

OH Approaches to Protect Health of Workers Engaged in Emergency Response and Recovery Operations at Fukushima No.1 Nuclear Power Plant

- **University of Occupational and Environmental Health, Japan**
 - **Koji Mori**



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- What happened in the Nuclear Power Plant?
- Occupational health risks workers were exposed to
- Strategic approaches that we took
- Lessons learnt for future disasters

WHAT HAPPENED IN THE NUCLEAR POWER PLANT?

OCCUPATIONAL HEALTH
RISKS WORKERS WERE
EXPOSED TO

Issues that People in and around the Nuclear Plants Have

	Residents	Workers
High Risk Work	—	⊙
Poor Lodging Condition	⊙	⊙
Poor Medical Care	⊙	⊙
Worry about Future Health	⊙	⊙
Worry about Future Life	⊙	○
Crisis Experience	○	△

⊙ : Most People Have
○ : Many People Have

△ : Some people may have
— : not applicable

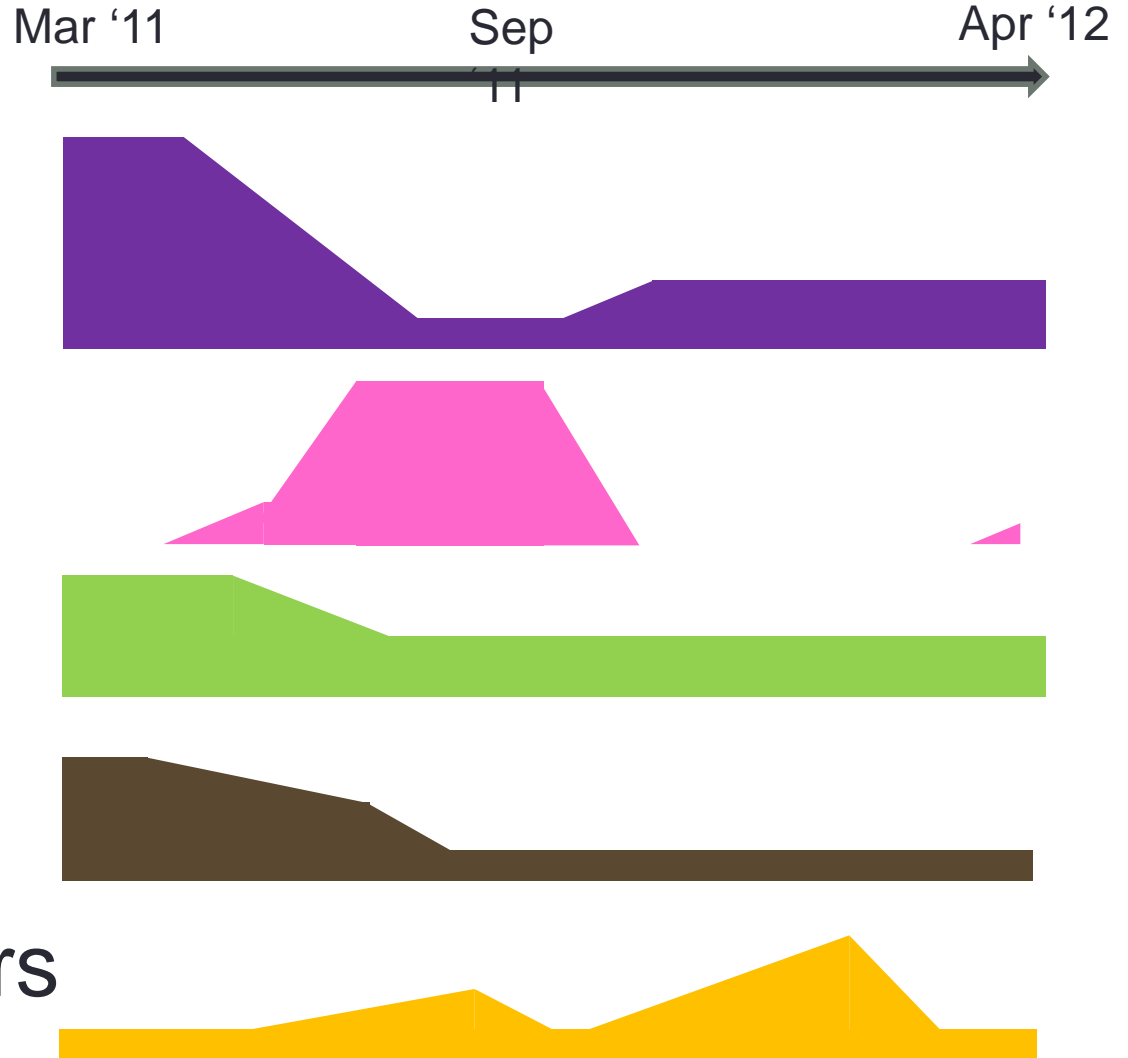
Dose of Radiation Exposure

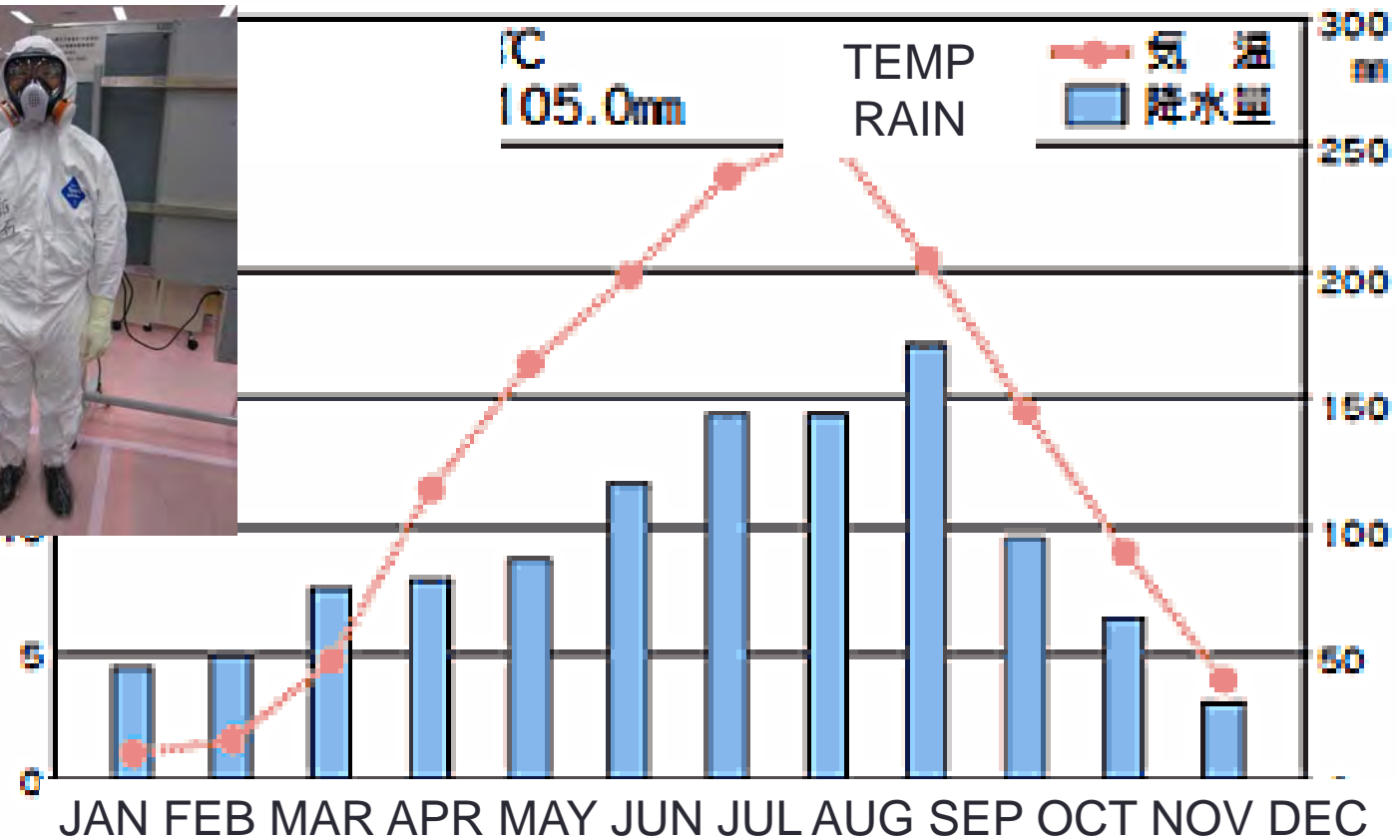
mSv	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
>250	6	0	0	0	0	0	0
200-250	3	0	0	0	0	0	0
150-200	20	0	0	0	0	0	0
100-150	133	0	0	0	0	0	0
50-100	542	42	4	0	0	0	0
20-50	1207	532	235	109	87	16	7
10-20	868	634	535	256	231	81	28
<10	966	2412	2256	1173	1812	1023	1098
total	3745	3620	3030	2138	2130	1120	1133
Max (mSv)	678.1	96.5	53.9	44.2	39.4	37.2	30.8
Av. (mSv)	31.1	9.57	7.04	5.11	4.58	2.99	1.71

Change of OH Risks that Workers was Exposed to

Health Hazards

- Radiation
- Heat Stress
- Mental Stress
- Over Duty
- Biological Factors





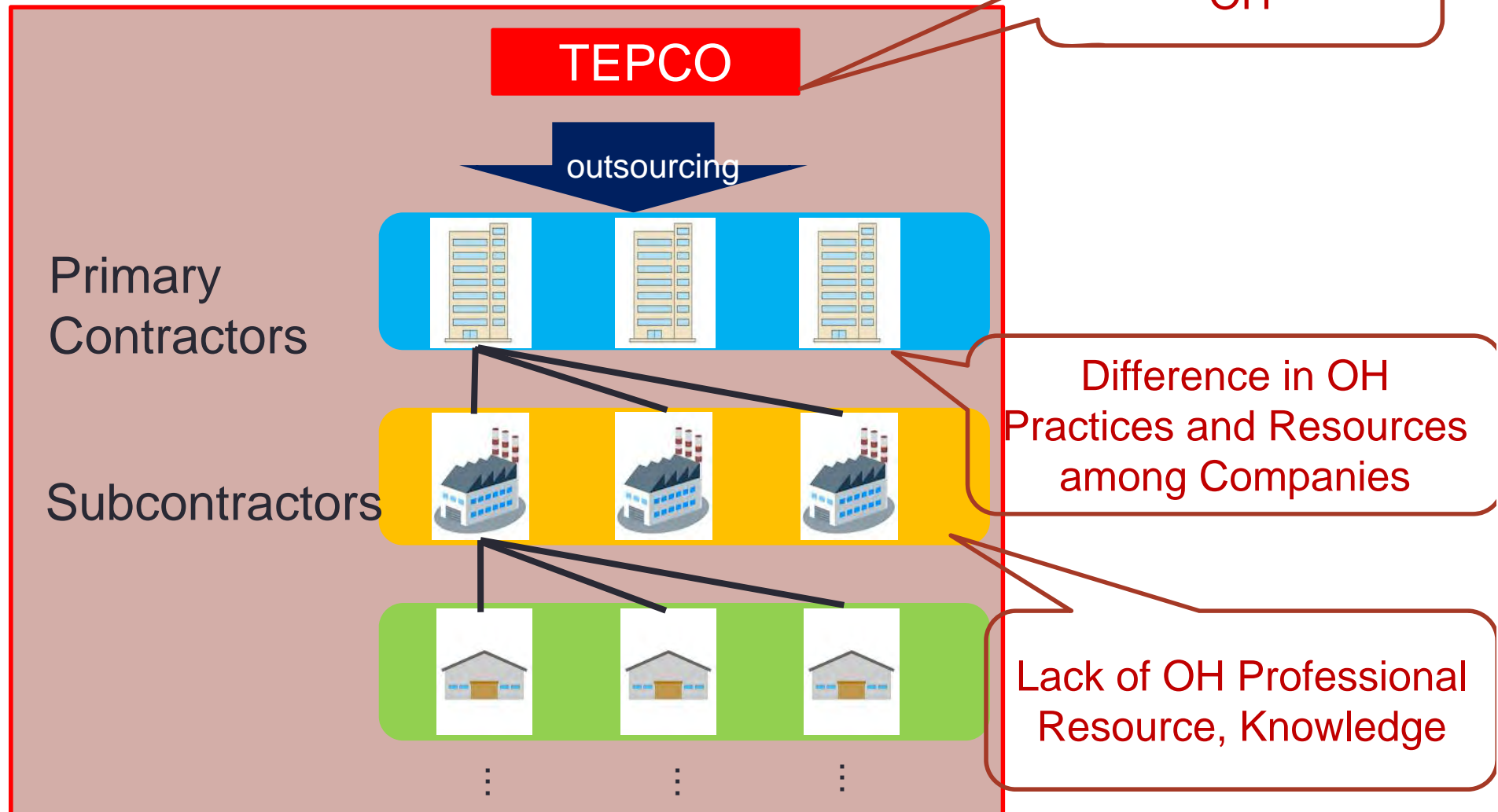
First heat illness case was reported in late March.

Issues on OSH risks

- Focused their efforts on radiation risks
- Insufficient attention to other occupational safety and health risks

BARRIER AGAINST OH RISK CONTROL

Relationship of Companies Involved and Existing Issues



Lodging conditions were improved but,

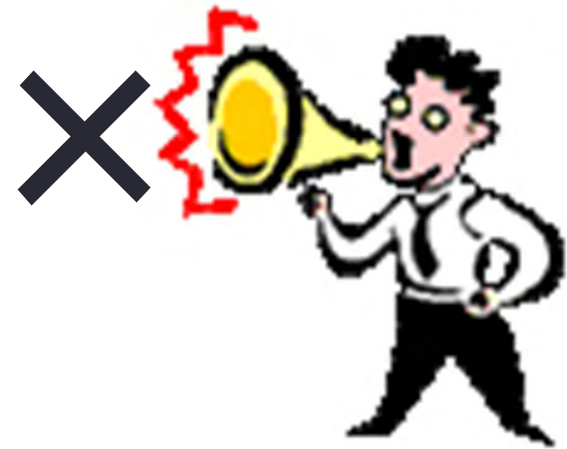


Beds rooms of TEPCO employees in gymnasium of the No2 Plant in May.



Small apartments of TEPCO employees near J Village in July

STRATEGIC APPROACHES THAT WE TOOK



Voices from outside don't reach inside at an emergency condition.

Strategic OH approach

STEP 1

Providing trustful services as requested



STEP 2 Providing recommendation and advice based on understandings of work condition.



STEP 3 Providing high-quality OH services based on guidelines and rules.



STEP 4 Supporting establishment and improvement of OH system.

UOEH dispatched doctors to the quake-proof building for first aids.



Our Recommendation to Ministries and TEPCO

- **Recommendation on OSH system**
 - Set Clear Rules in OH.
 - Improve Work environment, etc.
 - Clarify Qualification of Workers.
 - Conduct Necessary Training to Workers.
 - Establish System to Evaluate Programs.
 - Support Subcontractors that don't have enough resources
etc.
- **Recommendation on Countermeasures to Heat Stress**
 - Monitor WBGT and Inform Workers with Warning
 - Improve Work Schedules (e.g. Quit Works in the Afternoon)
 - Secure Rest Stations and Improve Environment including Air Conditioning
 - Provide Appropriate Electrolytic Water
 - Provide Cool Vest
 - Assess Fitness for Duty under the Severe Condition
etc.

UOEH was ready for professional supports

15 min training against heat stress

福島第一原子力発電所における 熱中症教育(15分版)

産業医科大学産業医実務研修センター

平岡 晃

Educational kit



Cool vest / hydration drink

Self check risk
assessment sheet

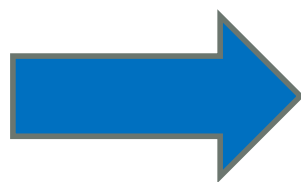
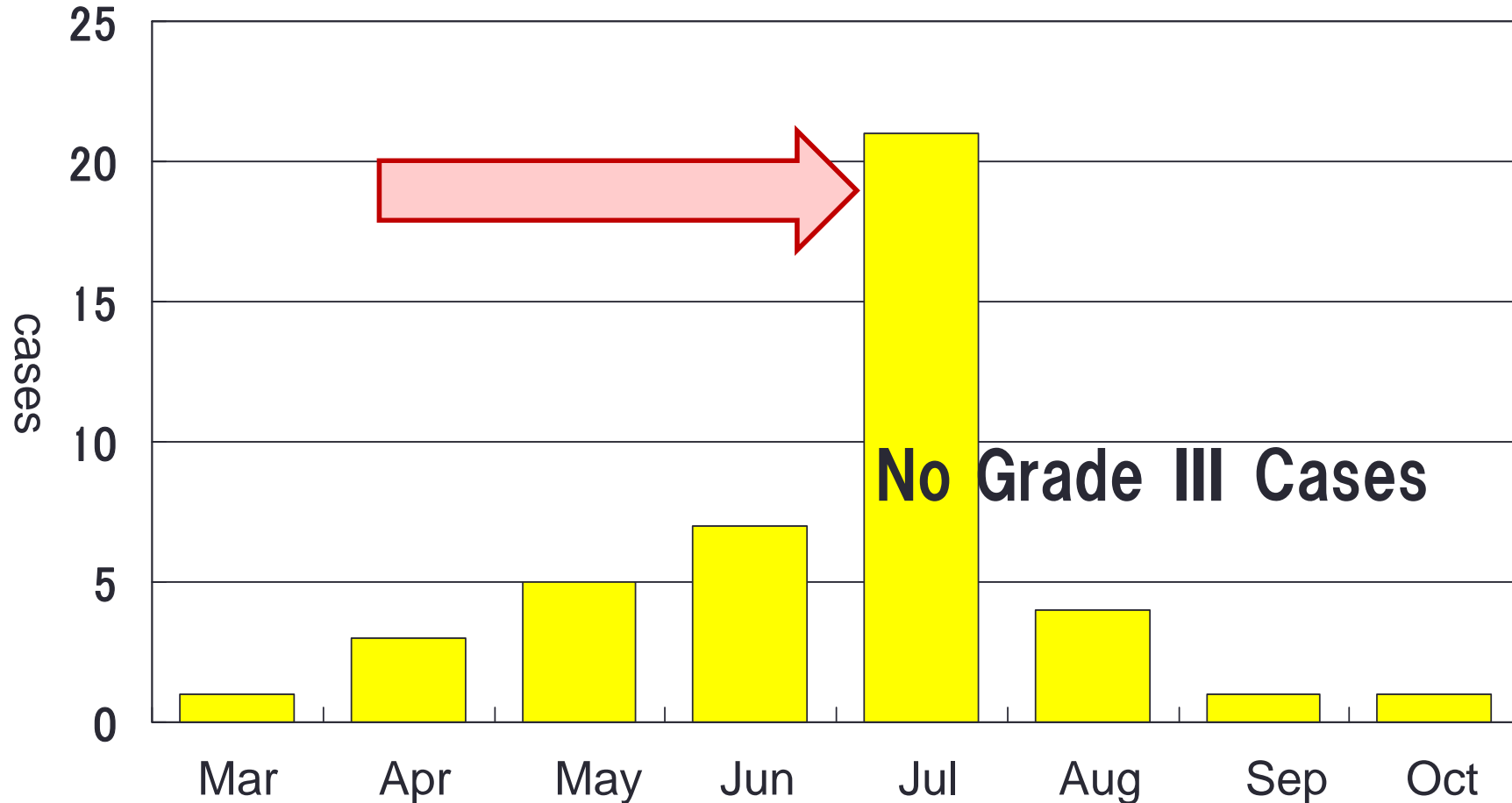
Posters



Display of Temp./WBGT
At gate to raise awareness



Heat illness in 2011



Comprehensive program was further improved, and heat illness cases decreased to less than 10 in 2013

Infection control program

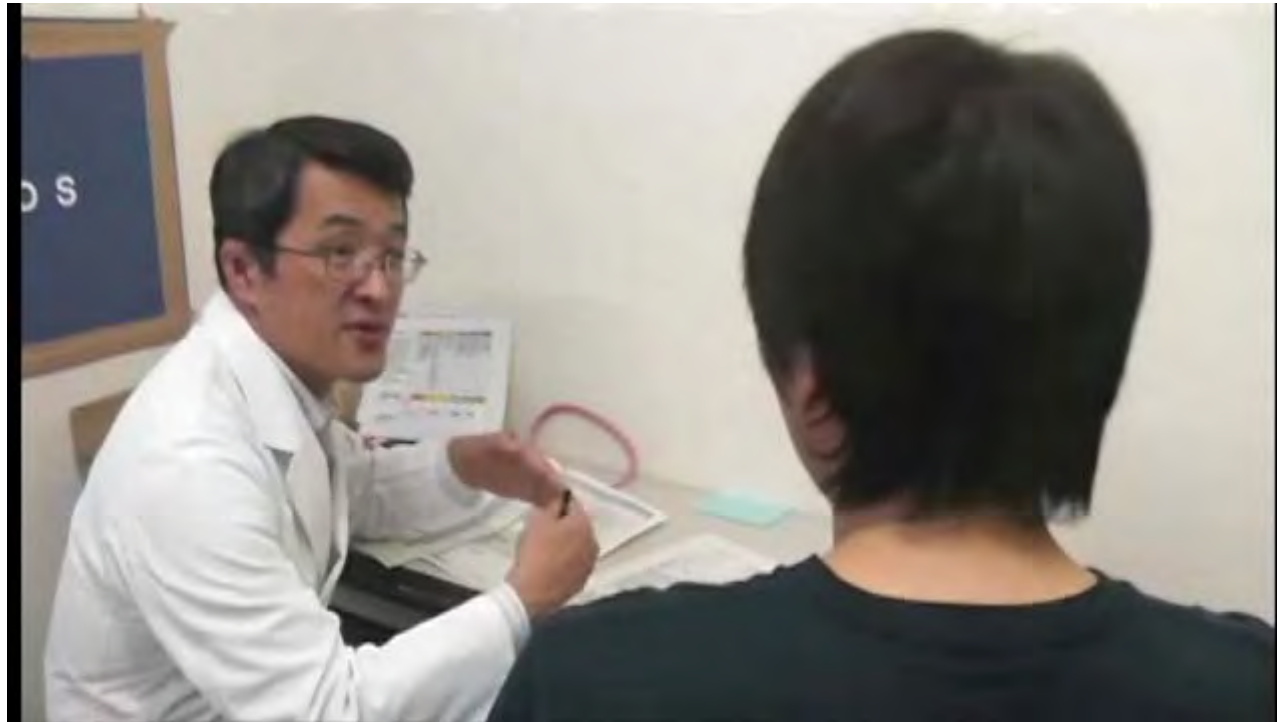
- Influenza Victimization
(5972 workers till last week)



- Provide mask, soap and disinfection materials, posters



Fitness for duty check up



Long tasks toward decommissioning nuclear reactors

Emergency Response

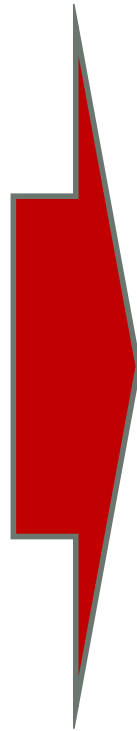
Stabilizing Work

Decommissioning Works



Expert
Meeting

Site Visit



Recommendations
/ Trainings



Training at J Village

LESSONS LEARNT FOR FUTURE DISASTERS

Emergency responders expose to various health hazards (Typical Case)



2001.9.11 Terrorist Attack @ NY

Multiple health hazards

Oil spill @ the Japan Sea in 1997

- Oil mist, Cold, Mental Stress

5 volunteers died from heart attack or other causes.



Oil spill @ the Mexico Bay in 2010

- Oil mist, Heat stress

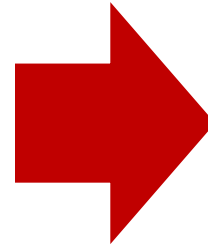
Several heat stress cases were reported.



Trade offs in health risks

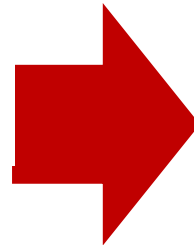


Respirator
/Wear



Heat Illness

Shoe Cover



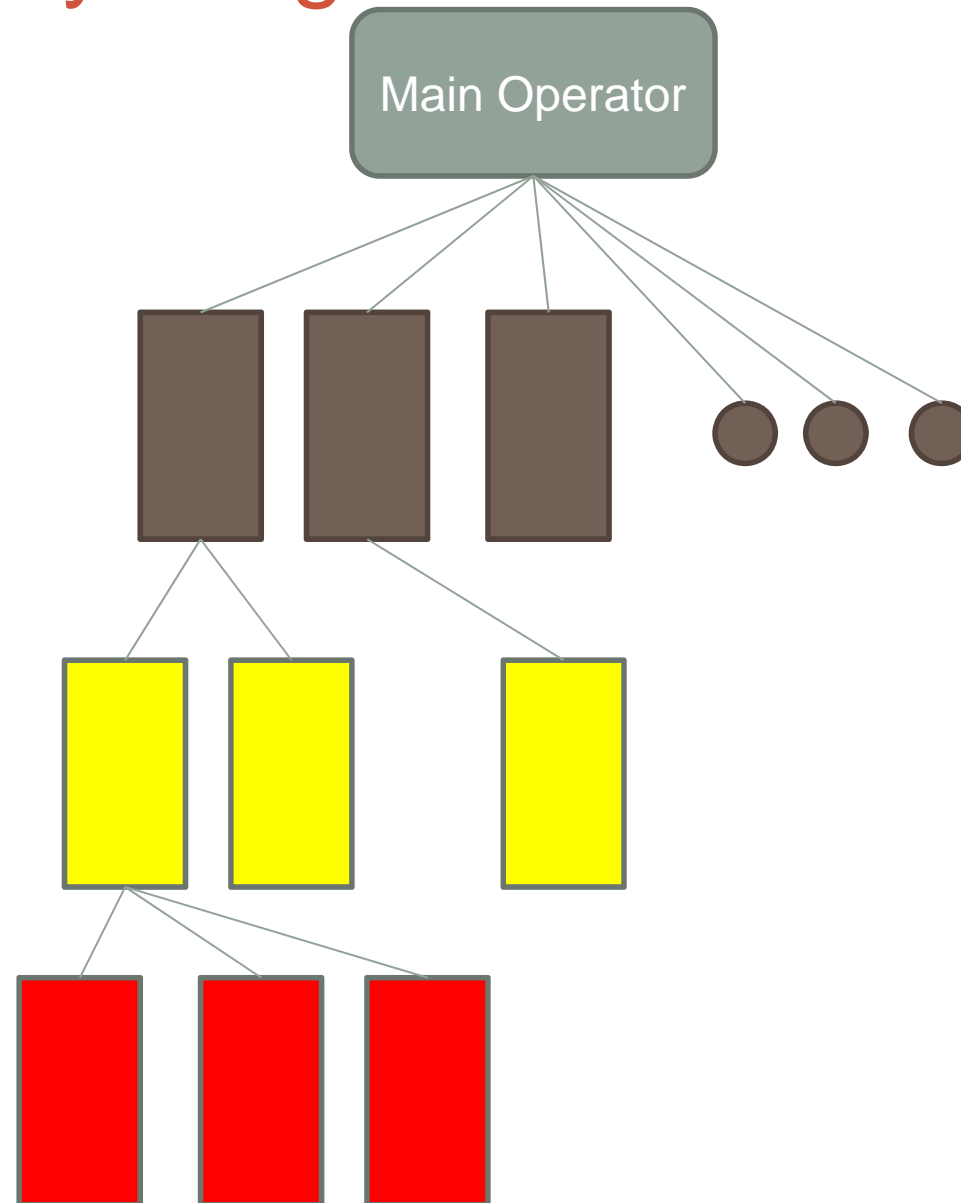
Slipping
/Falling down

Conclusion 1

Workers engaged in respond and recovery works are exposed to multiple health risks. There are trade offs in the risks.

- **Prevention programs and contribution of OH professionals are essential to protect the workers.**
- **The functions should be incorporate in emergency response plans.**

Multiple layer organizations



Conclusion 2

Workers belonging to various companies and organizations are engaged in risky tasks under complex chain of orders.

- **The establishment or revision of regulations to allow the national government and main companies greater responsibility for the health of all workers involved in disasters.**