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AFTER THE ATTACKS: THE METHOD

# AFTER THE ATTACKS: THE METHOD; Terrorists Were Well Trained, But Not Necessarily in Flying

By JAMES GLANZ  
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Whoever planned the airplane attacks on the World Trade Center and the Pentagon was knowledgeable about aircraft, architectural engineering, aviation fuel and the characteristics of planes in flight, several experts said yesterday. But there was disagreement about whether the hijackers themselves needed any special expertise beyond rudimentary ability at the controls.

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The experts, some of whom are involved in assessing the damage at the World Trade Center, are piecing together clues to form a sort of composite sketch of the terrorists who planned and carried out the devastating assault.

The clues involve the circumstances of the attack, including the jets that were chosen, the amounts of fuel they carried, the places where the planes struck and even details about the ways in which they were piloted in their final moments.

"The people who carried out this terrible thing did think and did study the events in several dimensions," said Dr. Oral Buyukozturk, a professor of civil engineering at the Massachusetts Institute of Technology. Dr. Buyukozturk, an expert on structures and materials, cited "the dimension of creating a bomb out of a jetliner and the manner of the explosion," as well as "the type of structure they were dealing with."

Darryl Jenkins, director of the Aviation Institute at George Washington University, said that those who carried out the attack were as sophisticated as those who planned it. "These guys knew what they were doing down to very small details," he said. "Every one of them was trained in flying big planes."

A number of aviation experts agreed, saying the hijackers must have been experienced pilots.

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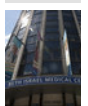
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But others said that little could be concluded solely from the way the big Boeing jets were piloted in the air, in part because the hijackers did not take the controls until the planes were airborne, after the more challenging takeoffs.

Dr. John Hansman, a professor of aeronautics and the director of the International Center for Air Transportation at the Massachusetts Institute of Technology, compared the pilots to the poorly trained kamikaze pilots of World War II, saying that because the day was strikingly clear, the terrorists did not have to do more than "find the Hudson River and fly south."

The most obvious element of the planning, but probably the simplest, involved the coordinated hijackings at several airports, said Mary Schiavo, inspector general for the Transportation Department from 1990 to 1996. Knives, the weapons thought to have been used by at least some of the hijackers, could have been disguised to elude scanners, or -- more likely, Ms. Schiavo said -- airport employees could have been involved in the plan.

Another crucial element was the choice of the planes. The two that struck the towers were wide-body jets, and with maximum weights of some 400,000 pounds, would have a devastating impact. Because all the planes were beginning transcontinental flights when they were hijacked, they would be carrying abundant fuel, which would create a fire hot enough to weaken and buckle steel columns in the towers.

After a terrorist bombing of the World Trade Center in 1993, Leslie E. Robertson, one of the structural engineers involved in the original design of the towers, said they had been designed to withstand the impact of a fully fueled Boeing 707. The jets that struck on Tuesday were about half again as large.

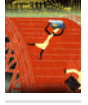
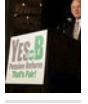
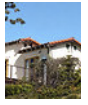
Mr. Robertson, who is traveling in Japan, has been unavailable for comment, but yesterday William Faschan, a partner at Mr. Robertson's firm, clarified his 1993 comments.

Only the initial impact and not any subsequent fire was considered in that analysis, Mr. Faschan said. "The matter of a fire after such an event, I think, goes beyond, perhaps, even today, what engineers can reliably, analytically predict," Mr. Faschan said.

Whether the terrorists deliberately chose large jets and counted on the fire damage cannot be determined. But John Nance, an airline pilot, author and aviation analyst, said the direct hits on the two towers and on the Pentagon suggested to him that the pilots were experienced fliers.

The smooth banking of the second plane to strike the towers supports this point of view, Mr. Nance said. He added that precisely controlling a large jet near the ground, necessary for the Pentagon attack, also required advanced skill.

"There's no way an amateur could have, with any degree of reliability, done what was done yesterday," Mr. Nance said.



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Just what level of technical expertise the terrorists were able to draw on is still a matter of debate, said Aine Brazil of Thornton-Tomasetti Engineers, a firm that is helping the city assess damage around the World Trade Center site.

"I would think that there was some knowledge of at least physics or demolition or, potentially, structural knowledge," Ms. Brazil said.

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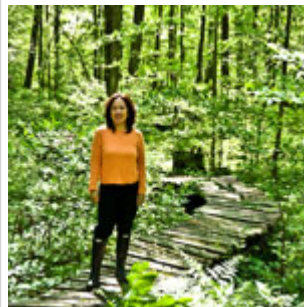
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