3	UNLIKELY	2	MAJOR	1	нідн	Frequent inspection of batteries and connections Observe operator's manual recommendations for battery operating temperatures Avoid harsh impact and movement of the unit that may damage batteries
8	SLIP, TRIP OR FALL Poor housekeeping, obstacles, lack of work platform, poor floor surfaces	8.1	Trip Hazard walking into outriggers or deployed wings	3	UNLIKELY	4	NEGLIGIBLE	3	LOW	Use hazard tape/barriers warning of the potential hazard
9	ERGONOMIC Poorly designed seating, repetitive body movement, poor body posture, excessive effort, poor lighting	9.1	No Hazard							
10	ASPHYXIATION Lack of oxygen or atmospheric contamination	10.1	Using a machine in unventilated areas	4	VERY UNLIKELY	3	MINOR	3	LOW	Do not operate machinery in confined or enclosed spaces, ensure adequate ventilation
	HIGH TEMPERATURE OR FIRE Contact with objects at high temperature or injured by fire	11.1	Fire or explosion from damaged batteries	3	UNLIKELY	2	MAJOR	1	HIGH	Frequent inspection of batteries and connections Observe operator's manual recommendations for battery operating temperatures Avoid harsh impact and movement of the unit that may damage batteries
12	OTHER HAZARDS Chemicals - Toxic Gases, Vapours, Fumes or Dust Noise - Noise levels > 85db(A). Vibration. Radiation. Other	12.1	Damage to hearing due to long term use	4	VERY UNLIKELY	2	MAJOR	2	MEDIUM	Position station away from workers Always wear appropriate PPE
>T PR GL RE IN:	DTES: HIS DOCUMENT HAS BEEN EPARED ACCORDING TO JIDELINES AND COMMENDATIONS FOUND 1. 'HAZPAK' PRODUCED BY THE WORK-COVER AUTHORITY AND 2. AUSTRALIAN STANDARE AS/NZS 3760 IN-SERVICE SAFETY INSPECTION AND TESTING OF ELECTRICAL EQUIPMENT.),	"LIKELIHOOD LEVEL" REF TO THE PROBABILITY OF . EVENT HAPPENING. THE FOLLOWING SCALE HAS E USED TO DESCRIBE THE LIKELIHOOD OF A DEFINE (HAZARD EVENT OCCURF DURING THE NORMAL OPERATION OF THE EQUIPMENT. NOTE THAT LIKELIHOOD EVALUATION QUALITATIVE AND BASED BEST ESTIMATION AND EXPERIENCE: 1. VERY LIKELY 2. LIKELY 3. UNLIKELY 4. VERY UNLIKELY	AN BEEN D RISH RING IS	THE SE CAUSEI OCCUR FOLLO' DEFINE DOCUM 1. FA RESI 2. MJ IRRE 3. MI INJU SEVI 4. NE	VER D DL RING WING D BY MENT JLT JLT AJOF VER RIES ERAL EGLI	ENCE" REFER ITY OF INJURY G, USING THE G SCALE AS THE "HAZPAI TITY = INJURIE: IN DEATH R = NORMALL SIBLE INJURI = REVERSIB REQUIRING DAYS OFF GIBLE = ABLE TED USING FI	Y NT S Y IES LE	SEVER ON TH AND "II LEVEL CONSI SEVER " LOW - HAS BI 1. H PER MAJ DAN 2. M TEM OR DAN 3. LI INCC	LEVEL" REFERS TO THE NJURY ".INHERENTLY, AS THE EQUENCE INCREASES IN NITY, RISK INCREASES IN WHEN LIKELIHOOD IS THE FOLLOWING SCALE EEN USED: IGH = POTENTIAL DEATH, MANENT DISABILITY, OR IGH = POTENTIAL EDIUM = POTENTIAL HPORARY, DISABILITY, MINOR STRUCTURAL AGE: OW = POTENTIAL DENT THAT HAS THE TENTIAL TO CAUSE ISONS TO REQUIRE

