

= Typhoon Gay (1989) =

Typhoon Gay , also known as the Kavali Cyclone of 1989 , was a small but powerful tropical cyclone that caused more than 800 fatalities in and around the Gulf of Thailand in November 1989 . The worst typhoon to affect the Malay Peninsula in 35 years , Gay originated from a monsoon trough over the Gulf of Thailand in early November . Owing to favorable atmospheric conditions , the storm rapidly intensified , attaining winds of more than 120 km / h (75 mph) by November 3 . Later that day , Gay became the first typhoon since 1891 to make landfall in Thailand , striking Chumphon Province with winds of 185 km / h (115 mph) . The small storm emerged into the Bay of Bengal and gradually reorganized over the following days as it approached southeastern India . On November 8 , Gay attained its peak intensity as a Category 5 ? equivalent cyclone with winds of 260 km / h (160 mph) . The typhoon then moved ashore near Kavali , Andhra Pradesh . Rapid weakening ensued inland , and Gay dissipated over Maharashtra early on November 10 .

The typhoon 's rapid development took hundreds of vessels in the Gulf of Thailand by surprise , leading to 275 offshore fatalities . Of these , 91 occurred after an oil drilling ship , the Seacrest , capsized amid 6 ? 11 m (20 ? 36 ft) swells . Across the Malay Peninsula , 588 people died from various storm @-@ related incidents . Several towns in coastal Chumphon were destroyed . Losses throughout Thailand totaled ? 11 billion (US \$ 497 million) . Striking India as a powerful cyclone , Gay damaged or destroyed about 20 @,@ 000 homes in Andhra Pradesh , leaving 100 @,@ 000 people homeless . In that country , 69 deaths and ? 410 million (US \$ 25 @.@ 3 million) in damage were attributed to Gay .

= = Meteorological history = =

In early November , a monsoon trough over the Gulf of Thailand showed signs of tropical cyclogenesis . A small , concentrated area of convection quickly developed over a low @-@ pressure area within the trough , and on November 2 it became sufficiently organized for the Joint Typhoon Warning Center (JTWC) to issue a Tropical Cyclone Formation Alert . Owing to its small size , the system began strengthening within the narrow gulf by taking advantage of warm waters and good outflow . Moving generally northwestward , it became a tropical depression later that day and underwent rapid intensification . As the newly named Tropical Storm Gay strengthened , it " presented a paradox to forecasters " according to Lieutenant Dianne K. Crittenden ; synoptic data from Malaysia and Thailand indicated decreasing wind speeds and increasing barometric pressures around the storm , but these observations were later interpreted as increased subsidence .

Strengthening faster than anticipated , Gay attained typhoon status early on November 3 . Later that day , the storm developed an eye before passing over the Seacrest , an oil drilling ship . On November 4 , Gay 's winds increased to 185 km / h (115 mph) , equivalent to a Category 3 hurricane on the Saffir ? Simpson Hurricane Scale , before making landfall in Chumphon Province , Thailand , at 0600 UTC . The Japan Meteorological Agency assessed that the storm had ten @-@ minute sustained winds of 140 km / h (85 mph) and a pressure of 960 mbar (hPa ; 28 @.@ 35 inHg) . Crossing the Kra Isthmus , Gay weakened to minimal typhoon status as it entered the Bay of Bengal . According to the India Meteorological Department (IMD) , Gay was the first typhoon since 1891 to form in the Gulf of Thailand and enter the Bay of Bengal . Responding to a ridge to its north , Gay maintained a west @-@ northwestward to northwestward track for the next four days . The storm gradually restrengthened as it moved through an area of low wind shear and warm waters ; however , this was limited by restrictions to the cyclone 's outflow . Early on November 6 , Gay passed near the Andaman Islands as a Category 2 @-@ equivalent cyclone .

After changing little in intensity for much of November 6 , Gay strengthened as the ridge to its north intensified and the previous restrictions to its outflow diminished . The storm moved due west through a small fetch of warmer waters , fueling the process of intensification over the next 42 hours . Based on estimates provided through the use of the Dvorak technique , the JTWC assessed Gay to have attained its peak intensity as a Category 5 @-@ equivalent cyclone with winds of 260 km / h (160 mph) early on November 8 . Around this time , the IMD estimated that the storm had three

@-@ minute sustained winds of 240 km / h (145 mph) , classifying Gay as a modern @-@ day Super Cyclonic Storm . Additionally , the agency estimated the cyclone 's central pressure to have decreased to 930 mbar (hPa ; 27 @.@ 46 inHg) . Around 1800 UTC , Gay made landfall over a sparsely populated area near Kavali , India , in Andhra Pradesh . Upon coming ashore , the storm 's eye was about 20 km (12 mi) wide , with gale @-@ force winds within 95 km (60 mi) of the center . Now over land , Gay no longer had access to warm waters , causing it to weaken to a tropical storm less than 12 hours after landfall . The storm continued to deteriorate while moving across India , before it completely dissipated over Maharashtra on November 10 .

= = Impact and aftermath = =

= = = Gulf of Thailand = = =

The most powerful storm to affect the Gulf of Thailand in more than 35 years , Gay produced 6 ? 11 m (20 ? 36 ft) swells that caught many ships in the region off @-@ guard . At least 16 vessels were reported missing by November 5 , including the 106 m (348 ft) Unocal Corporation oil drilling ship Seacrest . According to survivors , the vessel received no warning of the developing typhoon . Just when all crew members were about to abandon ship , the eye of Typhoon Gay passed over . Winds fluctuated violently and changed direction , preventing the ship from remaining stabilized despite being within safe operating limits . The vessel abruptly capsized with all 97 crew members on board during the overnight hours of November 3 , before any life boat could be deployed . Initial rescue attempts on November 4 were hampered by rough seas . Two days after the sinking , four rescue ships and two helicopters in the region were searching for survivors ; four people were rescued from the wreckage on November 6 . Divers from the Thai Navy were sent to search the capsized vessel for anyone trapped inside . Of the crew , only six survived ; 25 bodies were recovered , and the remaining 66 members were presumed dead . Losses from the sinking of the Seacrest totaled \$ 40 million . Another 20 cargo and fishing ships sank during the storm , resulting in 140 fatalities .

= = = Thailand = = =

Striking Thailand with unprecedented strength , Typhoon Gay caused damage across many of its provinces . Areas between Chumphon and Rayong Provinces were severely affected by heavy rains , high winds and large swells . Rainfall amounts peaked at Chumphon , where 7 @.@ 64 inches (194 mm) fell during the cyclone 's passage . Widespread disruption of communication and electricity occurred in most areas south of Bangkok ; many households remained without power for weeks . Damaging winds uprooted numerous trees and power poles and toppled wooden houses built on stilts . Exacerbated by deforestation , flash flooding triggered by the storm damaged or destroyed thousands of homes and caused at least 365 fatalities . Several towns and villages across Chumphon province were devastated , and one of the destroyed villages " looked like it had been bombed " according to the Bangkok Post . Entire districts were reportedly " flattened " within Chumphon and Prachuap Khiri Khan provinces . The typhoon destroyed many schools across Chumphon and Surat Thani provinces , many of which constructed from wood . All structures close to the storm 's path had their windows and doors blown out , and some multi @-@ story buildings lost their upper floors . A few schools constructed from reinforced concrete sustained little damage . Over 1 @,@ 000 roads and 194 bridges were damaged or washed away . At the height of the floods , over 250 @,@ 000 hectares (618 @,@ 000 acres) of land was under water . Onshore , 558 fatalities were attributed to the storm , and another 44 took place just offshore . Throughout Thailand , approximately 47 @,@ 000 homes were damaged or destroyed , and over 200 @,@ 000 people were affected , of which about 153 @,@ 000 were left homeless . Monetary losses reached 11 billion Baht (\$ 456 @.@ 5 million USD) , ranking Gay as one of the costliest disasters in the country 's history .

Within a week of the storm 's passage , the Government of Thailand began distributing relief goods

to residents throughout the affected provinces . Despite the effort by the government , 2 @, @ 500 people from Pa Thiew and Tha Sae demonstrated for additional and more intensive aid on November 9 . These protests were soon dispersed . Following considerable criticism for downplaying the impact of the typhoon , Prime Minister Chatichai Choonhavan delayed his visit to the United States to personally oversee relief efforts . By November 15 , the United States pledged to donate \$ 25 @, @ 000 for recovery operations . Telephone connection was restored from Bangkok to Prachuap Khiri Khan by this time ; however , areas further south remained disconnected . Generators were brought in to keep hospitals and government offices running since much of Chumphon province remained without electricity for more than two weeks . As the scale of damage became more apparent , a request for international aid was made by November 17 to the United Nations Disaster Relief Organization . Upon the announcement of the request , six countries pledged to provide nearly \$ 510 @, @ 000 in funds collectively . Agriculture across Surat Thani Province was severely affected by the typhoon in the long @-@ term as well . In the four years following Typhoon Gay , land use for orchard , rubber and oil palm plantations decreased from 33 @. @ 32 percent to 30 @. @ 53 percent . Additionally , rice paddy coverage decreased from 22 @. @ 96 percent to 13 @. @ 03 percent .

Following post @-@ storm surveys , it was determined that most of the severely damaged schools were built improperly and the upper @-@ floors were not designed to bear typhoon @-@ force winds . According to building codes in Thailand , structures are mandated to be able to withstand up to 120 kgf / m² of pressure from winds . In the years following the typhoon , studies by engineers were conducted in the hardest hit regions to determine how to best rebuild structures in the country . With many of the destroyed structures being constructed from wood , reinforced concrete structures were the suggested replacement . The new buildings could last up to 50 years with proper construction ; however , sub @-@ standard building would result in a need for repairs within 5 years .

= = = India = = =

After crossing the Malay Peninsula , Typhoon Gay moved through the Andaman Islands on November 6 . As a precautionary measure , all air and sea traffic were suspended to the region . Winds in excess of 120 km / h (75 mph) battered North Andaman Island , causing two structures to collapse . A few days before Typhoon Gay made landfall , officials in Andhra Pradesh began evacuating roughly 50 @, @ 000 residents along the coast and stockpiled relief goods . Some people were forced to leave vulnerable locations in the Visakhapatnam and Srikakulam districts . Local meteorologists warned that the storm was comparable to a cyclone in 1977 that killed more than 10 @, @ 000 people . Striking the southern coast of Andhra Pradesh , Typhoon Gay produced wind gusts estimated at 320 km / h (200 mph) . Along the coast , a storm surge of 3 @. @ 5 m (11 ft) inundated areas up to 3 km (1 @. @ 9 mi) inland , washing away numerous structures . About 20 km (12 mi) outside of Kavali , a 91 m (299 ft) tall , steel lattice microwave tower collapsed after experiencing winds estimated at 142 km / h (88 mph) . Transportation and communication across the region was disrupted and 20 @, @ 000 homes were damaged or destroyed , leaving at least 100 @, @ 000 people homeless . Nearly every structure in Annagaripalem were severely damaged or destroyed . Offshore , 25 fishermen drowned near Machilipatnam after ignoring warnings to return to port . Throughout Andhra Pradesh , 69 fatalities and ? 410 million (US \$ 25 @. @ 3 million) worth of damage was attributed to Typhoon Gay . In the months after the storm , concrete shelters were built to house displaced persons .