

## 目 次

1. 機械器具利用による進入 .....	1
(Entering Using Equipment)	
(1) かぎ付はしご .....	1
(Single Ladder (with Hook))	
(2) 三連はしご .....	3
(Threefold Ladder)	
(3) 二つ折はしご .....	4
(Twofold Ladder)	
2. 建物施設活用による進入 .....	5
(Entering Utilizing Facilities)	
(1) 隣接建物からの進入 .....	5
(Entering from Adjacent Building)	
(2) 建物外壁及び壁面等の施設物活用による進入 .....	6
(Entering Utilizing such Facilities as Outer Face and Wall of Building)	
3. 特殊な進入法 .....	8
(Special Entering)	
(1) はしごの吊り下げ伸てい .....	18
(Ladder Hanging and Extending)	
(2) 地下槽、タンク内等への進入要領 .....	13
(Procedures of Entering on Tank and Underground Tank)	
(3) 下水道横杭内への進入要領 .....	18
Procedures for Entering into Tunnel alongside Drain)	

## 1. Entering Using Equipment

Ladder is the simplest means to trespass on a high place from outside. Ladder can easily be used for entering on a place in the second or third floor by setting it directly or re-setting from part to part. Thus indispensable for fire fighting, ladder includes single ladder (with hook), extension ladder (two, three and four pieces) and twofold ladder.

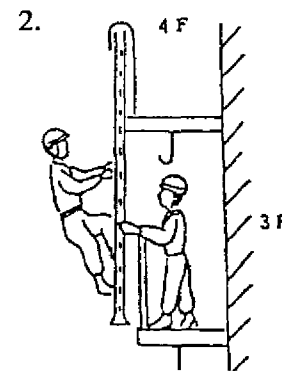
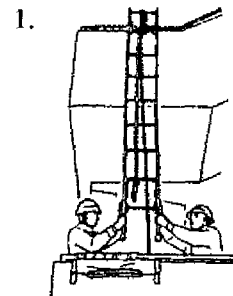
### (1) Single Ladder (with Hook)

This kind of ladder has hook at the upper end. The hook is hung on handrail of veranda, window frame or something, and re-hung sometimes to reach a high place.

Weighing light, this type of ladder may possibly be handled by one person. But, as unstable foothold is feared at a high place, it is usually handled by two or three persons in cooperation.

#### [Procedures]

1. All operators shall use safety rope, and other securing rope also depending on the condition.
2. Carry the ladder to the object to hang on, and raise hook to be perpendicular to the main frame.
3. Holding the main frame, send it upward to hang the hook on a handrail or a window frame. After hanging, assure the catching condition and stability.

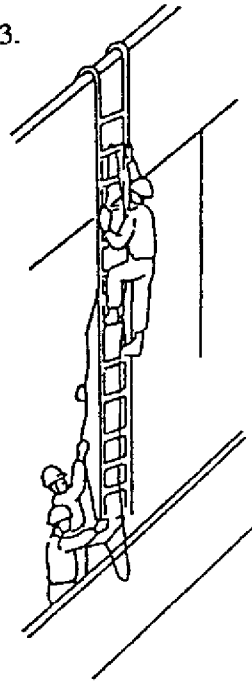


4. Climb the ladder quietly with the body separated from it, the hands holding the cross-bar and the arm extended lightly.

An assistant shall hold the main frame with both hands at the backside of the ladder taking stable posture (1).

5. In case of three person operation, those other than the climber shall operate securing rope or secure the upper end of the ladder on the upper floor (2).

3.

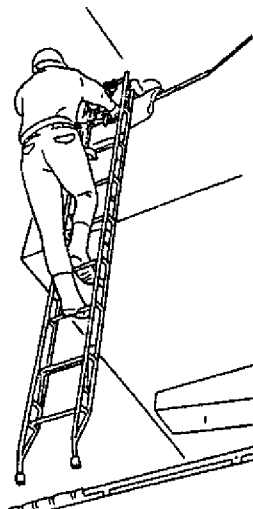


6. Trespass quietly assuring foothold. After trespass, undertake securing for the next climber.

[Cautions or training]

1. Check well strength of the handrail, the window frame, etc. to hang the ladder on.

Step squarely on the middle of each rung to climb up and down the ladder, in order to prevent the ladder from rolling side to side and to place an equal load on each hook.



2. Suspend the ladder in vertical position.
3. Climb and trespass quietly with good care not to give any impact.
4. Operators shall cooperate mutually to secure safety.

## (2) Threefold Ladder

Threefold ladder is widely used for the following reasons;

- highest installable height of existing fold type ladders, and the weights of its appliances which are generally suitable for the application, and
- easy to handle and operate.

As a rule, carrying, extending and installing of this threefold ladder shall be performed by two operators.

### [Procedure]

1. Carry the ladder to an object to be hooked on, and then hold it by one operator and pull its pull-rope, by other operator, to extend the ladder up to a proper height. After checking that it is securely hooked, tie the pull-rope securely.

The ideal suspension (installation) angle of the ladder is about 75 degree, keep this angle without fail.

2. In climbing, one operator shall support the ladder from backside with the grips in the both hands, and other, that is, climber (ladder climber) shall climb the ladder holding the crossbars step by step in both hands, while watching the foot and the inlet alternately.

3. When entering the building, be sure to check the entry side scaffolding condition, with good care not to kick the ladder, then enter quietly across window frame, etc.

[Cautions on training]

1. For location of the ladder, select a flat and rigid place.
2. Before installing, be sure to check the strength of an object to be hooked on, e.g. by hitting it with the ladder.
3. When having extended the ladder, be sure to check the hook for normal performance and then tie the pull-rope.
4. When installing, support the ladder upper end with a proper means when deemed as necessary upon the actual condition.
5. Climb quietly, with good care not to impact load to the ladder.
6. Take necessary work attitude, without fail, when working on the ladder.

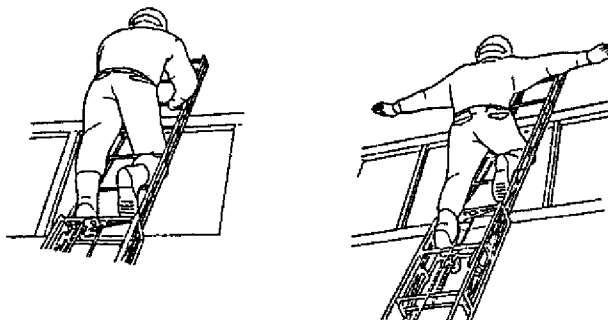
(3) Twofold Ladder

Because of its small size and lightweight, this ladder is conveniently used to climb and trespass a narrow place and a comparatively low place.

[Procedure]

1. Carry the ladder to an intended location and open it to 180 degree. At this time, be sure to check the wrist pin for normal performance. Thereafter, support the ladder from backside, with main bar in the hands.
2. For the climbing and trespassing procedure, follow the foregoing para. (2)-2 and -3.

<Operating Position>



Place your leg over the rung at your knee and lock the top of your foot under the next rung down. Put your other foot on the rung one or two steps down. Do not stand on the rung at the joint in the ladder to perform a task.

[Cautions on training]

1. When extending, be sure to check the wrist pin for normal performance.
2. For other cautions, follow those given in the procedure for threefold ladder.

2. Entering Utilizing Facilities

The method is for entering utilizing indoor or outdoor stairways, other building facilities or adjacent building. Description here excludes the method using stairs.

(1) Entering from Adjacent building

This method is for entering utilizing windows and/or housetop (roof) of adjacent building when clearance with the adjacent building is narrow in a house-crowded area.

[Procedures]

1. When clearance between houses is about 1 m, window or some other opening exists on the facing surface and hand- or foot-hold can be obtained, (climb and) enter using safety rope and securing mutually among persons.
2. When the clearance is a little wider (than that conditioned in the previous paragraph), enter settling temporary bridge with a portable ladder, timber or rope.
3. To make temporary bridge using a ladder (or something long and rigid), if a large space is secured like on the housetop. tie rope at the top of the ladder and lay the ladder gradually securing the rope, and if working area is narrow, send out the ladder little by little.

[Cautions on Training]

1. As these methods accompany danger, make sure of strength of objects and facilities, understand perfectly performances of materials used, take skill of the members into consideration and take sufficient safety measures beforehand.
  2. To settle a temporary bridge, the length of the crossing member should have sufficient margin to the clearance between the building, and fix the member so as not to get out of place or position.
  3. Enter so quietly as not to give abrupt movement of body weight or impulsive force by action.
- (2) Entering Utilizing Such Facilities as Outer Face and Wall of Building.

This category includes emergent and partial entering method by chimney and balance climbings making use of narrow clearance between walls of adjacent building or balcony, veranda, stand pipe, etc. on the outer face of the building.

[Procedures]

1. Entering by climbing narrow wall clearance

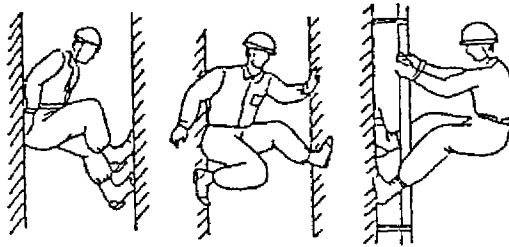
Climb utilizing friction between body and wall pressing the limbs and back to wall and using spring force of knees, waist and elbows.

2. Entering utilizing Vertical Facilities

Climb with hands holding facilities, opened legs placed on the wall, arms pulling the object and legs pressing the wall.

3. Climbing and Entering Utilizing Facilities That Can Support Hand and Foot Like Veranda and Balcony.

- 1) Climb and enter making use of handrail of veranda or balcony, slab, etc. When to climb alone, do it securing with safety rope hung on handrail or something and re-hung from time to time.
- 2) When two persons climb, one shall secure the other climbing tying mutual bodies with safety rope, and climb, the two changing alternately.



[Cautions on training]

1. Practice three point support method in climbing.

- \* Three point support method means that either three of the four limbs of a climber are contacting supports (wall, ladder, its cross-bar, hand- and foot-hold, etc.) at any time. When to move a hand, both feet and the other hand, and when to move a foot, the both hands and the other foot contact or hold support(s) to secure balance of body and safety.

2. Confirm conditions and strength of the facility well beforehand.

3. Determine position, target and route of climbing before start.

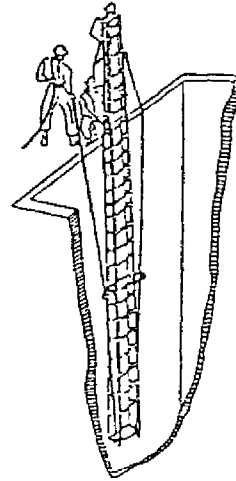


4. As this method is difficult technically and requires physical strength also, take sufficient security measures for practicing and limit the practice at the minimum.

### 3. Special Entering

Rescue site is not always flat and easy to reach but ranges widely from high place to deep underground.

Further, in addition to such bad conditions for entering as geographical configurations, natural features and installation on the ground, many interferences and dangers are latent sometimes that give bad influences to the rescuing members not to say the rescued person(s) directly such as dense smoke, electricity, toxic gas and hypoxia.



Therefore, rescuing members should be trained on smooth and safe entering and escaping procedures under such bad and interfering conditions as well as pay efforts for learning various rescue technologies.

#### (1) Ladder Hanging and Extending

This method is for entering in a case requiring rescuing member's descending at a site of foundation work for building, cliff, well, tank, river, etc. The substance of the method is hanging down and extending of portable ladder suitable for safe and smooth works.

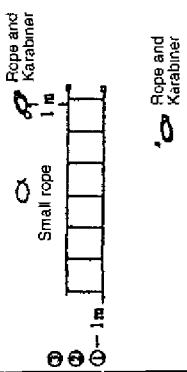
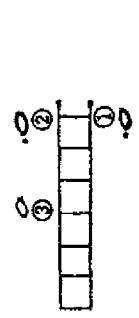
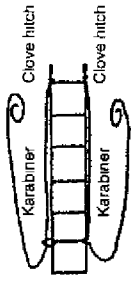
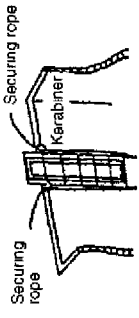
##### 1) Facility setting procedures

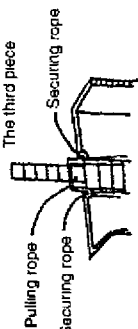
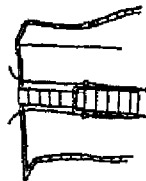
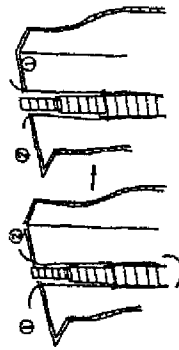
Tie rope at the part of the ladder touching the ground to be securing rope.

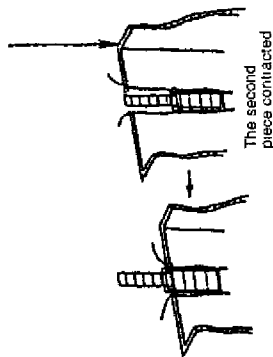
Hang down the ladder as it is contracted at the place to put up, and, then, extend it by operation of the securing rope.

- a. Take sufficient care on position of the ladder securer and securing method (standing, sitting or utilizing natural features on the earth).
- b. Mind elongation of each line of securing rope.

## 2) Ladder hanging and extending training procedure

Order	Leader	Person #1	Person #2	Person #3	Figure or Remarks
1	"Fall in!"	Form a row at about 1 m behind the ladder with person #1 at the top.			
2	Confirming the gathering, "Number off!"	"One!"	"Two!"	"Three!"	
3	"Take the position!"	Stand on lower right side of the ladder.	Stand on lower left side of the ladder.	Stand on middle left side of the ladder.	
4	Start ladder hanging and extending operation!"	<p>"All right!" Turn out the ladder in cooperation of persons #1 to #3.</p> <p>Tie rope at the lower right of the ladder, hang a Karabiner at the upside and pass the rope through it. "Tying is all right"</p>	<p>"All right!" Tie rope at the lower left of the ladder, hang a Karabiner at the upside and pass the rope through it. "Tying is all right"</p>	<p>"All right!" Untie the pulling rope of the ladder, and lift the ladder so as to be convenient for persons #1 and "2's work. (Be ready to carry the two small ropes.)"</p>	
5	"Raise the ladder!"	Raise the ladder in cooperation of persons #1 to #3.			
6	<p>"Ready to extend the ladder!"</p> <p>Confirming the ladder, "Secure!"</p>	<p>Persons #1 and #2 shall loosen rope to lower the ladder to such a position that the pulleys on the ladder are at about 20 cm above the ground.</p> <p>"Securing all right!"</p>		<p>"Ready!"</p>	

Order	Leader	Person #1	Person #2	Person #3	Figure or Remarks
7	Extend three piece ladder!" (Adjust pulling rope.) "Connect the second and the third pieces!"	Persons #1 and #2 secure the ladder.		Pull out the third piece upward and confirm the claws, "Extension all right!" Having connected the second and the third pieces with small rope, "Connection all right"	
8	"Ready to extend the second piece!" (Instruct the members to pull or loosen the rope. Confirming the ladder,) "#3 secure!"	Persons #1 and #2 gradually loosen rope depending on the leader's instruction.		Lower the ladder in cooperation with persons #1 and #2 so that the upper end of the third piece comes to the ground level. Tying the upper end with the small ropes, "Securing all right!"	
9	"Extend the second piece!" "Turn the ladder!" (Positioned on the right side of person #1, assist person #3's turning the ladder.) "Secure the ladder!" "Setting finished!"	Persons #1 and #2 shall extend the second piece loosening the rope. "Extend the second piece!"  Secure the ladder maintaining the rope taut.  "Ladder all right!" (May descend on the ladder.)	Turn the ladder loosening the rope. And immediately, moving to the right of the leader, tension the rope.  "All right!"	Secure the upper end of the rope. Turn the ladder to the right and transfer the upper end of the ladder to the leader. Then, moving to the right of person #1, receive the upper end of the ladder from the leader and secure.  "All right!"	

Order	Leader	Person #1	Person #2	Person #3	Figure or Remarks
10	"Turn the ladder!" "Contract the second piece!" "#3, loosen securing!" "Pull the rope!" "#1 and #2, secure!" "Untie the connection!"	Persons #1 to #3 shall turn the ladder to the left in cooperation. (procedures according to that in setting)	Persons #1 and #2 shall pull the rope to contract the second piece.	Untie the upper end small rope.	 The second piece contracted
11	"Contract the third piece!"		"Securing all right!"	Untie the connection between the second and the third pieces.	
12	"Pull up the ladder!"	Persons #1 to #3 shall pull up the ladder upon the ground in cooperation.			
13	"Contain!"	Persons #1 and #2 shall return to the gathering place after putting the rope, etc. in the container.		Tie the pulling rope of the ladder, put the small ropes into the container and return to the gathering place.	
14	"Break up!"	Saluting the ladder, return to the original place at person #1's word of command.			

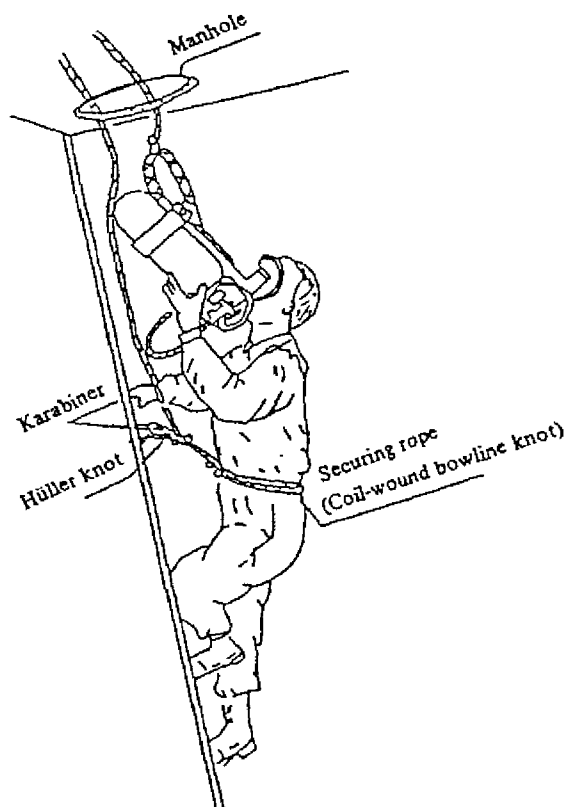
(2) Procedures of entering on Tank and Underground Tank

Gas toxication accidents are reported from time to time in painting works, etc. of water supply tank, purifier tank or underground tank.

As these sorts of tank have only a narrow mouth (45 to 60 cm) for their volume, sufficient care should be taken for securing safety of the rescue members against gas toxication in these installations. As a countermeasure to such a case that entrance as equipped with a respirator is impossible, a method is to put on the equipment in the way of entering.

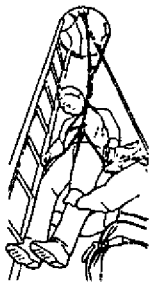
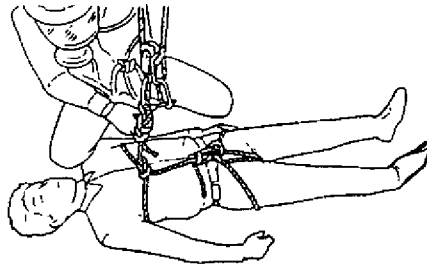
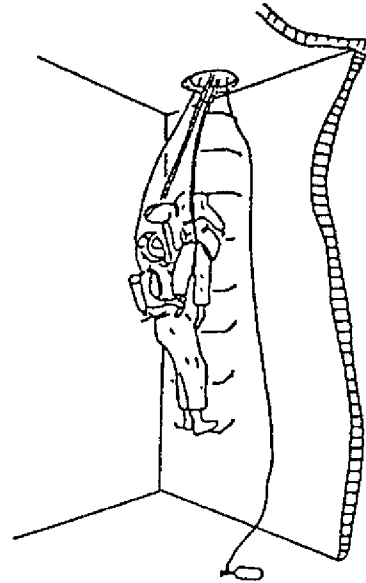
1) [Procedures]

- a. The member, connected with safety rope, firstly passes through a manhole putting on only the mask of a respirator. And after that, securing his body, he puts on the body of respirator hung from above and goes in.
- b. In going out, reversing the procedures of entering, he puts off the body of the respirator at a place immediately below the manhole and takes off the mask after escaping out of the tank.

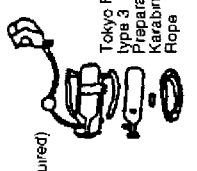


2) [Procedures of Rescue]

- a. Open valve of a preparatory air cylinder and lower it inside the tank to supply fresh air for the rescued person.
- b. Entering shall be done in the procedures stated in (1).
- c. Tie the rescued person with double bowline knot.
- d. In in-arm-holding method, the entered member carries the rescued person up to outside in cooperation with other members.



### 3) Procedures of Training on Trespassing on and Rescuing form Tank

Order	Leader	Person #1	Person #2	Person #3	Person to be rescued	Figure or Remarks
1	"Fall in!"	Form a row at about 1 m behind the tools with person #1 at the top.				 <p>(Required)</p> <p>③ Tokyo Fire Fight Type 3 ② Preparatory cylinder ① Karabiner 1 Rope</p>
2	Confirming the gathering, "Number off!"	"One!"	"Two!"	"Three!"	"Four!"	
3	"Start operation of trespassing on and rescuing from _____ tank!"	Carry rope and a Karabiner.	Carry a preparatory cylinder.	Carry a respirator.	Enter into the tank.	
4	Confirming inside of the tank, "Person to be rescued is one!"	Making a double bowline knot in the rescuing rope. "All right!"	Attaching the preparatory cylinder to rope, open the valve and lower the cylinder in the tank. "Cylinder all right!"	Make coil-wound bowline knot with securing knot. And, make a Huller knot at the waist and hang the Karabiner with it.		
5	"Ready to go in!" Confirming condition of the members, instruct them suitably.	Taking person #3's rope and securing posture, "Securing all right!"	Tying the respirator with rope, "Respirator all right!"	Confirming pressure gauge, ejaculate "Pressure all right!" and put on the mask.		
6	"Go in!"	Operate the securing rope.	Lower the respirator in coordination with person #3's trespass.	Entering into the tank, secure the body on the ladder at a position just below the manhole, and put on the respirator body to go further down in.		
						Arrange the remaining length of each rope so as not to be mixed and entangled.



Order	Leader	Person #1	Person #2	Person #3	Person to be rescued	Figure or Remarks
7	Confirming person #3 reaching the bottom, "Down the rescue rope!"		Handing the leader the rope of respirator, lower the rescue rope (with a double bowline knot), "Rope"	On reaching the bottom, give sign with the rope, and carry the preparatory cylinder to the person to be rescued.		Method of sign with rope shall be determined beforehand.
8	On sign of finish of tying, "Ready to rescue"	Handing the securing rope to the leader, prepare to pull rescued person up in cooperation with person #2. "All Right!"	Prepare to pull the rescued person up in cooperation with person #1. "All Right!"	Tying the rescued person, give sign with rope. Carry the rescued person to the position just below the manhole, and secure the body of the rescued person using the embracing rescue method.		Method of sign with rope shall be determined beforehand. The leader and person #3 shall always mind the remaining pressure of the respirator cylinder. And, be careful to be safe interchanging proper instructions and signs.
9	Confirming persons #3's securing condition, "Pull rope!"	Reciting "Pull rope," pull the rescue rope in cooperation.		Climb the ladder holding the rescued person in arm.		
10	At the time when the rescued person's head has passed the manhole, "Reached!" The ladder and person #1 pull up the rescued person and carry him to a proper place.	Operate securing rope to assist person #3's escape.	Operate the rescue rope to secure the rescued person. Operate the respirator rope to assist person #3's escape.	Push up the rescued person from below. Securing himself, put off the respirator body. And, after coming out of the tank, take off the tank., take off the mask.		

Order	Leader	Person #1	Person #2	Person #3	Person to be rescued	Figure or Remarks
11	By person #3's escape, #Rescue finished, contain!"	Contain and carry the rescue and securing rope, and return to the place of gathering.	Pull up the preparatory cylinder, contain and carry the rope. Return to the place of gathering.	Untie the securing rope, carry the respirator and return to the place of gathering.	Return to the gathering.	
12	"Break up!"	Salute to the leader. Return to original position at person #1's word of command.				

### (3) Procedure for Entering a Drain Pipe

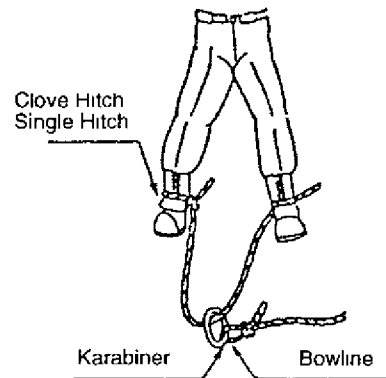
Most of the accidents in underground drains occur due to a lack of oxygen or to the presence of poisonous gas while the drain is being cleaned or inspected.

Such drainpipes consist of various types of pipes such as the sewer line leading to each home (dia.: 25 cm) and the main sewer lines (dia: approx. 3 to 5 m). If an accident occurs in such a place, it can be difficult to get into the drain due to the small diameter.

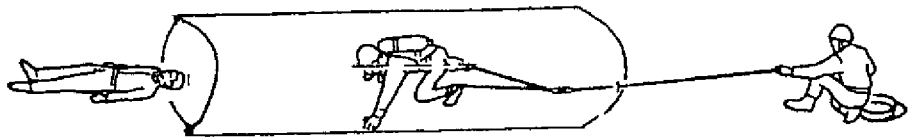
When entering such a drain, you should be equipped with a respirator and enter at the nearest the manhole access pipe (dia.: 60 to 90 cm) to rescue the person.

#### 1) [Procedures]

- a. After putting on the respirator, the rescuer should have a sling rope tied around both ankles using a clove hitch. The safety rope should be connected to the middle of the sling rope with a karabiner.



- b. The rescuer should be crouch down and crawl into the drain. The line handler should control the safety rope according to the movements of the rescuer.



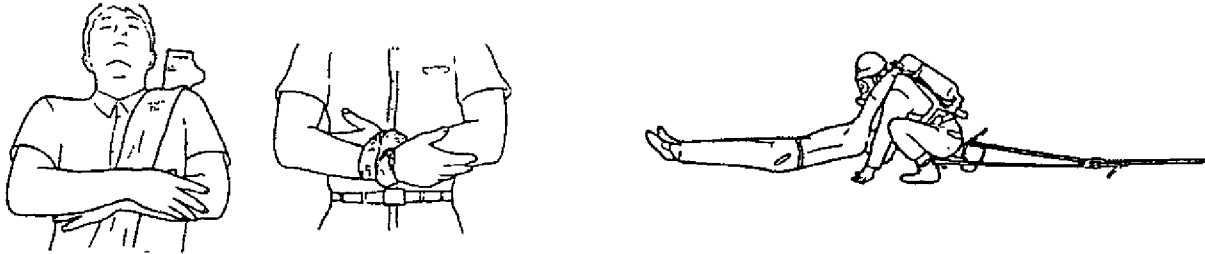
#### [Cautions on training]

Before entering the drain, check the air quality of the drain pipe and decide on the type of the respirator and the length of safety rope that will be needed

## 2) [Rescue Procedures]

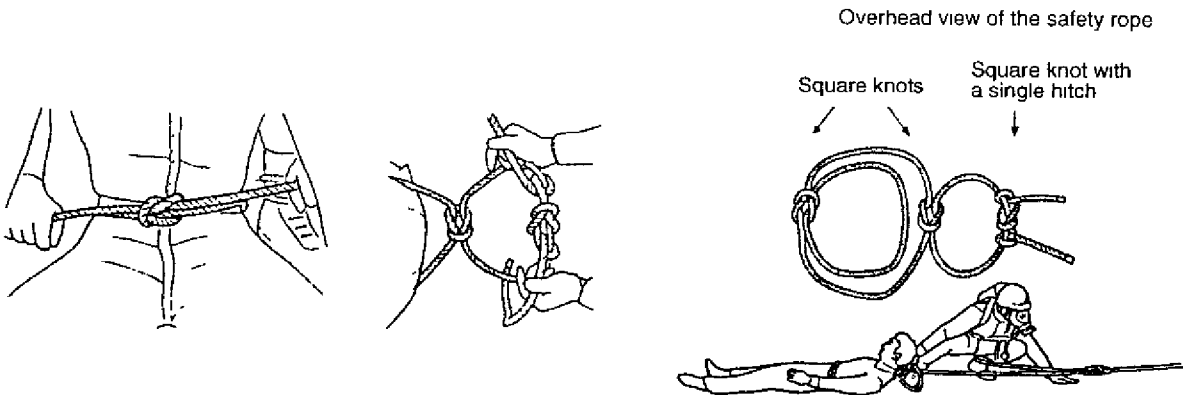
- a Securing the injured person's hands with a cloth

Lay the hands of the injured person on their chest and secure them with a cloth bandage, using a square knot. Then, their hands can be placed around the rescuer's neck to pull them out of the drain.



- b Securing a person with a sling rope

Raise the upper body of the injured person and tie a sling rope around their waist. Tie a second safety rope to the short rope to pull them out.



## [Cautions on Training]

Make sure both people understand the signs and signals that will be used between the rescuer and the line handler before starting the rescue.