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Ceiling-Mounted Stowage Bin on New-Generation Narrow-Bodied Aircraft

Enidine Air Spring Application

By: Tom Miller

Situation Overview

Cabin space on today's commercial aircraft is at an absolute premium. Every cubic inch is accounted for with items such as passenger seating, stowage area for food and beverage service and passenger luggage. This leaves little additional storage room for emergency medical and life raft equipment.

Application Opportunity

A major air frame manufacturer decided to design long, flat compartments into the ceiling of the aircraft where emergency equipment could be stowed. The bin design was complex and ITT Enidine Inc. was asked to develop a functional concept for control of the bin as it rotated open and shut. The manufacturer was planning to offer these bins as an option. A maximum of seven ceiling bins can be installed in a single aircraft.

The ceiling bin design is large, enabling it to accommodate up to 300 pounds of contents. The designers were concerned about the speed that the bin would lower under varying load conditions and the ease with which the crew could push a fully loaded bin upward to latch flush with the ceiling.

Product Solution

ITT Enidine Inc.'s experience with actuator/rate control products for aircraft interiors led us to develop a special product which controlled the door safely under a wide range of loads. A pair of long stroke rate controls installed on each door provided hydraulic damping as the bin was lowered. They controlled the speed of the bin from between three and eight seconds, both when the bin was fully loaded and completely empty.

ITT Enidine Inc. also supplied a counter-balance spring actuator on either side of the bin that provided lift assistance when the bin was being pushed upward. As the bin is lowered, the spring is compressed so that when a crew member pushed the bin up, the spring makes it easier to close.

The application of proven hydraulic rate controls also prevented the bin from a free-fall downward once the latch was released. Older ceiling-mounted bins could not provide this assurance, resulting in several crew member accidents, creating a liability issue for the airline and air frame manufacturer.

Project Results

ITT Enidine Inc.'s design concept and product development proved successful. Prototype units were installed in a mock-up bin and performance tested. The air frame manufacturer approved ITT Enidine Inc. as a qualified source of supply. Since then, the air frame manufacturer has continued to promote this ceiling bin option with their airline customers and have been successful in selling the option.

The solution required a focus on both damping rates and counter-balance loads. When the development was complete, both the air frame manufacturer and the airline were pleased with the control of the ceiling-mounted bin.

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