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**Aircraft Industry Knowledge**

**1. Boeing**

1. Four Boeing Aircraft safety officials attended the Pacific Coast Shipyard Safety Conference in Seattle in 1945. The hazard of asbestosis from insulation dust was addressed in two presentations on occupational disease hazards.

2. Boeing joined the Industrial Hygiene Foundation of America in 1956 and continued its membership in the organization through at least 1970. See IHF records, attached as **Exhibit 2.** As such, Boeing would have received IHF publications including the Industrial Hygiene Digest which contained numerous abstracts of articles on the lethality of asbestos. Boeing officials could also have attended meetings and conferences where asbestos diseases and the responsibilities of manufacturers to warn concerning hazards associated with their products were discussed.

3. Boeing officials Wilson Applegate, Walter Poppe Jr, and M Chain Robbins were members of the American Industrial Hygiene Association in the late 1950s. (1959 AIHA Membership Roster). The AIHA distributed a monthly journal to its members that included articles about hazards associated with asbestos exposure. See, e.g., the Industrial Hygiene Guide on Asbestos, American Industrial Hygiene Association Journal, Vol. 19, No. 2 (April 1958).

4. Boeing attended the Thirteenth International Congress on Occupational Health in July 1960. Asbestos was a topic of several of the presentations given at that meeting.

5. Boeing's Howard Kienle and Fred Denton were listed as participants at the the Aerospace Section of the 1957 annual meeting of the National Safety Council (National Safety Congess), where one presentation raised concern over the cancer hazard of asbestos. During the 1960s, Boeing's Safety Director served as Senior Program Chair for the Aerospace Section of the National Safety Council, and Boeing's Chief Health &

Safety Officer, W.C Applegate—who was also a member of AIHA in 1959—served as the Industrial Hygiene Chair of the NSC Aerospace Section. The NSC held an annual meeting, called the National Safety Congress, and then disseminated a publication called Transactions to its members, where it memorialized the topics that were discussed at the meetings. Topics discussed at the annual meetings and in Transactions during the 1960s included: the association between asbestos exposure and cancer, asbestos hazard control methods, types of asbestos-containing products that released asbestos, and occupations that were at risk for asbestos exposure.

6. In light of the information available to members of the aerospace industry, throughout the 1940s, 1950s, and 1960s, about the potential for asbestos to cause diseases, including cancers; as well as the information that emerged during that time about the various occupations that were at risk for developing asbestos-related diseases, it is my opinion that Boeing, a major aircraft manufacturer, either knew or should have known, that the asbestos containing components of Boeing's airplanes had the potential to cause grave harm to mechanics repairing Boeing aircraft who were exposed to dust that might be generated by the handling of this material. By the late 1940s, it was well established in the literature and well-known by the asbestos industry and its major customers in various industries, that asbestos dust was toxic and carcinogenic. In addition, by the early 1950s it was recognized in the medical and scientific literature that individuals could contract asbestos-related diseases as a result of relatively low exposures to asbestos dust.

**2. Curtiss-Wright**

1. A paper prepared by Curtiss Aircraft was presented at the National Safety Congress in 1931.
2. Curtiss-Wright's DG Welch was an officer of the National Safety Council's Aeronautical Section in 1941-42.

3. JC Sewell of Curtiss-Wright was listed in the proceedings of the National Safety Congress in 1957.
4. John Donovan of Curtiss-Wright was a member of the AIHA in 1959. The *AIHA Journal* had publications including the Industrial Hygiene Guide on Asbestos (1958) and Marr's paper on shipyard asbestos hazards (1964).

**3. North American Aviation**

1. R Wilkins and Richard Dentnor were the representatives of this company listed in proceedings of the 1957 National Safety Congress.
2. Dr. Benjamin Kaplan of North American Aviation was a member of AIHA in 1959. The *AIHA Journal* had publications including the Industrial Hygiene Guide on Asbestos (1958) and Marr's paper on shipyard asbestos hazards (1964).

**4.Pratt & Whitney**

1. Pratt & Whitney Safety Supervisor AM Chapman taught about safety engineering and industrial health in a course on industrial hygiene at Harvard in 1949. Among the subjects discussed in the course was asbestosis.
2. This company had 7 employee members of AIHA in 1959 (Richard W. Belden, Charles De Simone, Bernard Havens Jr., Francis Lally, JA Martin, Thomas Mannix, and Gordon Wheeler). The *AIHA Journal* had publications including the Industrial Hygiene Guide on Asbestos (1958) and Marr's paper on shipyard asbestos hazards (1964).

**5. Lockheed**

1. Dr. FE Poole, Medical Director of Lockheed, spoke about occupational diseases at the 31st National Safety Congress in 1942.
2. Lockheed's Carl Irwin, Joseph Griffith, and Franklin Knight Jr. were members of AIHA in 1959. The *AIHA Journal* had publications including the Industrial Hygiene Guide on Asbestos (1958) and Marr's paper on shipyard asbestos hazards (1964).
3. Then US Navy industrial hygienist Carl Mangold has testified (*Kinsman*, deposition 10/16/01) that he went to Lockheed shipyard in 1965-66 and discussed Marr's report and Selikoff's report in *JAMA*, stopping by the safety department every 3 months and also meeting with upper management.
4. Lockheed, as an owner of the shipyard from 1959 on, was subject to the *Minimum Requirements for Safety and Industrial Health in Contract*

*Shipyards* issued in 1943 by the US Navy and the US Maritime Commission. This document called for control of asbestos hazards in shipbuilding and ship repair.