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C. GILL

1367

General Purpose

1076A

1044

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1367B

1166

1266

TION

Merwyn C. Gill Parent

Puncture

Specialty

The Family Tree

~ Cargo Iners ~

Established

THE AVIATION INDUSTRY WAS BORN ON A COLD, WIND-SWEPT HILL OVERLOOKING THE VAST ATLANTIC OCEAN.

Many people had tinkered with the notion of flight and years of experimentation finally paid off in 1903 when the Wright Brothers took to the air. For 12 stunning seconds, the "Flyer" became the first pilot-controlled, power-driven, heavier-than-air machine to sustain flight.

In the beginning, airplanes were built by amateur enthusiasts and primarily constructed of wood, cloth and wire. Function was initially an afterthought, but history intervened.

The onset of World War I stoked interest in other uses for these aircraft. By the time Lindbergh made his famous trans-Atlantic flight, the idea of using airplanes for commercial transportation had taken root.

The first commercial airplanes were supported and subsidized by the Postal Service for transporting mail. The cash flow that was generated helped fledgling airlines to offset their losses from passenger and freight travel.





World War II brought advancements to aeronautical designs and increased public acceptance of air travel. The first commercial cargo planes utilized ABS, aluminum and plywood in their baggage and cargo compartments. However, these materials were undesirable due to weight and rigidity. When Douglas Aircraft thought to substitute fiberglass reinforced plastics (FRP), destiny brought M.C. Gill to the aviation industry.

By the mid '40s, Merwyn C. Gill's company was in its infancy. M.C. was experimenting with various consumer plastics when he was approached by Convair.

In 1946, he received an order for fiberglass cloth reinforced polyester (FRP) cargo liner. The liner that M.C. Gill developed was a composite material with multiple plies of fiberglass cloth (for strength) and a matrix resin. The cloth is embedded in the resin to translate the properties of the reinforcement. Convair needed a unique material for their 240/340/440 series planes. The company required 60" wide polyester laminated sheets, a requirement no one else could fill. Intrigued by the challenge, M.C. secured his future by using a wet layup technique to successfully complete the order for Gillfab 1038.

Gillfab 1038 had low specific gravity, excellent corrosion and dent resistance, good aging and fatigue properties, satisfactory flame resistance and was repairable. Gilliner 1038 was constructed of a plain weave 1500 style fiberglass cloth with no "finish" and polyester resin. The "E Glass" cloth was a relatively low-cost reinforcement with high mechanical strength properties, good moisture, chemical and heat resistance.

Early resins contained chlorinated waxes and an assortment of additives to meet fire extinguishing demands. Product improvements quickly followed and, while M.C.'s small operation was expanding into a growing business, the product offering grew.

M.C. GILL CORPORATION CARGO LINER

In 1951, Douglas Aircraft Company commissioned M.C. Gill Corporation to create a cargo liner with improved mechanical properties (improved rigidity) in 48" wide sheets. M.C. Gill Corporation upgraded the product with satin weave style fabrics which increased bolt pullout at the edges. White pigments were added to the resins and reductions to surface porosity improved the integrity of the sheets. Puncture resistance was achieved by a breakthrough in resin formulation. This increased the weight, but weight was not a critical concern in the early 1950s. Gillfab 1018 became a Douglas staple offered in 48" and 60" widths. This type of general purpose liner helped M.C. Gill Corporation establish the standard for all future cargo liners.



Early press

Over the next decade, several new products evolved. This crystallized the corporation's commitment to customize products for each client's specific needs. The industry flourished and created new opportunities for growth.

New types of liners emerged with new resins, new manufacturing processes, additives and combinations of E and S Glass fabrics. S Glass offered higher tensile strength and greater puncture resistance but was more costly than E Glass. The new high-impact liners exhibited both superior impact and puncture resistance. These products met a wide range of specifications and M.C. Gill Corporation became the preferred supplier for Douglas, Boeing, Lockheed, Convair, United and other major airlines.



Early resin reactor

1 An Overview of The Air Cargo System, International Civil Avia Organization, hhhtp://ntl.bts.g "Total world scheduled air cargo traffic experienced a sharp build-up in 1947 to 1951 and a growth of 100% in the decade of the 1950's."

M.C. GILL CORPORATION CARGO LINER

To ensure a consistently high-quality product, M.C. Gill Corporation pioneered impact test fixtures to quantify comparative performance values. Manufacturing processes were improved, additives and cloth weaves were upgraded, and resin technology evolved.

Polyester resins were a fundamental ingredient to the first cargo liner designs. They are low cost, easy to process and have fast cure times with no out-gassing. Polyester resins offer fairly high mechanical strength and do well in highimpact applications. They do, however, emit high smoke and some toxic emissions in a fire.





Impact head



Tensile fixture



Tensile fixture

The introduction of large multi-engine jet aircraft like the DC-10 and Boeing 727 required even greater weight reductions. When Gillfab 1038 was developed, it was ideal for the Convair 240. The Convair weighed a mere 25,445 pounds². A typical DC-10 weighed a staggering 121,198 pounds, so material requirements were amended.



Impact and puncture resistance remained of prime importance, while specific new characteristics (increased abrasion and shear resistance, improved rigidity for a better after-installation appearance, higher flame resistance, enhanced color uniformity, reduced surface blemishes and discoloration, zero surface porosity) became increasingly critical.

Commercial aircraft carriers realized this combination of improvements would greatly prolong service life. In the late 1950s M.C. Gill Corporation reformulated Gilliner 1066 and it quickly became the liner of choice. Gilliner 1066 is a woven fiberglass cloth-reinforced polyester laminate categorized as a general purpose liner. It offers high puncture resistance and a proven history of in-service durability.



As social and political trends evolved, jet aircraft grew in popularity. Designers of these aircraft required more stringent material specifications. Material requirements were met by higher performance reinforcements. The resulting liners offered better abrasion, shear, puncture and flame resistance, increased rigidity and, most important, additional weight reductions. M.C. Gill Corporation also developed several specialty liners, promising the elimination of surface blemishes and porosity.

Rising oil prices in the 1970s and growing concerns about smoke and toxicity, led to experimentation with phenolic resins. In 1983, Air Canada Flight 797 (a DC-9) had an in-flight fire. Twenty-three of the 41 passengers succumbed to smoke inhalation. The FAA (and most manufacturers) began to realize that flammability, toxicity and smoke resistance should be a critical requirement for all liners. Well before the Aviation Safety and Research Act of 1988, M.C. Gill Corporation led the industry by producing the first cargo liners constructed with phenolic resins and various fiberglass substrates that met smoke, toxicity and puncture resistance requirements. Airframe manufacturers became more vocal about specific performance requirements vs. whatever was available in the market.

Phenolic resins support the weight reduction requirements, are relatively low in cost, produce low smoke emissions and are resistant to burning. Phenolics have good mechanical strength and fair puncture resistance when modified. Unlike the polyester resins, phenolics require high-temperature curing, take longer to manufacture and tend to emit volatiles during curing.

Mindful of their customers' ever-changing material requirements, M.C. Gill Corporation once again drew on its years of experience in developing new breakthrough cargo liners.

M.C. GILL CORPORATION CARGO LINER

Domestic carriers relied on M.C. Gill Corporation to exceed their transforming material demands. The McDonnell Douglas MD80 required a cargo liner with enhanced mechanical properties, low flammability, smoke and toxicity resistance. In 1985, Gillfab 1167, constructed of fiberglass cloth and phenolic resin, was qualified to DMS 2226. A year later, Boeing presented a similar set of needs for their 737 series and Gillfab 1367 was qualified to BMS 8-223, CL 2, Gr B. Both these liners exceed the FAA's Federal Airworthiness Regulations (FAR 25.853-b and FAR 25.855-a) for performance when exposed to fire³. Overseas, Airbus was adopting a different design approach. The A320, conceived to compete with Boeing's 727 and early 737 variants, incorporated dramatic overall design modifications aimed at severe weight reductions. The result was a 50% reduction in fuel consumption⁴. Airbus discovered that sandwich panels would fulfill their needs and qualified Gillfab 4422. Gillfab 4422, qualified to Airbus specification 2550 M1M 0008 00, consists of woven fiberglass-reinforced phenolic resin facings bonded to a Nomex[®] honeycomb core. Gillfab 4422 is a high-impact-resistant sandwich panel used in

It's worth noting that many products (such as Gillfab 130 1367 and Gillfab 1367A) are to numerous OEM specificat cargo compartment sidewalls, ceiling, partition walls, and decompression panels. This product provides superior impact strength (20 times greater than the Airbus specification), high mechanical strength, corrosion resistance and low smoke and toxic emissions in a fire.

This approach allowed Airbus to apply modern composite technology to meet their broad performance requirements.

In keeping with its commitment to continuous improvement, M.C. Gill Corporation's R&D Department continued to optimize the performance of its new phenolic cargo liners with hybrid liners that combined different styles of E and S glass.

Gillfab 1367A (derived from Gillfab 1367, the highest puncture resistance of all M.C. Gill Corporation lowsmoke laminates) incorporated similar physical and mechanical properties, a 1-millimeter Tedlar[®] overlay on the face and a lower finished cost.

> 3 The Here and Now, *Doorway*, Volume 27, Winter 1990, pg 5

> 4 Airbus 320, www.wikipedia.org, 12/20/06

M.C. Gill 56, Gillfab still qualified ions today! (See pages 12 and 13)



As the new millennium approached, aircraft manufacturers were incorporating more composites into their designs. One example is the Boeing 777. Originally conceived as a larger version of the 767, it grew to 85% of a 747 and became the world's largest twin engine plane. To achieve this, Boeing had to achieve major reductions in structural weight. Largescale use of composites (9% by weight) and other breakthrough materials allowed Boeing to shave 5,800 lbs for a finished aircraft weight of 307,000 lbs.⁵ Gillfab 1367B, a phenolic laminate, was developed specifically for the Boeing 777 to provide superior impact strength, low smoke and toxicity and low weight (20-25% lower than 1367 & 1367A).

Supporting the Boeing 737 program, Gilliner 1076B, M.C. Gill's newest polyester reinforced specialty liner, provided high wear and abrasion resistance for areas such as the lower 15 inches of sidewalls in the baggage compartment.

Each new liner is infused with unique features and properties. Addressing diverse customer needs goes beyond the product itself. M.C. Gill Corporation offers its cargo liners in sheets and rolls of varying thickness, lengths and widths. Special attention is given to each request. Our staff is highly trained to expedite the order process with efficiency and accuracy, and particular attention is given to A.O.G's. Our industry has experienced wars, deregulation and the greatest technological developments in history. Since the first cargo liners left our plant, the M.C. Gill name has been synonymous with cutting-edge innovation. The first six years of the 21st century have presented our industry with some of its greatest challenges yet:

- the tragic events of September 11, 2001
- multi-digit increases to the cost of jet fuel (from \$0.78 cents per gallon in 2000 to \$1.81 cents per gallon in 2006)
- new environmental regulations
- unexpected surges in regional demand
- natural disasters
- geopolitical factors⁶

Rather than succumb to these daunting events, M.C. Gill Corporation's R&D Department defied the usual product-specific development models when they began to explore new resins, hardeners, additives and reinforcements. New resins offered the possibility of faster curing, superior toughness and better visual and mechanical properties derived from unique chemistry. M.C. Gill Corporation's goal was to meet the requirements of BMS 8-223 Class 4 types with considerable weight reductions; Gillfab 1367B served as a baseline. With the trust and firm commitment from the shareholders, the R&D Department adopted a new strategy and began to systematically evaluate new materials. Unbound by traditional product, schedule and customer requirements, the R&D scientists created products based on science and capability and *then* determined an application. The result is the latest addition to our family of cargo liners, Gillfab 1367G.

Gillfab 1367G is a low-weight, high-impact, low smoke, flammability and toxicity fiberglass reinforced phenolic laminate.



Impact test fixture

Designed as an aircraft cargo compartment liner, it features high mechanical strength, puncture and corrosion resistance with a white Tedlar overlay on the face side for reflectivity. Gillfab 1367G is qualified to Boeing BMS 8-223, Cl 5, Gr B and meets FAR Pt. 25, appendix F Parts I & III (burn through). This laminate uses lower aerial weight fabrics that reduce the weight and thickness of the liner while maintaining the properties of thicker, heavier products. This feature-rich product is ideally suited for today's state-of-the-art aircraft. Gillfab 1367G is the preferred cargo compartment liner for what promises to be one of Boeing's most successful new aircraft, the 787 Dreamliner.

Gillfab 1367G is the newest addition to our Family Tree of cargo liners, but it is far from our last. M.C. Gill Corporation promises to continue leading the industry with an ever-improving product line that will amaze and impress throughout this century and, possibly, into the next.



M.C. GILL OEM-QUALIFIED &

Manufacturer	Gill Part	Specifications	Construction/Key Characteristic
Proprietary	Gilliner 1066	Far 25.855(1)(a)(ii)	Woven fiberglass cloth-reinforced polyester laminate. General purpose, with high puncture resistance and proven history of in-service durability. Forerunner of all high-performance cargo liners.
Boeing	Gilliner 1076A	BMS 8-2 Class 1 Grade A .013", .023", .035", .045", .059", .070"	Woven fiberglass cloth-reinforced polyester laminate. General purpose, low cost with good mechanical strength.
Boeing	Gilliner 1076B	BMS 8-2 Class 3 Grade A .020", .045"	Woven fiberglass cloth-reinforced polyester laminate with wear resistant surface. High wear and abrasion resistant, designed for use in areas such as 737 lower sidewall which may be prone to wear-through over frame sections and/or fastener hole tear-out at attach points.
Boeing	Gillfab 1108	BMS 8-100 Class 1&2 Grade A .020", .030", .040", .050", .070"	Unidirectional fiberglass-reinforced epoxy laminate. High impact resistance.
Boeing	Gilliner 1266	Per Boeing Drawing	Woven fiberglass cloth-reinforced polyester laminate with .004" Gillcoat® surface. Superior abrasion resistance and good rigidity.
Boeing	Gilliner 1366	BMS 8-2 Class 2 Grade A .011", .020", .030", .045", .070"	Woven fiberglass cloth-reinforced polyester laminate. Superior impact resistance and edge bearing strength.
Boeing	Gilliner 1366T	BMS 8-2 Class 2 Grade B .011", .020", .030", .045", .070"	Woven fiberglass cloth-reinforced polyester laminate. Superior impact resistance and edge bearing strength. White Tedlar® overlay on face side for cleanability.
Boeing	Gillfab 1367	BMS 8-223 Class 2 Grade B .013 ^r , .020 ^r , .030 ^r , .040 ^r , .050 ^r , .070 ^r	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. Superior impact resistance, low smoke and toxicity.
Airbus	Gillfab 1367A	2550 MIM 000800 Airbus Types 1-5	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. A lower cost than Gillfab 1367 because of hybrid construction.
Boeing	Gillfab 1367B	BMS 8-223 Class 4 Grade B .011", .018", .026", .035", .045"	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. Superior impact strength, low smoke and toxicity. Lighter weight (20-25%) than 1367 and 1367A.

PROPRIETARY CARGO LINERS

Manufacturer	Gill Part	Specifications	Construction/Key Characteristic
de Havilland	Gilliner 1366	DHMS P1.42 CI B .020", .030", .040", .050"	Woven fiberglass cloth-reinforced polyester laminate. Superior impact resistance and edge bearing strength.
Lockheed	Gilliner 1366	LAC-C-22-1249 Class 3 .020", .030", .040", .050", .070", .125"	Woven fiberglass cloth-reinforced polyester laminate. Superior impact resistance and edge bearing strength.
Lockheed	Gillfab 1367	LAC-C-22-1249 Class 3 .020", .030", .040", .050", .070", .125"	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. Superior impact strength, low smoke and toxicity.
Mc Donnell Douglas	Gillfab 1100	DMS 1946 Type 1 .010", .016", .023", .030", .045", .060", .070", .090", .110", .120"	Woven fiberglass cloth-reinforced polyester laminate. High impact strength and rigidity.
Mc Donnell Douglas	Gillfab 1100G	DMS 1946 Type 2 .010", .016", .023", .030", .045", .060", .070", .090", .110", .120"	Woven fiberglass cloth-reinforced polyester laminate. High impact strength and rigidity. Color: green.
Mc Donnell Douglas	Gillfab 1167	DMS 2226 Type 1 Class 1 .016", .023", .030", .045", .060"	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. Superior impact strength, low smoke and toxicity, good rigidity. First high-performance phenolic cargo liner.
Mc Donnell Douglas	Gillfab 1367A	DMS 2419 Class 1 .013", .020", .030", .040"	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. Superior impact strength, low smoke and toxicity. Lower cost and weight than 1167 due to hybrid construction.
Boeing	Gillfab 1367G	BMS 8-223 Class 5, Grade B all types	Woven fiberglass cloth-reinforced phenolic laminate with white Tedlar [®] on the face side for reflectivity. High mechanical strength, puncture resistance and corrosive resistance. Color: white on face side, amber on back side.
Airbus	Gillfab 4422	2550 MIM 000800 ABD 0031	Woven fiberglass cloth-reinforced phenolic laminate with 1ml Tedlar [®] overlay bonded to Nomex [®] honeycomb core Superior impact strength (exceeds Airbus specifications by 20-30 times). High mechanical strength and corrosion resistance. Low smoke and toxicity.

M.C. Gill Corporation Appoints Director of Manufacturing and Director of Sales

DECEMBER 11, 2006





Randy Johnsen

Henry "Hank" Evers

I Monte, California – M.C. Gill Corporation is pleased to announce that Mr. Randy Johnsen has joined the organization as its Director of Manufacturing. Mr. Johnsen brings an impressive background with more than 27 years of aerospace experience to this position.

Most recently, Mr. Johnsen was Vice President of Operations – Aerospace for Henkel Corporation. Before that, he spent 15 years with Hexcel Corporation in increasing positions and responsibilities, leaving as Manager Matrix Resins – U.S. Mr. Johnsen began his aerospace composites career at Narmco Materials in Anaheim as an Engineering Group Leader.

Mr. Johnsen earned his Bachelors Degree in Chemical Engineering from Cal State University at Long Beach and his MBA from Pepperdine University.

Mr. Johnsen recently relocated to Southern California and his office is located at the corporate headquarters in El Monte, California. Mr. Johnsen can be reached at 626-443-4022 ext. 2315 or by email at rjohnsen@mcgillcorp.com.

M.C. Gill Corporation is also pleased to announce that Mr. Henry "Hank" Evers has joined the organization as its Sales Director. Mr. Evers brings more than 20 years of sales and marketing management experience to this position.

Most recently, Mr. Evers was Vice President of Sales and Marketing for Kittrich Corporation, a manufacturer and global distributor of stationery products. Previously, Mr. Evers was employed by the Thales In-Flight Entertainment and Avionics Group as Vice President over various functions including Sales, Marketing, Customer Service and Business Development. Prior to that, Mr. Evers was Director of Marketing for Sony TransCom and Vice President of Sales and Marketing for Pioneer Electronics.

Mr. Evers' office is located at the corporate headquarters in El Monte, California, and he can be reached at 626-258-2729 or by email at hevers@mcgillcorp.com.

M.C. Gill Corporation is the oldest, continuously operating manufacturer of reinforced plastics – called "composites" – in the world. We are vertically integrated and our corporation is privately held. M.C. Gill Corporation is headquartered in El Monte, CA.

THE M.C. GILL GROUP OF COMPANIES

Castle Industries

Announces Appointment of Director of Business Development

OCTOBER 13, 2006

Ontario, California -

to announce that

Mr. Bruce Brayshaw has joined the Castle

Industries team as

Development. Mr.

Brayshaw holds a

Director of Business

Castle Industries, Inc.

of California is pleased



Bruce Brayshaw

B.S.M.E. and M.B.A. from Ohio State University and brings more than 20 years of aerospace experience to this position.

Prior to joining Castle Industries, Mr. Brayshaw was employed by Brice Manufacturing where he was VP of Marketing and Sales. Previous to Brice, he was employed by Weber Aircraft and held various positions in engineering, manufacturing, program management and sales.

Mr. Brayshaw can be reached at his office in Ontario, California, at 909-390-0899.

Castle Industries, Inc. of California provides complete support for fabrication of precision assemblies, machined metal components and formed sheet metal parts. Castle Industries is a part of the M.C. Gill Corporation Group of Companies.



M.C. GILL CORPORATION

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ALCORE



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Alcore Overnight[™] Expedited Delivery email: overnight@alcore.ci

Alcore does not sell sandwich panels. Contact M.C. Gill for these products.



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www.mcgillcorp.com

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PAPER AND SHOULD BE RECYCLED



Looney Laws

In Salem, West Virginia, it is illegal to leave home without knowing where you're going.

Maine state law prohibits catching a lobster with your bare hands.

Exploding an atomic bomb in Chico, California, is punishable by a \$500.00 fine.

In Michigan, it's against the law to put a skunk in your boss' desk.

In Washington, D.C., it's against the law to marry your mother-in-law.

In Paulding, Ohio, it's illegal for a police man to bite a dog.

Know the typical lifespan of an animal?

Hippopotamus: 30 years Kangaroo: from 4 to 6 years Oyster: 6 years Earthworm: from 4 to 8 years Alligator: from 35 to 50 years Tarantula (female): from 25 to 30 years Tarantula (male): from 5 to 7 years

The Number of...

People in airplanes at any given time: 366,144 Pounds of fish a pelican can hold in his beak: 25 Yards a healthy slug can travel in a day: 50 Steps to the top of the Empire State Building: 1,860 Pieces of paper the IRS sends to taxpayers every year: 8,000,000,000

A hobo comes up to the front door of a neat looking farmhouse and raps gently on the door. When the farm owner answers, the hobo asks him, "Please, sir, could you give me something to eat? I haven't had a good meal in several days."

The owner says, "I have made a fortune in my lifetime by supplying goods for people. I've never given anything away for nothing. However, if you go around the back, you will see a gallon of paint and a clean paint brush. If you will paint my porch, I will give you a good meal."

So the hobo goes around back and a while later he again knocks on the door. The owner says, "Finished already? Good. Come on in. Sit down. The cook will bring your meal right in."

The hobo says, "Thank you very much, sir. But there's something that I think you should know. It's not a Porsche you got there. It's a BMW."

Junior had just received his brand-new driver's license. To celebrate, the whole family trooped out to the driveway and climbed into the car for his inaugural drive.

Dad immediately headed to the back seat, directly behind the newly minted driver.

"I'll bet you're back there to get a change of scenery after all those months of sitting in the front passenger seat teaching me how to drive," said the beaming boy to his old man.

"Nope," came dad's reply, "I'm gonna sit back here and kick the back of your seat while you drive, just like you have been doing to me for sixteen years."