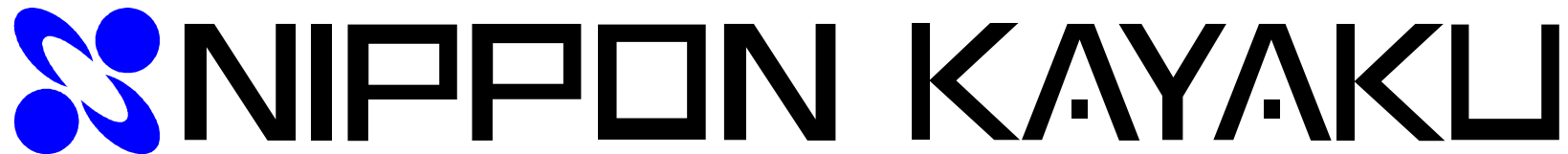


Deflagration during production of gas generating agent tablets



EXPLOSIVES DIVISION

T. Matsuzawa

in Geneva

2005. May 27

Explosives Plant Location



Asa plant of Nippon Kayaku Co., Ltd. is located in Yamaguchi-Prefecture, the western part of Japan.

Asa Plant



1. Outline of Accident

(1)Date: 2002.July.08 10h44a.m.

(2)Location: Nippon Kayaku Co., Ltd. Asa Plant
Yamaguchi-Prefecture, Japan

(3)Damage:

①human: 2 operators were injured

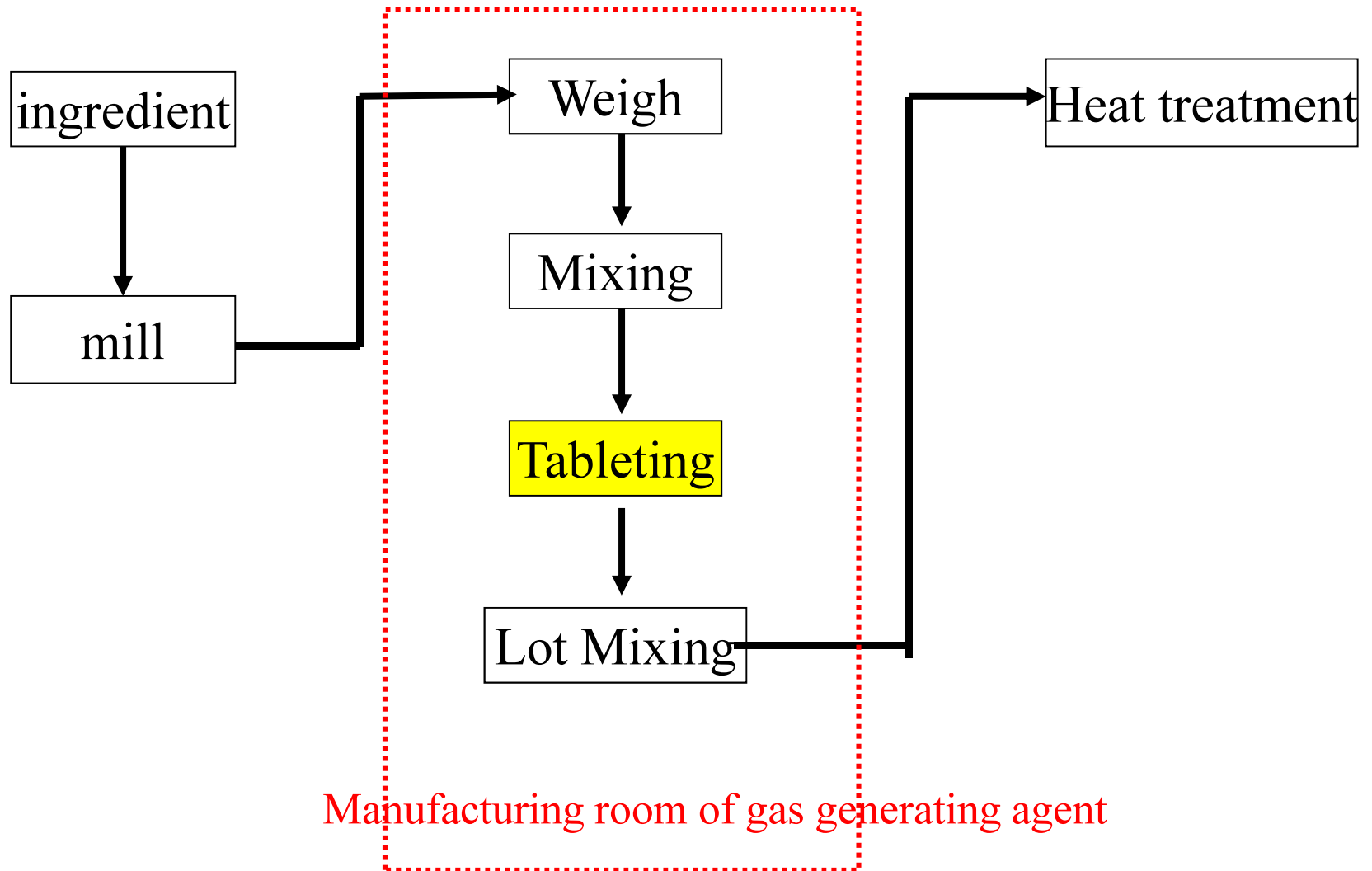
1 severely; break the collar bone and the chin

1 slightly; a burn

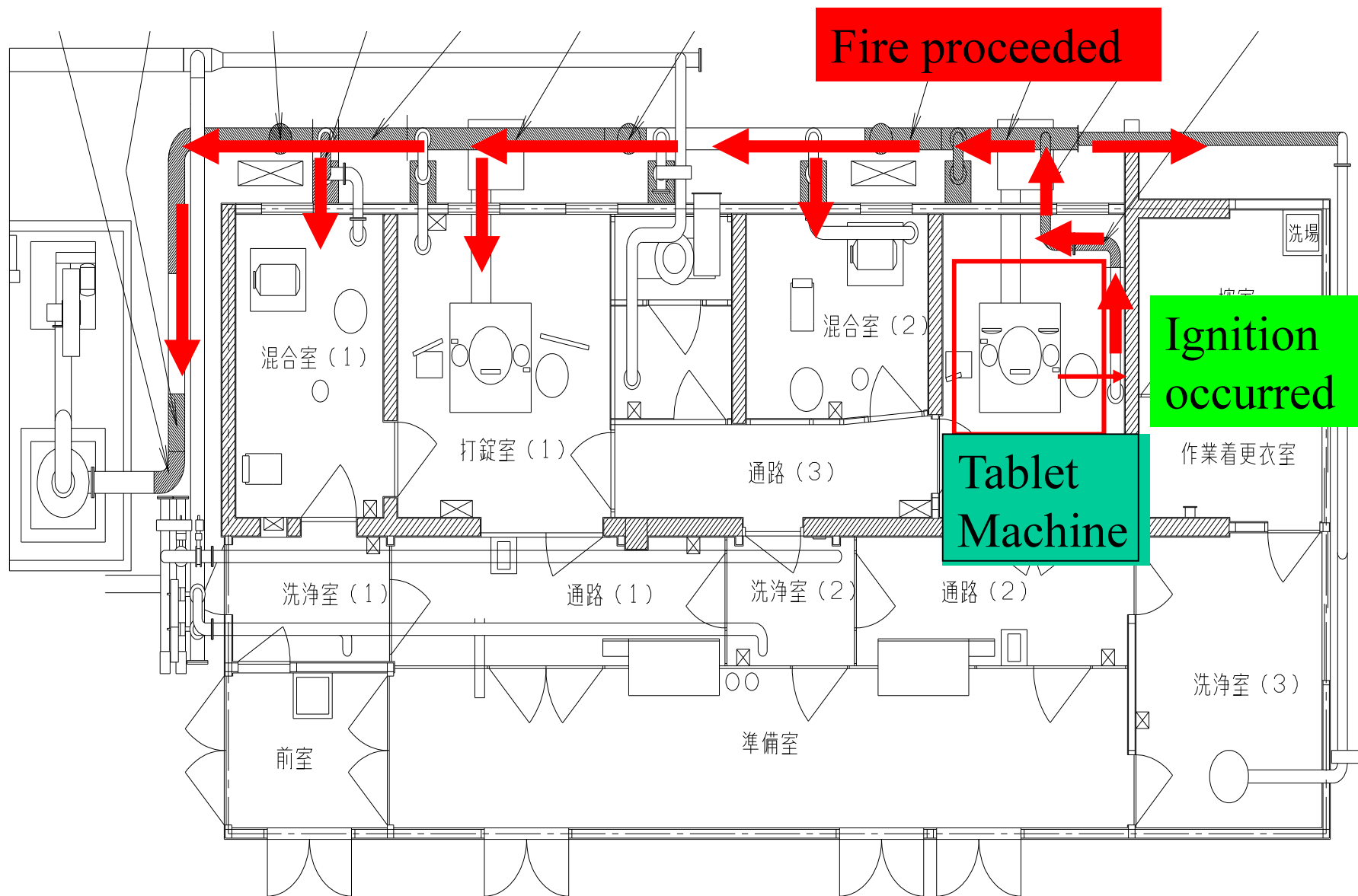
②physical: concerned room (roof, ceiling, wall were damaged. Other rooms (windows) were damaged.

(4)Phenomenon: Explosion and Combustion of gas
generating agent for airbag(32kg) and ingredient(32.3kg)

2. Manufacturing flow of gas generating agent



3. Damage









4.Causes of accident

(1)Cause of ignition

- ①Tablet machine : Increased sensitivity by entering the foreign bodies such as the grains of the sand, Increased energy of tablet by increasing tablet speed
- ②Static electricity: Discharge broke out between tablets and the plastic bag .But, this gas generating agent has low static electricity sensitivity. So, the possibility of cause of ignition is low.

(2) Cause of spread damage

①A flame sensor did not work. (The duct hid the flame sensor.)

②The gas generating agent, was accumulated in an exhaust pipe, exploded by the flame.

③By this explosion through the exhaust pipe, powder of the gas generating agent exploded.

5. 1 Actions to prevent recurrence (to prevent an ignition)

①Prevention of the invasion of the foreign bodies:

Example; When we bring any materials into the manufacturing room, we must prevent the invasion of the foreign bodies by blowing air gun and any other ways.

②Improve a speed of manufacturing tablets:

③Static electricity control:

We should use uncharged plastic bag in manufacturing tablets.

5. 2 Actions to prevent recurrence (to minimize damages)

① Reinforcement of fire fighting equipment

Increase flame sensors, Introduce the system of short time from flame sensing to discharge water.

② Independence of exhaust pipe

The exhaust pipes were completed separately among each room. The structure is easy to clean.

③ Review of layout of manufacturing room

Remote control of manufacturing tablets

④ Decrease of explosive and ingredient stocks

5. 3 Actions to prevent recurrence (management)

① 5S is a basic of safety

Sort, Straighten, Scrub, Systematize, Standardize

② Reinforce the supervision

- Complete examination system for safety
- Review an operation manual
- Reinforcement of daily and regular examinations

③ Reinforcement of training