A PANAMA CANAL TRANSIT

By Ted Cookson

A trip through the Panama Canal is truly fascinating. Cruise ships offer an informative narration throughout the transit so that passengers will understand what is happening to their ship as it proceeds through the various parts of the canal. Some ships even sail down from the southern U.S. and go half-way into the canal to Lake Gatun before turning around and sailing back into the Caribbean. While not as interesting as a complete transit, even these so-called ‘canal cruises’ still allow passengers to experience being on a ship as it is lifted and lowered by locks.

Ferdinand de Lesseps led a decade-long French effort beginning in 1880 to build a canal at sea level across Panama. However, over the course of 10 years more than 20,000 workers died, mostly from yellow fever and malaria; and the French had still only excavated about 10 per cent of the total earth finally removed to create the finished canal. On the other hand, the U.S., after purchasing the assets of de Lesseps’ Compagnie Universelle du Canal Interocéanique for USD 40 million, proceeded to build a canal with locks, beginning in 1906. The U.S. spent a total of USD 387 million before the canal was inaugurated finally on 15 August 1914; and during the first year 1,058 ships transited the canal. The U.S. is the main user of the canal in terms of the number of loads transported.

The Panama Canal runs from the northwest to the southeast. While it is 80 km (49.7 miles) from deep water in the Atlantic to deep water in the Pacific, as the crow flies the distance between the two entrances of the canal is only 69.1 km (42.9 miles).

The principal features of the canal include the three Gatun Locks on the Caribbean coast, Gatun Lake, the Gaillard Cut, Pedro Miguel Lock, Miraflores Lake, and the Miraflores Locks on the Pacific side. Traffic proceeds within the canal at roughly 14.5 km per hour (nine miles per hour), and the average ship takes nine hours to transit the canal.

At Gatun is the world’s largest and longest set of locks, the construction of which took four years from the first cement pouring in August 1909. Each of the three paired locks at Gatun is 33.5 metres (110 feet) wide and 305 metres (1,000 feet) long. This arrangement enables the passage of ships as wide as 32.3 metres (106 feet) and as long as 294 metres (965 feet). Due to the increase in the size of ships since the opening of the canal in 1909, nowadays ships cruise through the canal with less than 0.3 metres (one foot) of clearance. The Gatun Locks lift ships a total of 26 metres (85 feet).

The locks of the canal depend on water from Gatun Lake. No pumps are required as the entire system is fed by gravity. Culverts measuring 5.5 metres...
(18 feet) in height parallel the centre and side walls of the locks. Water then flows from Gatun Lake into the culverts. From there it continues into cross-culverts under the floors of the locks and then into the locks themselves.

Water is conserved since it runs from one lock to the next. In a period of about 10 minutes a ship can be raised about 8.5 metres (28 feet) to the next level. For each large cruise ship some 197 million litres (52 million gallons) of water are consumed.

Electric locomotives, known as mules, run along the edges of the canal at a speed of 3.2 km per hour (two miles per hour). These USD2 million devices can pull 31,818 kg (70,000 pounds) each and are capable of operating at a 45-degree incline between the locks.

The lock gates are double and swing like double doors. Although weighing hundreds of tons, each gate is practically weightless in water since the lower half is hollow.

More cement was used in constructing the canal than in any other project until the Boulder Dam was built in the 1930s.

Gatun Lake was created when the Gatun Dam was completed across the Chagres River in 1912. The Gatun Dam, 2,438 metres long (8,000 feet long) and 32 metres (105 feet) high, was created in part by the dumping of fill from the Gaillard Cut. This cut, 12.88 km (8 miles) long and hewn from solid rock, was named after Col. David Gaillard, the engineer in charge of this section during the canal’s construction.

The Pedro Miguel single lock has a 9.4-metre (31-foot) lift. This is followed by the 2.4 km-long (1.5 mile-long) Miraflores Lake and the Miraflores double locks. Due to the extreme Pacific Ocean tides, the latter locks have the biggest lift capacity. The Miraflores Locks can lift up to 19.8 metres (65 feet) at low tide. Also, the lower lock gates at Miraflores are the largest in the canal, weighing 819.5 metric tons (745 U. S. tons) and measuring 25 metres (82 feet) high. The Miraflores Locks are 1.16 km (0.7 miles) long.

The Bridge of the Americas, nearly a mile long, was built in 1962. Traffic passes almost 122 metres (400 feet) over the canal on this bridge, which provides the only highway link between North and South America.

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