

CBRNE Terrorism Response by Fire Services



Tomoya MATSUURA

Fire and Disaster Management Agency, Japan

11/29/2018

Self Introduction

- Name: Tomoya MATSUURA

- Position: Section Chief of Rescue,
Civil Protection and Disaster Management Department

- Age: 43

- Career:
 - ✓ 1999 Joined in Tokyo Fire Department
 - ✓ 2001 Water Rescue Unit (for 11 years)
 - ✓ 2013 Rescue Section, Fire Suppression Division
 - ✓ 2016 Commander, Azabu Fire Station
 - ✓ 2017 Seconded to Rescue Section, FDMA





Arrangement for Rescue Activities in Japan

(As of April 2017)

- Fire Department across the nation: 732
- Fire Department with Rescue Unit: 715
- Rescue Unit: 1,420 (full-time 563, concurrent 857)
- ✓ General Rescue Unit: 776
- ✓ Special Rescue Unit: 644 (including advanced rescue teams and special advanced rescue teams)
- Rescuers: 24,596 (full-time 8,663, concurrent 15,933)



Fire Service's Preparedness for NBC Disaster

Required Activity	No of Fire Department	Fire Dept. Required	Vehicle and Equipment for NBC Disaster
<ul style="list-style-type: none"> ■ Advanced Detection, Zoning, Rescue, Large Scale Decontamination ✓ Special Advanced Rescue Team> 	<p>21 (3%)</p>	<p>Tokyo Fire Dept. and Designated Cities' Fire Depts.</p> 	<p>Equipment of General Rescue Team, Special Rescue Team and Advanced Rescue team +</p> <ul style="list-style-type: none"> ✓ Special Disaster Response Vehicle ✓ Hazmat Decontamination vehicle ✓ Chemical Agent Detector
<ul style="list-style-type: none"> ■ Detection, Zoning, Rescue and Decontamination ✓ Advanced Rescue Team 	<p>88 (12%)</p>	<p>Core Cities' Fire Depts.</p> 	<p>Equipment of General Rescue Team and Special Rescue Team +</p> <ul style="list-style-type: none"> ✓ Chemical Agent Detector ✓ Biological Agent Detector ✓ Radiation Survey Meter 
<ul style="list-style-type: none"> ■ Rescue and Decontamination ✓ Special Rescue Team 	<p>214 (30%)</p>	<p>All of the Fire Department with rescue unit, covering 100K people</p> 	<p>General Rescue Team's equipment +</p> <ul style="list-style-type: none"> ✓ Radiation Protection Suit ✓ Personal Dose Meter ✓ Decontamination Shower ✓ Decontaminant Sprayer ✓ Gas Measuring Instruments ✓ Radiation Meters
<ul style="list-style-type: none"> ■ Rescue ✓ General Rescue Team 	<p>392 (55%)</p>	<p>All of the Fire Department with rescue unit</p>	<ul style="list-style-type: none"> ✓ Positive Pressure Type Chemical Protective Clothing ✓ Chemical Protective Clothing

CBRNE Hazard

- C ... Chemical Hazard
- B ... Biological Hazard
- R ... Radiological Hazard
- N ... Nuclear Hazard
- E ... Explosive Hazard

Common character of the hazards above

Invisible for Responders



Quite difficult to identify the type of disaster among these five, which the responders should keep in mind during the disaster response.

Protection Outfit

Level A



Level B



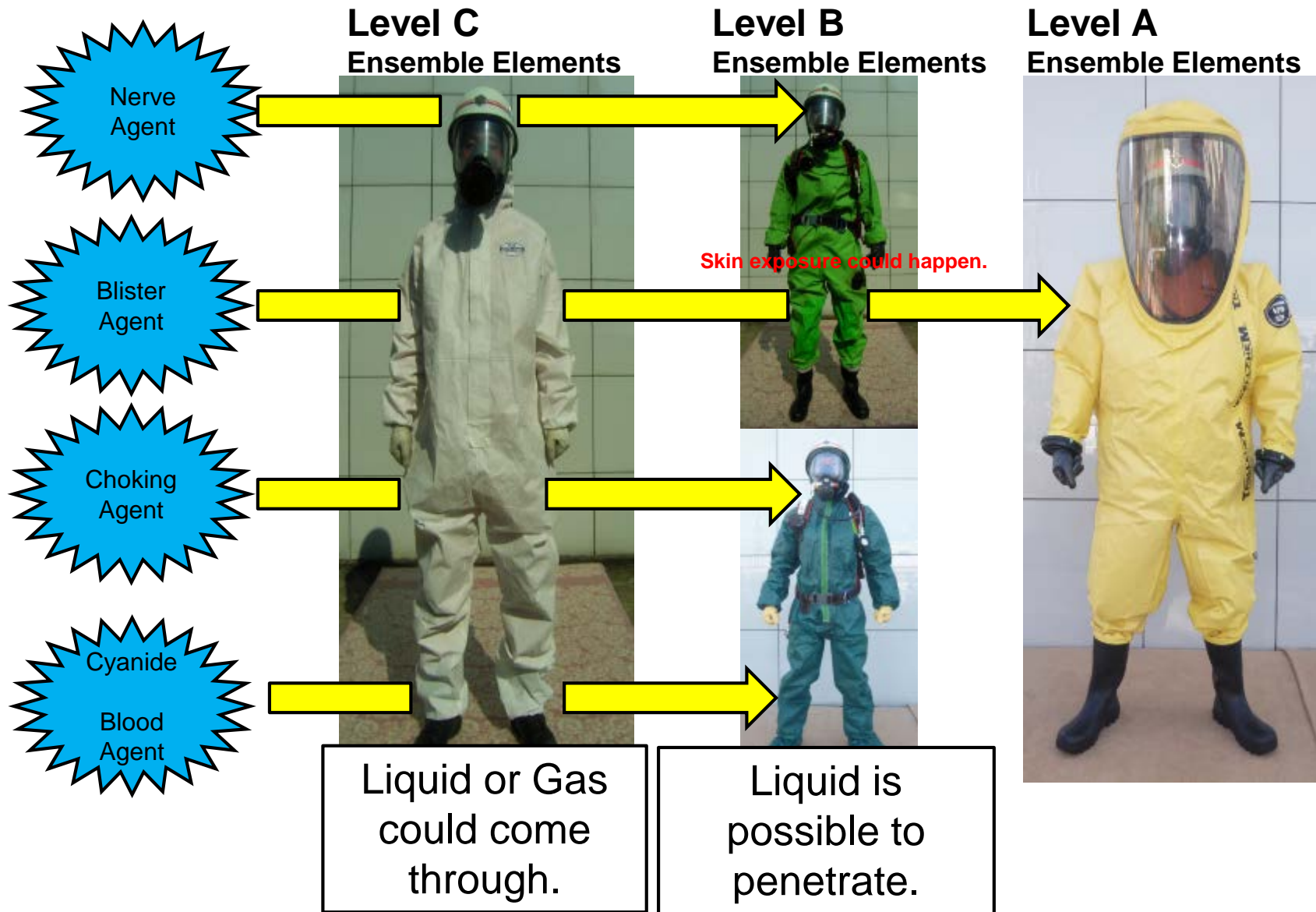
Level C



Level D



Protection against C Hazard



Protection to Respond to B Hazard

Level C Ensemble Elements

biological
agent

biological
agent

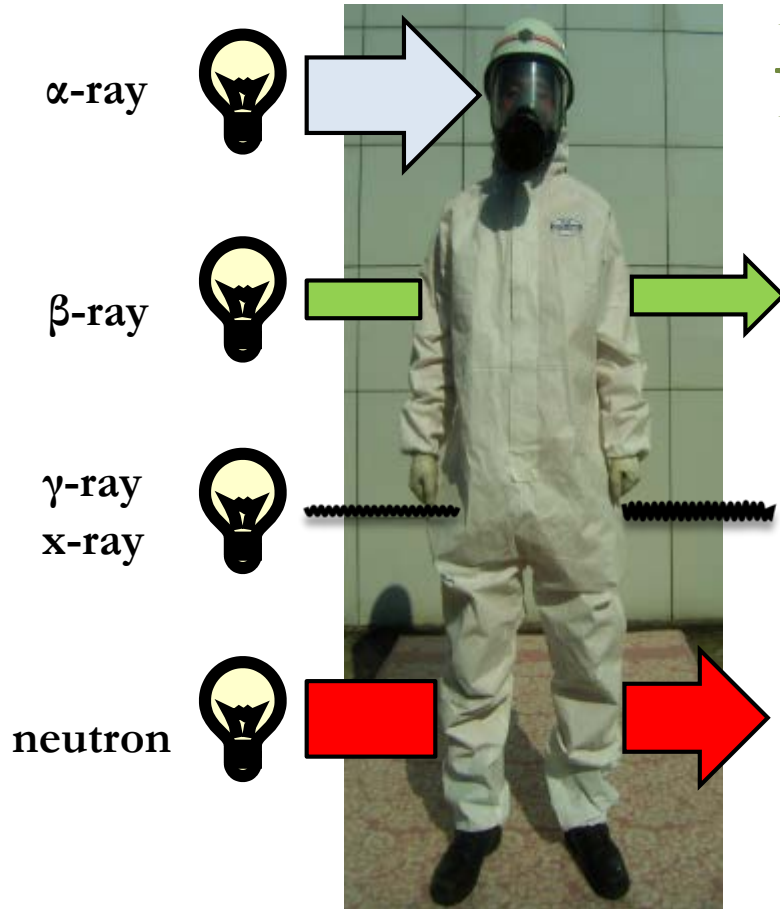
biological
agent



**Guard against
pathogenic
microorganism**

Protection to Combat N Hazard














Level C Ensemble Elements



Protection to stop
Radioactive Material,
which exposes a-ray, from
coming into the body

Type of Activity	Max Radiation Dose	Personal Dose Meter Setting
General Firefighting	10mSv or less	Same as the left
Type of Activity	Max Radiation Dose for a Certain Period	Personal Dose Meter Setting
Rescue	100mSv	30mSv - 50mSv
Rescue on and off	100mSv for five years (also, 50mSv for a year)	Same as the left

Which Squad in Charge of Which Zone & Activity?

Zone	Type of Squad Involved				Required Activities
	Before Identification	After Identification			
		Chemical	Bio	Nuclear	
Hot	Level A Squad 	Level A Squad 	Level C Squad 	Level C Squad 	<ul style="list-style-type: none"> ● Basic detection ● Designation of hot zone ● Removal of Hazmat and its container like bottle ● Rescue
Warm	Level B Squad 	Level C Squad 			<ul style="list-style-type: none"> ● Designation of warm zone ● Evacuate people exposed to hazardous materials if ambulatory ● Collective Protection(only for Bio hazard) ● 1st triage ● Decontamination
Cold	Level C Squad  Level D Squad 	Level D Squad 	Level D Squad 	Level D Squad 	<ul style="list-style-type: none"> ● Information gathering ● Designation of cold zone and restricted area ● Setting of entry control line ● Public relations, evacuation instruction ● 2nd triage ● Ambulance and medical treatment

N, B and C Hazards Response Tool Used by Fire Services

Measurement Instrument



Air Quality Meter
(flammable gas, oxygen, carbon monoxide, hydrogen sulfide)



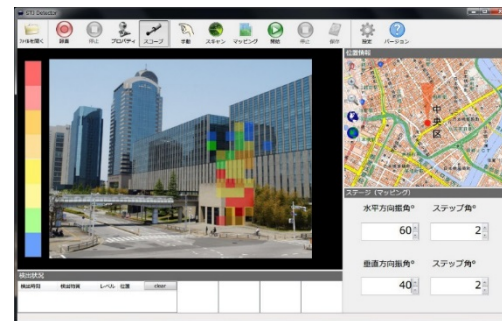
Chemical Agent Detector
(nerve agent, blister agent, blood agent and choking agent)



INFRARED GAS ANALYSIS APPARATUS
(for liquid, gas and solid material)



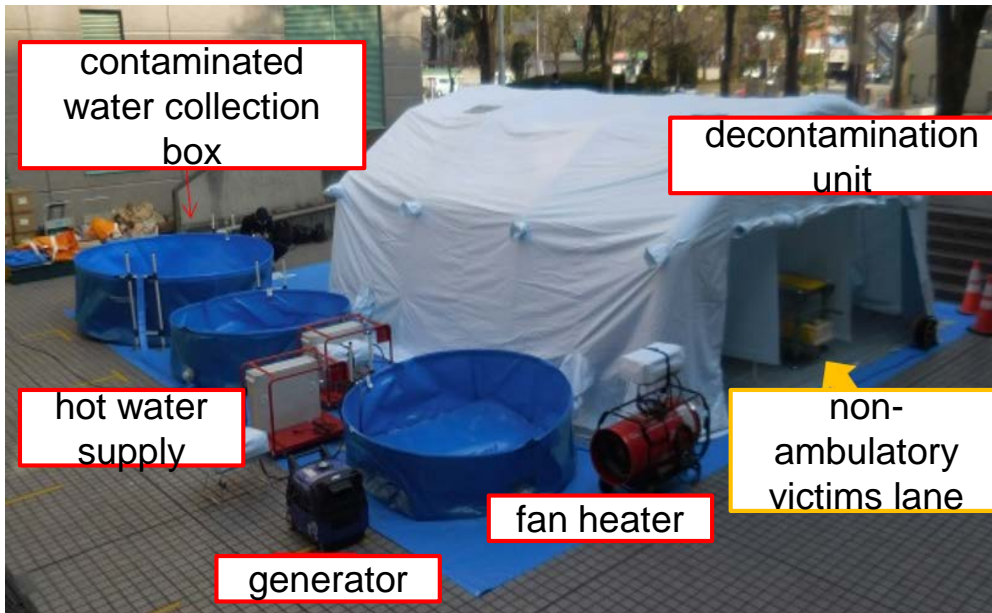
to visualize



Portable Hazard Observation System
- can detect the chemical agent from 5km distant place

Large Decontamination System Equipped Vehicle

Large Decontamination System Equipped Vehicle – which can cleanse 200 people an hour



Special Hazmat Truck

- ◆ Equipped with a hazmat analyzing room composed of positive pressure function
- ◆ Toxic substance detection device and other NBC disaster response tools loaded on



Rescue Procedure Flow

1 Report to Fire Dept.

2. Arrival at Incident Site

3. Info Gathering

4. Setting of Restricted Area

4. Setting of Entry Control Line

5. Simplified Detection

6. Designation of Three Zones

Hot Zone

Rescue of Victims

Removal of Hazmat

Warm Zone

1st Triage

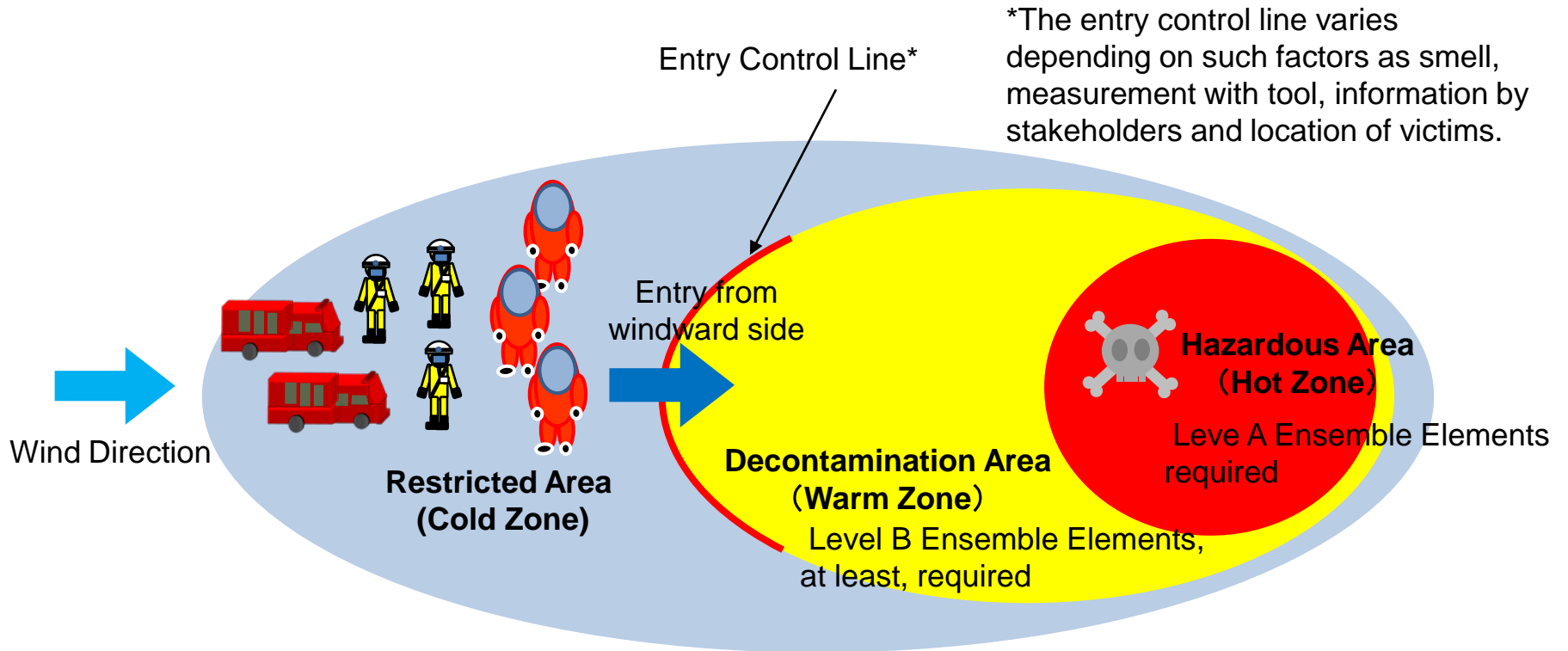
Decontamination

Cold Zone

2nd Triage

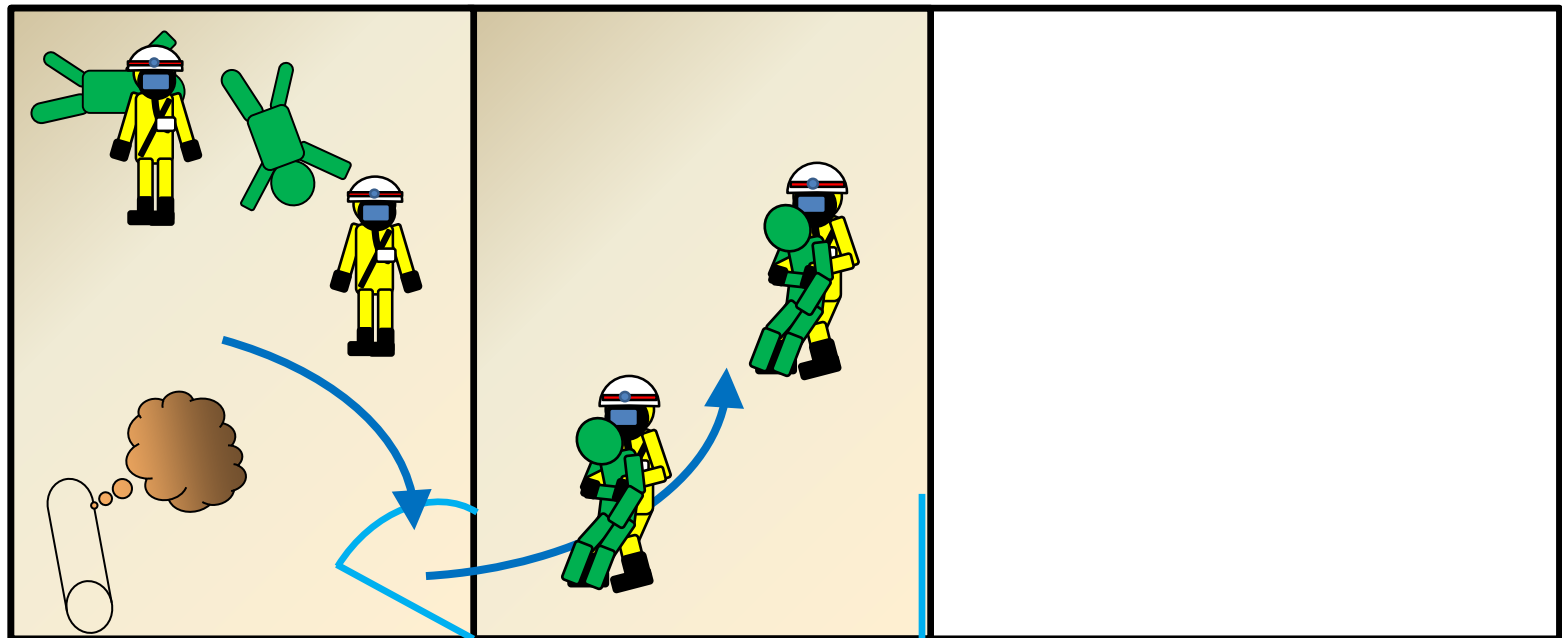
Ambulance

Zoning



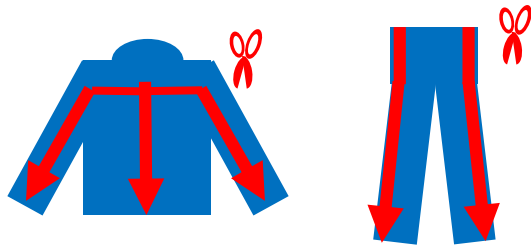
Short Pick-Up

When discovering a victim in the hot zone, rescuers are supposed to carry them to a safer place, even if not possible to reach the cold zone, so that the victim can get a better condition for breathing.

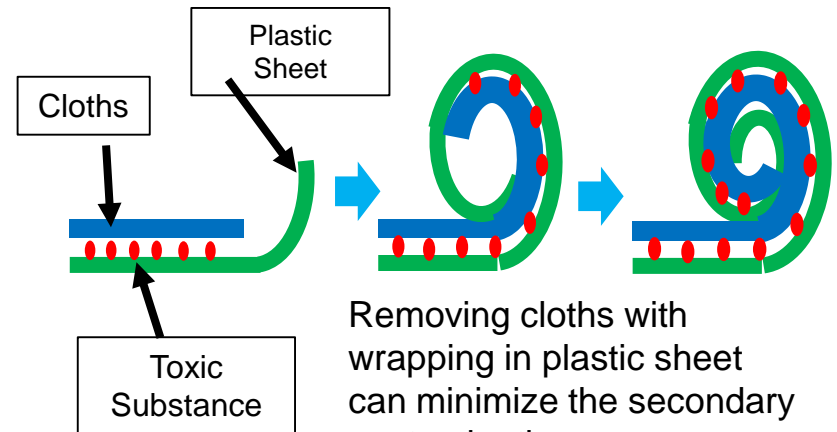


Dry Decontamination

To remove cloths of rescuer/rescue for getting rid of toxic substance on them



Cloths are cut by scissors, as following the arrow illustrated.



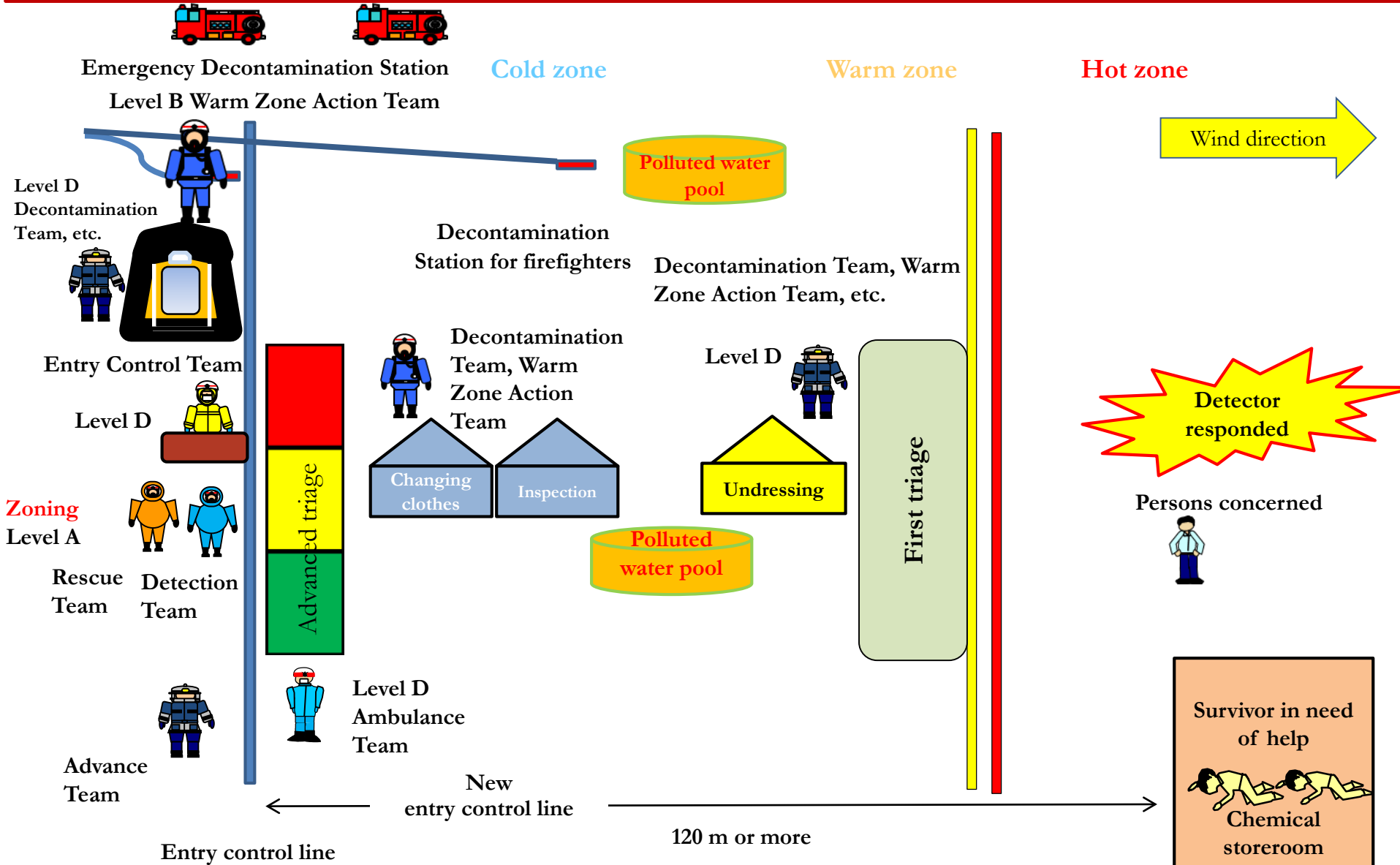
Wet Decontamination

When the victim gets the whole of body contaminated, the wet decontamination in the decontamination tent is needed.



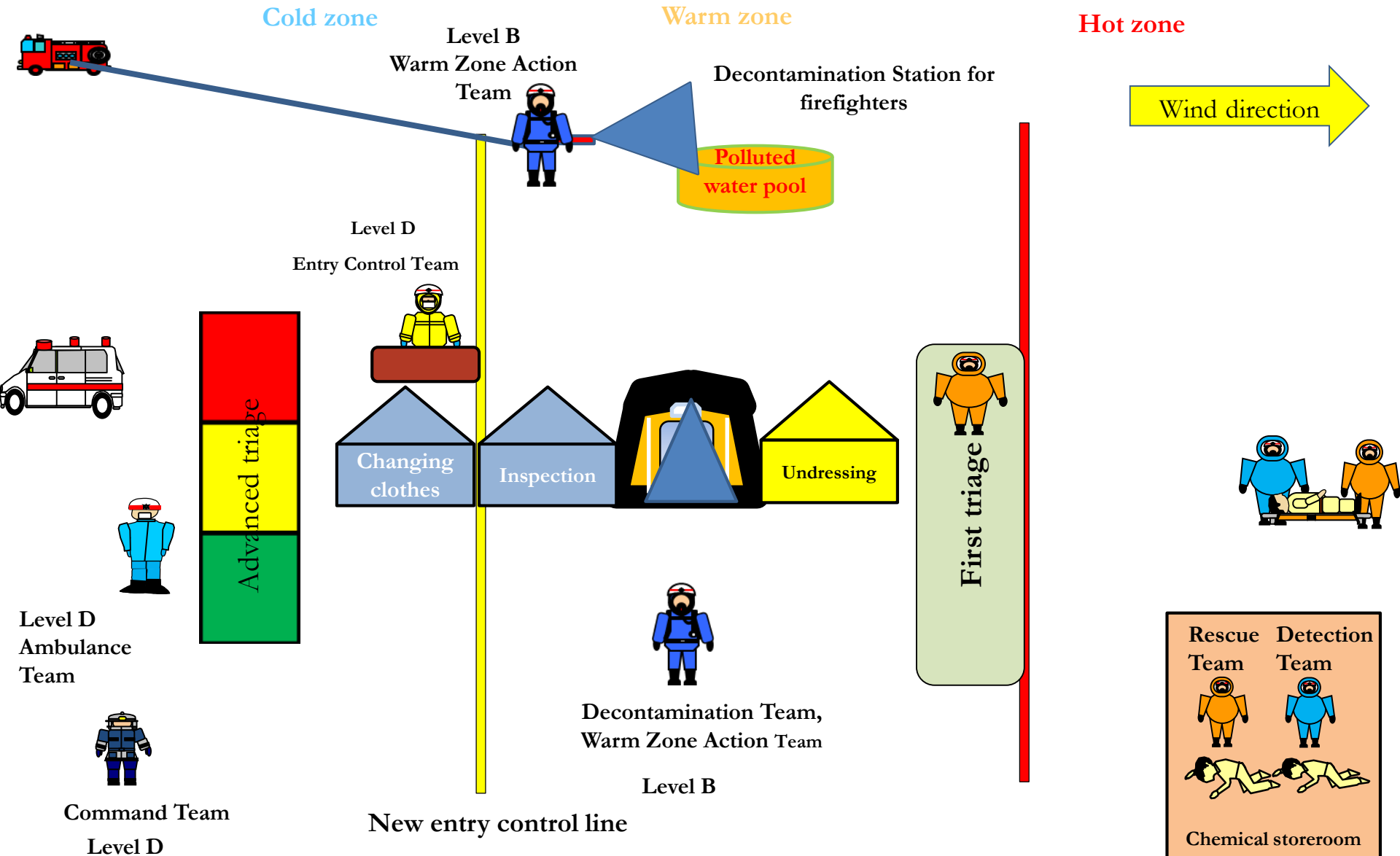
Action Procedure

(Arrival at Site - Setting Up Decontamination Station)



Action Procedure

(Rescue of Survivors in Need of Help - Ambulance Transport)



Tokyo Subway Sarin Attack

- The incident occurred past 8:00 March 20 1995, at 16 stations of the three subway lines – Hibiya Line, Marunouchi Line and Chiyoda Line.
- Around 6,300 injured or died.
- 340 units and 1,364 firefighters attended the incident sites.



Tokyo Subway Sarin Attack



Damages on Responders

(zoning, physical protection and decontamination)

135 firefighters were injured while engaged in rescue. Medical institutions have also seen their staff injured, when receiving victims.



Firefighter Engagement in Explosion Terrorism



7 July 2005 London bombings

- The secondary attack should be most paid attention to, through proper and prompt information sharing with other responders, especially the police, which is responsible for **safety evaluation** at the scene.



Boston Marathon Bombing (2013)

- In bombing attacks, the procedures for CBRN are also supposed to be followed – **the explosion terrorism may happen using toxic substance** like chemical agent, biological agent and radiation agent.

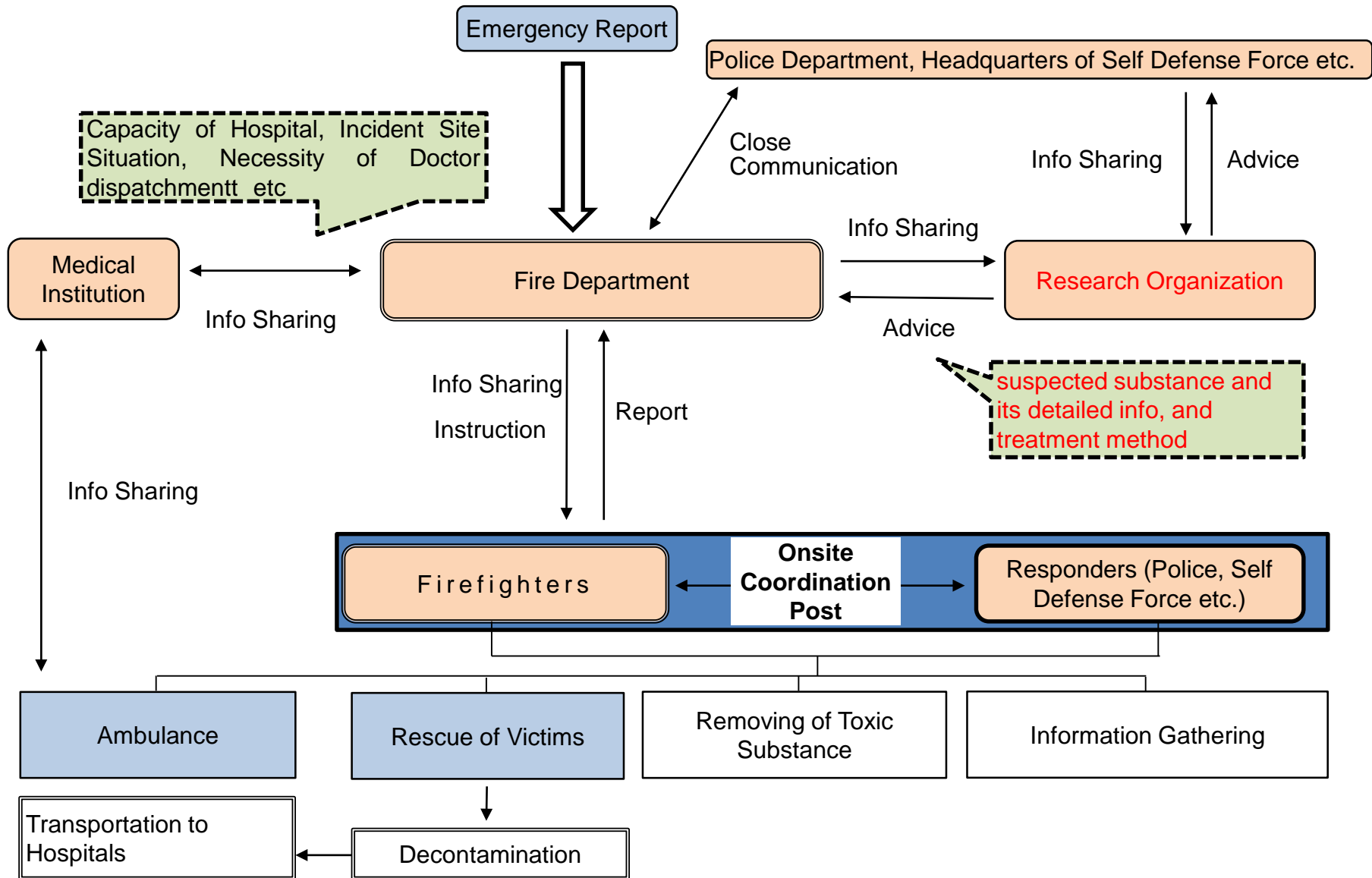


Hemostasis with Tourniquet

- Victims with blast injury need to be **treated with CAT(Combat Application Tourniquet)**, which works well for arterial bleeding – that crucially impact on victims' lives.

Robust Response Collaboration

- Rescue, Ambulance, Medical and Research -





Thank you very much for listening.