

DEMONSTRATION TEST OF A SHIPPING CASK FOR HIGH BURNUP SPENT FUELS

--VIDEO of Drop test, Thermal test and Water immersion test--

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BACKGROUND

The video tape contains the pictures of the demonstration test of a shipping cask for high burnup spent fuels by CRIEPI that is a part of tests under the sponsorship of Science and Technology Agency of Japan.

These tests of full scale packaging (electric heaters only were simulated by actual spent fuels) carried out, in order to demonstrate integrity of the casks under a series of the IAEA transport regulations, and to confirm the test method. The results of these tests are of some help for the person in charge of actual designs and the public acceptance.

TEST

The cask used in this was NFT-14P which contains 14 fuel assemblies for PWR.

. (Photo-1)

The test is showed hereinafter.

- Environmental Temperature Test ($38^{\circ}\text{C}/1\text{week}$:
test to demonstrate the ability to withstand normal condition of transport)
- Free Drop Test . . . (Photo-2) (0.3m drop on to a flat rigid :
test to demonstrate the ability to withstand normal condition of transport)
- Drop Test I . . . (Photo- 3 ~ 5) (9 m drop on to a flat rigid target :
test to demonstrate the ability to withstand accident condition of transport)
- Drop Test II . . . (Photo- 6 ~ 8) (1 m drop on to a mild steel bar :
test to demonstrate the ability to withstand accident condition of transport)
- Thermal Test . . . (Photo- 9 ~ 11) ($800^{\circ}\text{C} \times 30\text{min}$:
test to demonstrate the ability to withstand accident condition of transport)
- Water Immersion Test ($150\text{ Kpa} / 8\text{hr}$:
test to demonstrate the ability to withstand accident condition of transport)
- Water Immersion Test . . . (Photo-12) ($2\text{MPa} \times 1\text{hr}$:
test for packages containing irradiated nuclear fuel)

RESULTS

The test results confirms that the cask is sufficiently secure, then public acceptance can be got.

■ NFT-14P

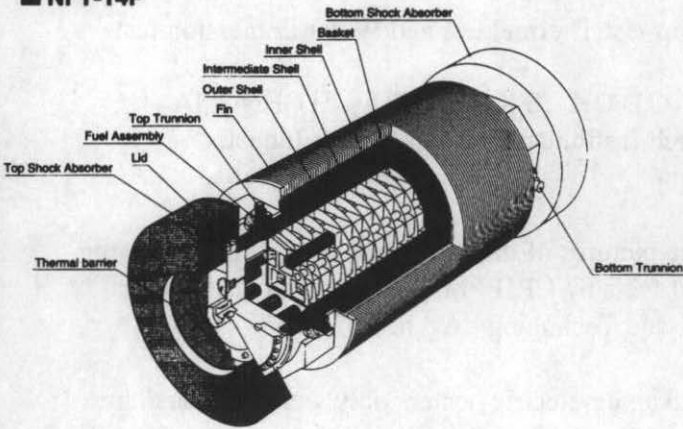


Photo-1

The cask used in the tests was NFT-14P type cask.

SPECIFICATION

Weight, loaded	115 ton
Overall length	6.3 m
Overall diameter	2.6 m
Weight, empty	101 ton
Type of fuel	PWR
No. of fuel assembly	14

Ref. : NFT brochure

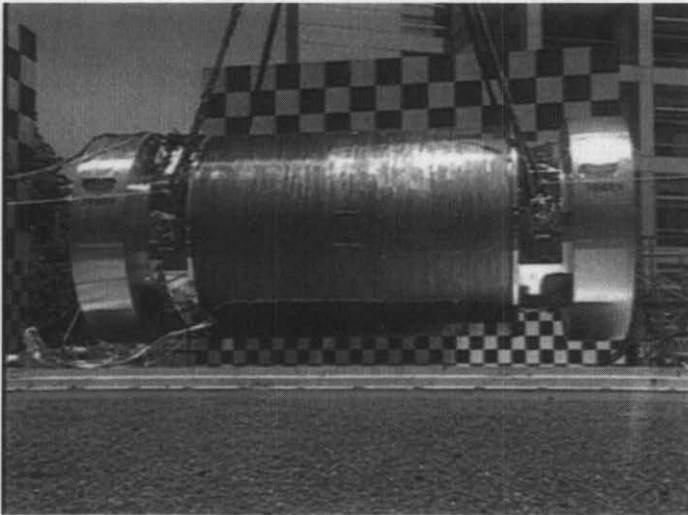


Photo-2

According to IAEA regulation, leak tightness test were carried out before each test under the temperature of 38 °C.

Photo-3

Drop test I

The test cask was set 9 m over the target.



Photo-4

In the middle of 9 m drop.



Photo-5

Impact energy was absorbed by impact limiter and fins as designed.



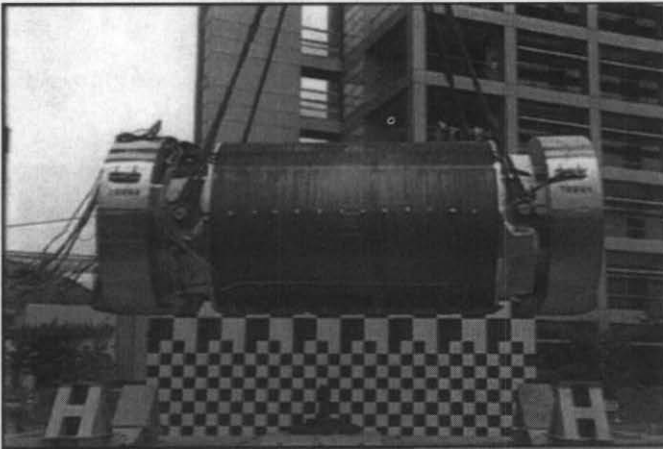


Photo-6

Drop test II

Drop from 1 m to mild steel pin
with diameter of 15 cm.

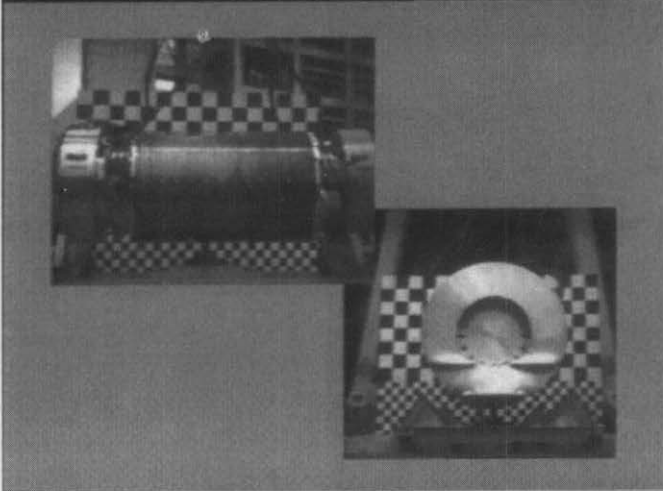


Photo-7

A front side and a lateral face.



Photo-8

Afetr come down.



Photo-9

Fire test

The temperature in the test facility was set to be test temperature.

The cask experienced Drop test I and II.



Photo-10

The test cask being exposed in the atmosphere of 800°C and during 30 minutes was drawn out.

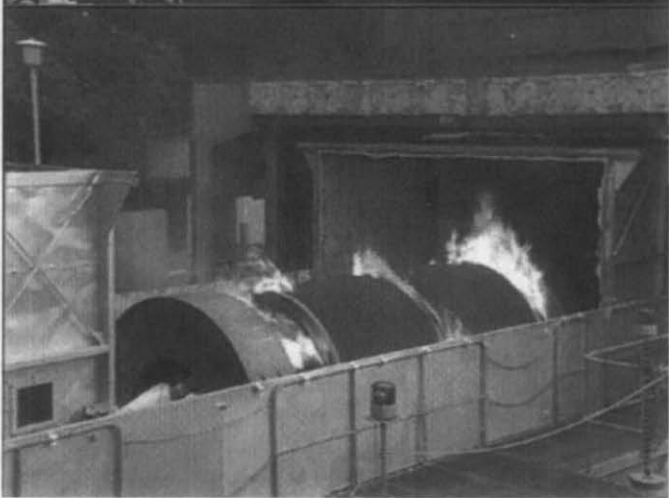


Photo-11

Some parts of impact limiter and neutron shielding material burned.

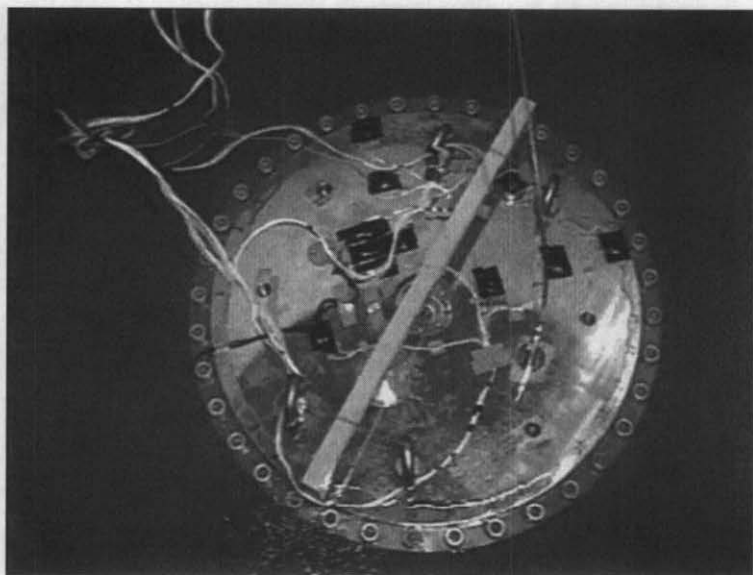


Photo-12

The integrity of the containment system was confirmed by the immersion test under an external gauge pressure of 2 MPa which corresponds to a head of water 200 m for a period of one hour.

It is confirmed that NFT-14 cask for transporting spent fuel assemblies meets the requirement for normal and accidental conditions stipulated in IAEA regulation.