



**PDC INC. ENGINEERS**

Transforming Challenges into Solutions



## Elmendorf AFB 3<sup>rd</sup> Air Force Composite Medical Facility

This \$163 million, 430,000 sf combination hospital and medical treatment facility was designed to the most rigorous seismic criteria used in Alaska and incorporated the advanced techniques of Integrated Building Systems for efficient handling of the complex suite of medical and building mechanical systems.

For the structural systems, PDC undertook a significant effort to determine the most efficient framing arrangement. In the end, a lightweight concrete slab over steel members was chosen. We used the latest LRFD design techniques to optimize the composite steel/concrete framing. We also participated in the initial studies of the lateral load resisting system. This system incorporated very large moment resisting frames in both directions in order to maintain operational and renovation flexibility in the architectural floor layout.

The initial phase of this project included an evaluation of the existing five-story concrete building. We performed a dynamic structural analysis for this highly irregular structure using response spectra techniques. This analysis was performed using the procedures presented in the Armed Forces Technical Manual TM 5 809 10 1 "Seismic Design Guidelines for Essential Buildings." These guidelines include a two-level approach to dynamic analysis. The building is designed to perform elastically under a moderate earthquake, and the post yield structure is investigated for a severe earthquake. The analysis was performed using the CSI "ETABS" computer program.

PDC provided mechanical and electrical engineering services for the Central Plant Facility and connecting link, ambulance garage, and site utilities design, as well as the complete and integrated fire detection and alarm system for the hospital and its central utility building. Our cold regions expertise contributed to the overall facility design. Additionally, we produced the Utility and Energy Source Analysis, a thorough survey and analysis of existing facilities condition and code compliance that included addressing the issues related to placing decommissioned portions of the existing facility in a contingency standby condition.

Our responsibilities continued through construction phase, for which we provided support services.

### Client:

United States Air Force

### Location:

Elmendorf AFB, Alaska

### Project Completion:

1992

### PDC Involvement:

- Structural Engineering
- Mechanical Engineering
- Electrical Engineering

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