

exhaust velocity of nearly 30 mph at a distance of more than 100 feet behind the airplane.

Exhaust temperature was another dangerous factor, with heat of as much as 700 degrees F emanating from the engine exhaust aperture, diminishing to 150 degrees F at the tail of the airplane. Jet exhaust velocity at full takeoff power was measured at a formidable 1,000 feet per second at the exhaust cone of the engine nacelle. At that velocity, unprotected cars driving on a perimeter road behind a jet

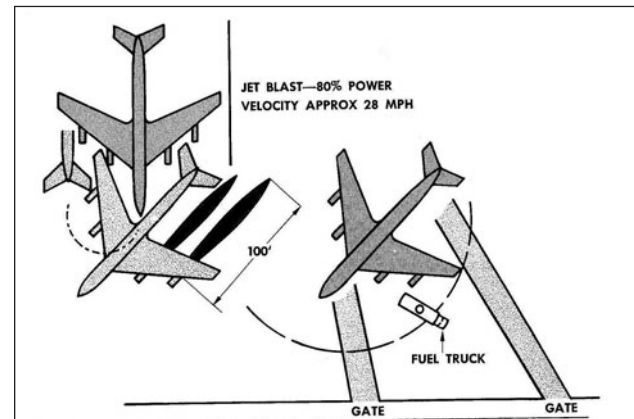


Chart from the Boeing 707 operating manual shows an added element of danger with the jet's exhaust blast being a factor in turning clearances. It is evident that the concept of enclosed jet bridges for passenger loading and unloading had not been thought of when this artwork was created in 1956. (Mike Machat Collection)

at full takeoff thrust would be blown over like a child's toy. The front of the jet engine also posed a potentially fatal hazard to ramp personnel with overpowering suction from the air intake replacing spinning propeller blades as the number-one ground safety threat.

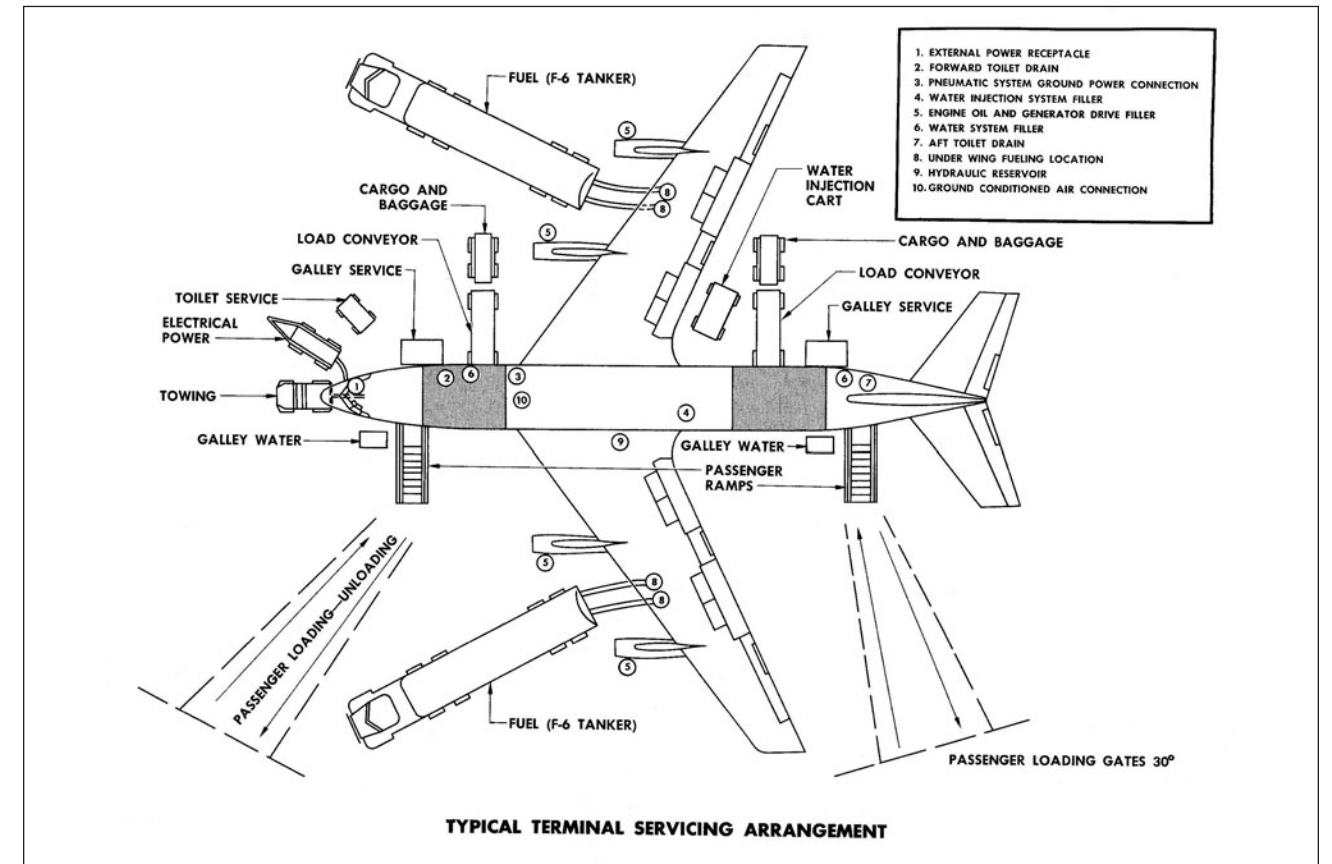
Fueling the new jetliners would also be a different experience for ground handlers. The days of placing ladders against wing leading edges, then climbing up and walking out on top of the wing while trailing a fuel hose and nozzle would soon be ending. The first big advance for fueling the big jets was underwing fueling capability, meaning that two men, each operating a 6,000-gallon F-6 fuel tanker truck, could hook up underwing hoses and fuel the entire airplane in one continuous operation. This was a welcome change for ground crewmen having to walk around on top of the wings, opening fuel-tank caps and then filling one tank at a time on a Constellation or DC-7.

Further advances would eliminate the fuel truck altogether, as underground pipes fed fuel stored in large airport fuel-tank "farms" to valves and hose hook-ups located in the ramp itself just below the parked airplane's wings. This way, ramp fueling personnel could plug hoses from these outlets into small mobile pumping units and then connect those directly to the underwing attach points of the jetliners, thus reducing the amount of large vehicles needed to service the airliner.

Speaking of vehicles, new types of ground equipment would also supplement, and in some cases eliminate



Graphically demonstrating the transition period from props to jets, we see a TWA Boeing 707 at Chicago-O'Hare surrounded by a sea of ground equipment as listed on page 99. Manually pushed boarding stairs exposed to the elements soon gave way to fully enclosed and extendable jet bridges attached directly to the terminal building. (Jon Proctor)



This schematic shows the proper location relative to the airplane of all the ground equipment necessary for the new 707. Compare this layout to the photograph (on page 98) of an actual TWA 707 being serviced at O'Hare Airport in Chicago. (Mike Machat Collection)

altogether, standard prop-era ramp vehicles such as electrical power carts, lavatory trucks, and baggage-handling tugs. Engine-water trucks would be required to pump aboard the alcohol and distilled water mix for water-injected takeoffs. Galley delivery trucks the size of small moving vans would back up to the airplane, their aft sections rising to the height of the cabin floor, to deliver meals and other galley provisions directly into the cabin. Large galley loading doors designed into the airframe would define how differently the new jets would be operated from all the other airliners that had come before.

These new galley doors were located fore and aft on the right-hand side of the airplane at main cabin floor height. Also on the right-hand side but below the cabin floor were large forward and aft baggage doors that allowed baggage and freight to be loaded aboard conveyor belts angled up to the open baggage bay. Ground power connections were also located on the right side of the jetliner's nose to facilitate ramp personnel operating safely away from passengers loading on the left side of the airplane.

As originally intended before the jets entered service, each airplane would be surrounded by an armada

of ground vehicles upon arrival at the gate and while being turned around for its next flight. A typical fleet of ground vehicles and service apparatus required for handling the new jets parked at a terminal was expected to include:

- External power cart
- Forward lavatory service truck
- Aft lavatory service truck
- Forward baggage bay cargo and baggage conveyer truck
- Aft baggage bay cargo and baggage conveyer truck
- Engine-oil and generator-drive filler service
- Ground tug for towing or pushing on the ramp
- Potable-water service truck
- Right wing F-6 tanker truck
- Left wing F-6 tanker truck
- Forward door passenger-loading ramp truck
- Aft door passenger-loading ramp truck
- Ground air-conditioning truck
- Water-injection service truck
- Truck for engine "air-starts"