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A Preliminary Assessment and Identification of the Shipwreck Remains Uncovered in 1916 at the World Trade Center Site in New York City

Gerald A. de Weerd

Charred wood timbers of a shipwreck found and rescued in 1916 at the future site of the World Trade Center in Manhattan were originally identified as remains of the Tijger, a Dutch ship that burned in 1614. A swivel cannon marked VOC was also found at or near the site in 1967. An examination of the timbers, preserved in the Museum of the City of New York, suggests they are instead from a vessel of about 55 feet in length built for use on the river or other inland waters, probably by an English shipwright. The cannon was made in Amsterdam after 1715. This finding does not diminish the significance of the timbers, since very few, if any, remains of other colonial vessels used on the Hudson River or on other inland waters in the New York City area have been uncovered and preserved for study.

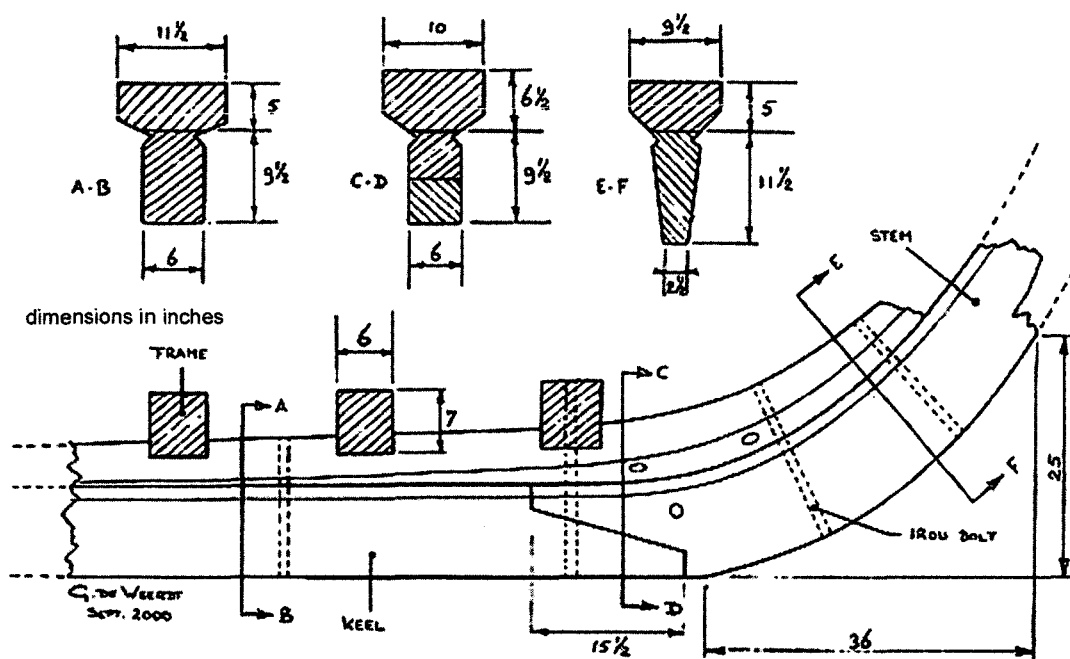
Des pièces de structure carbonisées provenant d'une épave mise au jour et sauvée en 1916 sur le site futur du World Trade Center à Manhattan ont été identifiées a priori comme étant des vestiges du Tijger, un navire néerlandais ayant brûlé en 1614. Un pierrier portant l'inscription VOC a aussi été retrouvé en 1967 sur le site, ou tout près de celui-ci. Un examen de ces pièces de structure, préservées au Museum of the City of New York, suggère qu'elles proviennent en fait d'un vaisseau d'environ 55 pieds de longueur construit pour être utilisé sur la rivière ou sur d'autres eaux intérieures par un charpentier de marine anglais. Quant au pierrier, il aurait été fabriqué à Amsterdam après 1715. Cette découverte ne diminue pas l'importance des pièces de structure puisque très peu de vestiges d'autres vaisseaux coloniaux ayant été utilisés sur la rivière Hudson ou sur toute autre eau intérieure de la région de New York, voire aucun, n'ont été découverts et sauvegardés pour des fins d'études.

De verkoolde spanten van een scheepswrak dat in 1916 werd gevonden en geborgen op het toekomstige terrein van het World Trade Center in Manhattan werden in eerste instantie geïdentificeerd als resten van de Tijger, een Nederlands schip dat in 1614 afbrandde. Een draaibas kanon met het opschrift VOC werd in 1967 op of dichtbij hetzelfde terrein gevonden. Onderzoek aan de spanten, die bewaard worden in het Museum of the City of New York, geeft echter aan dat deze afkomstig zijn van een schip van ongeveer 17 meter lengte dat bedoeld was voor de vaart op een rivier of ander binnenwater en dat waarschijnlijk gebouwd werd door een Engelse scheepsbouwer. Het kanon werd na 1715 in Amsterdam gemaakt. Deze nieuwe informatie doet niets af aan het belang van de spanten, omdat weinig of geen resten van andere koloniale schepen die werden gebruikt op de Hudson rivier of andere binnenwateren in de omgeving van New York zijn ontdekt en bewaard voor studie.

The wood timbers of a shipwreck were found in 1916 during the construction of the subway below Greenwich Street, at Dey Street, in Manhattan. A part of these remains was rescued by amateur archaeologist and construction crew foreman James A. Kelly; more of the wreck was present but unfortunately not within reach (Hallowell 1974: 12). The length of the retrieved portion is about 8.5 feet and is now in the collection of the Museum of the City of New York. During the early stages of the construction of the World Trade Center in 1967 it was expected to find more of the wreck, but the remains were inexplicably not found despite a search in what was believed to be the location of the 1916 discovery. Instead, a bronze breech-loading swivel cannon marked

VOC was found in the same general area. This cannon, with the initials of the Dutch East India Company, was believed to date from the 17th century and "most likely stood on the deck of the *Tijger*" (Gillespie 1999: 72, 241; Hallowell 1974: 20-22; Noble 1976: 209; Patterson 1978: 25).

During subsequent research on the remains in the years following the 1916 excavation and later in the 1950s by Columbia University, it was concluded, based on the limited knowledge of that time, that the wreck was possibly part of the remains of Captain Adriaen Block's Dutch ship the *Tijger* (Tiger), which burned somewhere near Manhattan in 1614 (Cantwell and Wall 2001: 152; Hallowell 1974: 13). The major arguments for this conclu-



Estimated total ship length about 55 ft.

Figure 1. Dimensions of shipwreck timbers of the 1916 World Trade Center Wreck, Manhattan, New York. Drawing by author, September 2000.

sion were as follows: 1) the construction was flat-bottomed and therefore was Dutch; 2) wood dating in 1955 by C^{14} indicated that the wood was cut about 320 to 360 years earlier; 3) analysis of the iron bolt material gave the impression that it was typical of the composition of iron in Europe around 1600; 4) small artifacts found in and around the wreck such as fragments of ceramics and clay pipes, an axe blade, and a bronze breech-loading swivel gun all seemed to be 17th-century Dutch in origin; and 5) there was evidence the wreck had burned.

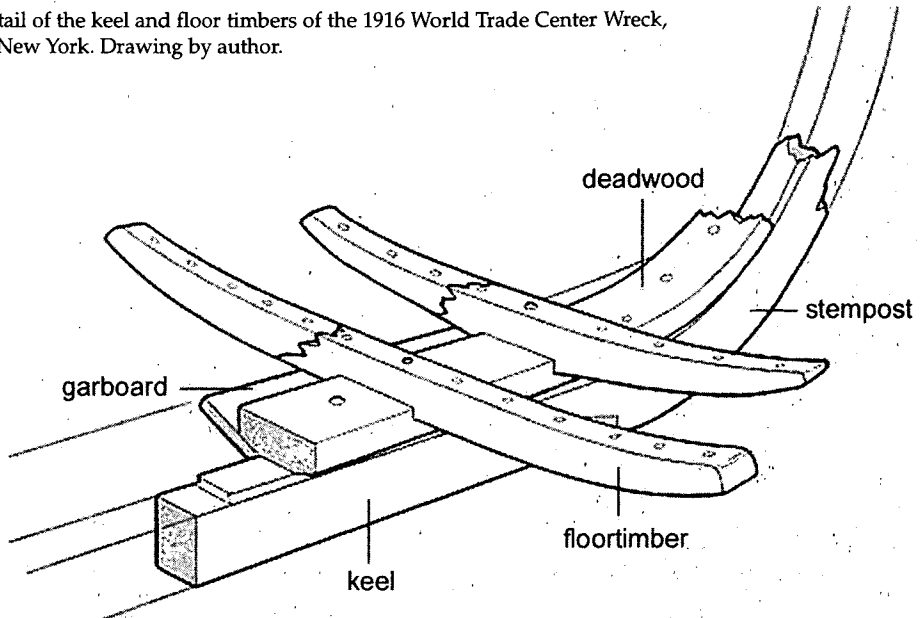
Relevant facts about the *Tijger* known from original written sources are limited. Captain Adriaen Block lost his ship the *Tijger* in January 1614 somewhere near Manhattan when the ship caught fire and had to be abandoned and sunk. Although accurate dimensions of the ship are unknown, based on the size of the crew of about 18 men and the ship's possible load capacity of about 130 tons (65 lasts), the ship must have been more than 70 feet in length, most probably around 90 feet.

By comparison, Henry Hudson's ship (yacht) the *Halve Maan* of 1609 was 70 feet in

length, but Hudson's ship was the smallest type that was used for transatlantic voyages at that time. The *Halve Maan* was not specifically built for trade but was intended mainly for exploration/reconnaissance purposes. Block's voyage was a regular trading expedition, and the *Tijger* was therefore most likely a typical merchantman and thus considerably bigger than the *Halve Maan*.

This writer conducted research on the wreck in 2000 and 2001 at the Museum of the City of New York. It is noteworthy that the Museum has no drawings of the timbers, and probably no drawings were ever made. The Museum granted permission to make accurate measurements of the wreck from which some reliable drawings were produced (FIGS. 1 and 2). Some preliminary conclusions can now be reached about this wreck on the basis of ongoing research in the Netherlands on Dutch shipbuilding. This writer's experience of more than 20 years of research on the history of early Dutch shipbuilding, first as head of the National Museum of Ship Archaeology in the Netherlands and now of the Maritime Museum of the Island of Terschelling, has

Figure 2. Detail of the keel and floor timbers of the 1916 World Trade Center Wreck, Manhattan, New York. Drawing by author.



included his involvement in some of the major developments in the knowledge of this subject. During the past 15 years many details about shipbuilding techniques have been discovered, and one major fact that is now recognized is that from about 1590 to the middle of the 18th century, sea-going ships were built according to generally accepted formulas, published for the first time by Nicolas Witsen in 1671 (De Weerd 1993: 55-57; Witsen 1671). With the help of many shipwreck excavations it has been possible to verify this thoroughly. Therefore it is now known that there was a fixed ratio between the overall dimension of a ship and the dimensions of its major components: keel, stem and stern, frames, and deck beams. The ratios used by Dutch ship builders were about the same as those used by English ship builders.

An examination of the dimensions of the keel or the bottom end of the stem of this wreck shows that it is 6 inches thick. This dimension in particular directly suggests through the Witsen formulas the original length of the ship, from stem to stern, which was 60 feet. Calculations based on the other dimensions of the stem suggest an even smaller ship. Averaged, the ship's length must have been about 55 feet, with an absolute maximum of 60 feet (FIG. 3). With this information the load capacity can be calculated, and this is

only about 22 lasts, or 44 tons, burden and much too small for a regular seagoing merchant ship, whether it was English or Dutch.

Moreover, in examining the design of the accessible portions of the wreck, this writer noted that they do not represent the usual construction of Dutch ships. Firstly, the connection of the stem to the keel is certainly not the typical design that is known from many shipwrecks and the available literature (FIG. 4). Secondly, the planking rabbet of the World Trade Center wreck is cut out right on the seam between the keel and the deadwood. This is very unusual in Dutch shipbuilding. The typical method in the Netherlands is to cut this rabbet some distance off this seam.

In further checking this with colleagues in the Netherlands, France, and England, this writer found that only with smaller ships from southern England the shape of the connection of keel and stem looks like that of the World Trade Center wreck (FIG. 5) (McKee 1983). Furthermore, the distances between the floor frames are not set according to the formulas for sea-going ships. These should be much closer, roughly the distance between the frames, and should be of the same size as the thickness of the frames. This is necessary for the ship to be strong enough for sailing at sea. These distances in the World Trade Center wreck are much wider, about 2.5 times the

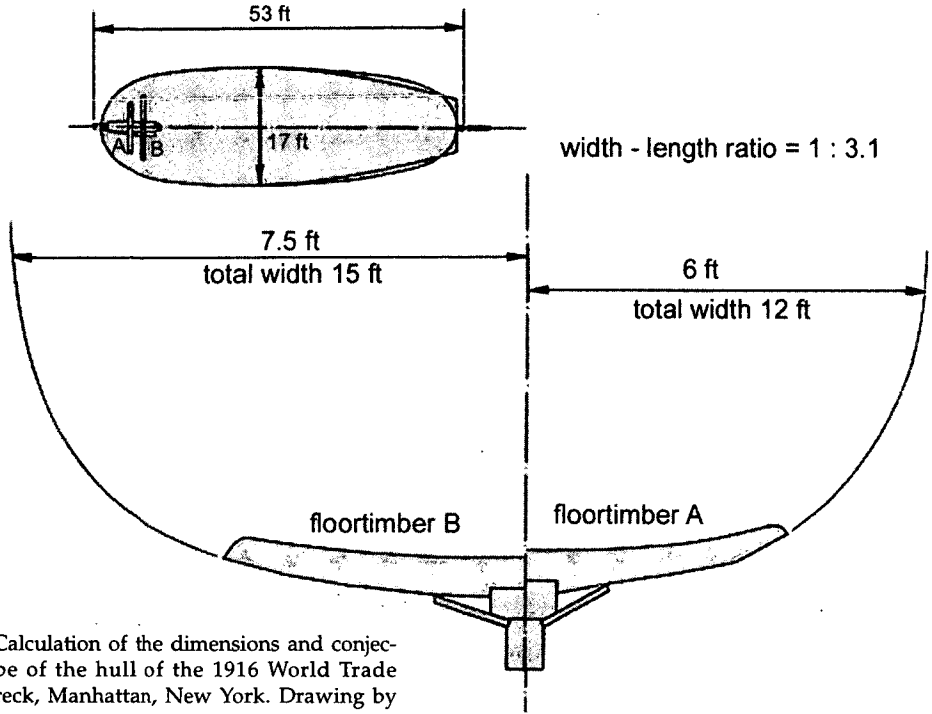
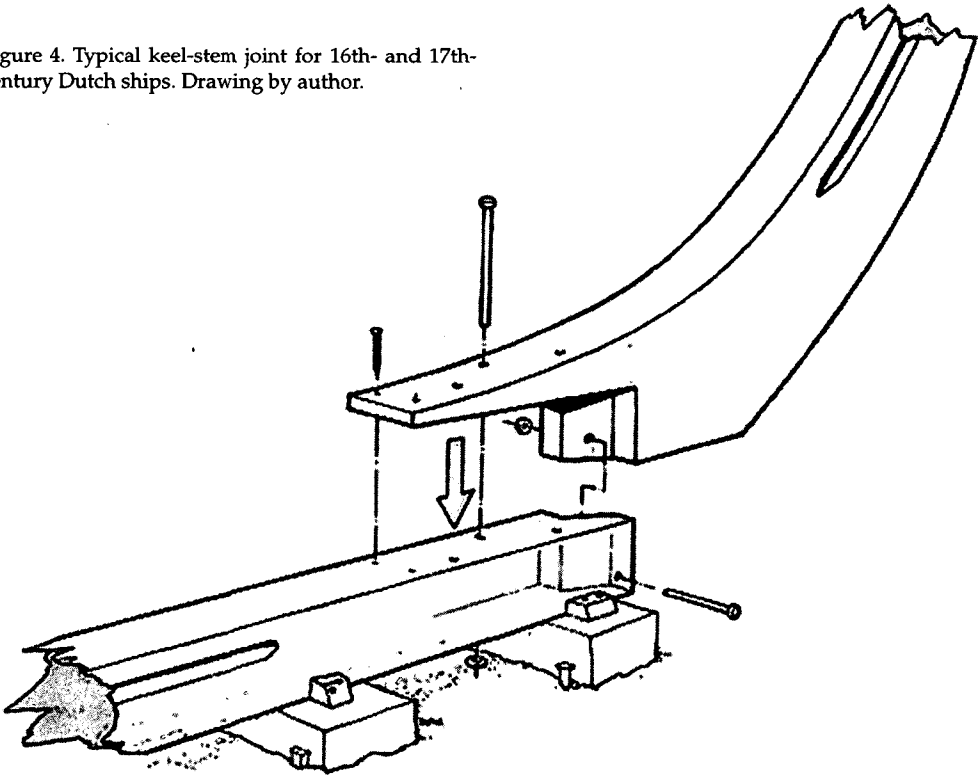


Figure 3. Calculation of the dimensions and conjectural shape of the hull of the 1916 World Trade Center Wreck, Manhattan, New York. Drawing by author.

Figure 4. Typical keel-stem joint for 16th- and 17th-century Dutch ships. Drawing by author.



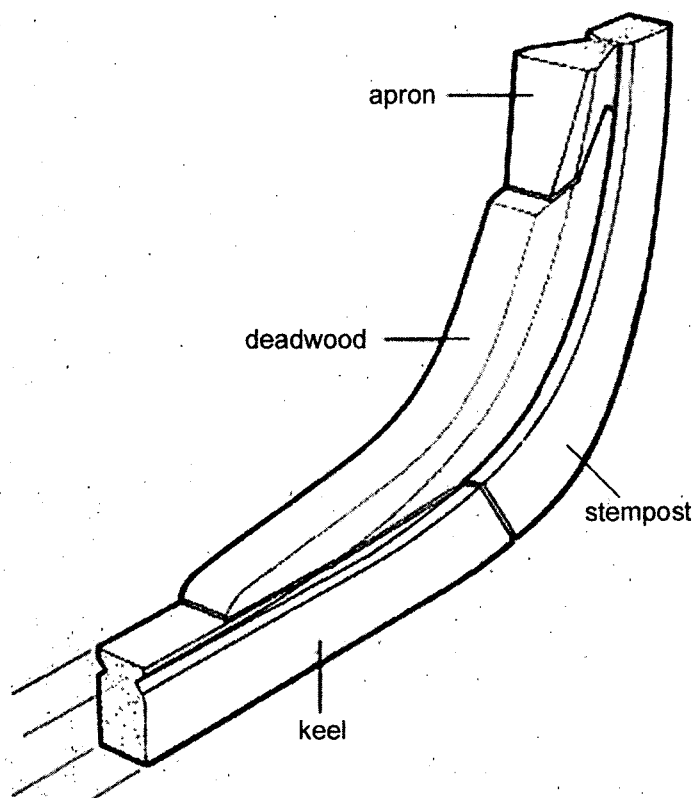


Figure 5. Split rabbetted keel and stem connection of a working boat from Sussex, southern England. Drawing by E. McKee.

thickness of the frames. This indicates this was an inland waters ship instead of a sea-going ship. In fact, the flat-bottomed Brown's Ferry vessel recovered from the Black River in South Carolina, while it was constructed without a keel, exhibits a number of features that are akin to the structural details observed in the World Trade Center wreck. The Brown's Ferry vessel dates from around 1740; it carried a 25-ton cargo of bricks and was a 50-foot merchant vessel designed for river and limited coastal travel (Albright and Steffy 1979).

In summary, this writer comes to the conclusion that the World Trade Center wreck was most likely a river vessel with a length of about 55 feet and with a loading capacity of about 44 tons. The ship was built in the area, and the shipwright was probably of south coast English origin. During the Dutch colonial period, from 1609–1664, it seems unlikely that an English shipwright would have settled in New Netherland, so it is believed this ship

was built after 1664. The presence of the gun found in 1967 where it was supposed the wreck had been located earlier, rather than providing evidence for a 17th-century date, is another interesting reason to conclude that the ship is of a later date in the 18th century, if, in fact, this cannon actually came from the wreck. The bronze swivel gun is of a well-known type, made by the famous gun maker S. Crans in Amsterdam. These guns were not made before 1715. Very similar breech-loading swivel cannons made in Amsterdam were recovered from the wreck of the Dutch warship *Curaçao*, sunk in 1729 off the coast of the Unst in the Shetland archipelago (Sténuit 1977: 114–115). Also, considering that the area where the ship was found is a landfill made between 1763 and 1767, one would not be surprised to find that the ship was left there between 1715 and 1763.

In response to the arguments developed by earlier researchers, this writer concludes: 1) flat-bottomed inland waters ships were also built in England; 2) dating by C¹⁴ method is not very precise, certainly not 50 years ago; 3) in the Netherlands the production of iron for construction did not change very much between 1600 and 1800, thus determining the date of a shipwreck by analyzing the composition of iron has not given much reliable information so far; 4) the small artifacts were possibly dumped there as part of the landfill process and were perhaps brought from elsewhere on Manhattan; and 5) the evidence of burning in the wreck is explainable. This ship could have been abandoned on the Manhattan shoreline because it was worn out and then burned in order to dispose of the upper parts of the vessel.

For a reliable confirmation of these conclusions, dendrochronological research using a small wood sample from the wreck should be conducted. This could determine whether the wood is of American or European origin and might provide an exact year when the wood was cut. While this research has unfortunately not yet been possible, these preliminary con-

clusions do not in any way diminish the significance and value of this interesting wreck. Very few, if any, remains of other vessels as early as the World Trade Center wreck have been found in the New York City area or farther up the Hudson River. The World Trade Center wreck undoubtedly has a very interesting history of its own that can be revealed only as research continues.

The location where the World Trade Center wreck was found indeed has a very interesting mercantile and maritime history. In 1700 the shoreline of the Hudson River ran through what later became the middle of the World Trade Center. The two World Trade Center towers were just west of the original shoreline. Most of the World Trade Center site is within the land that was originally granted on April 25, 1644, to Jan Jansen Damen, who arrived from the Netherlands in 1634 and became a wealthy merchant. He was an owner of the ship *La Garce*, a privateer. Later, in the 18th century this area became a busy waterfront and produce market area. The markets included the "Oswego Market," also called the "Hudson Market" or the "Bear Market," built in 1771. To the south was Thurman's Slip, built before 1733, the Crown Market, and the ferry to Paulus Hook, New Jersey, established in 1764. John Thurman built a new market house in the Crown Market in 1771, but it was destroyed in the great New York fire of 1776 (Huey 2002). The World Trade Center wreck most likely was a river vessel that hauled produce to and from this waterfront area.

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