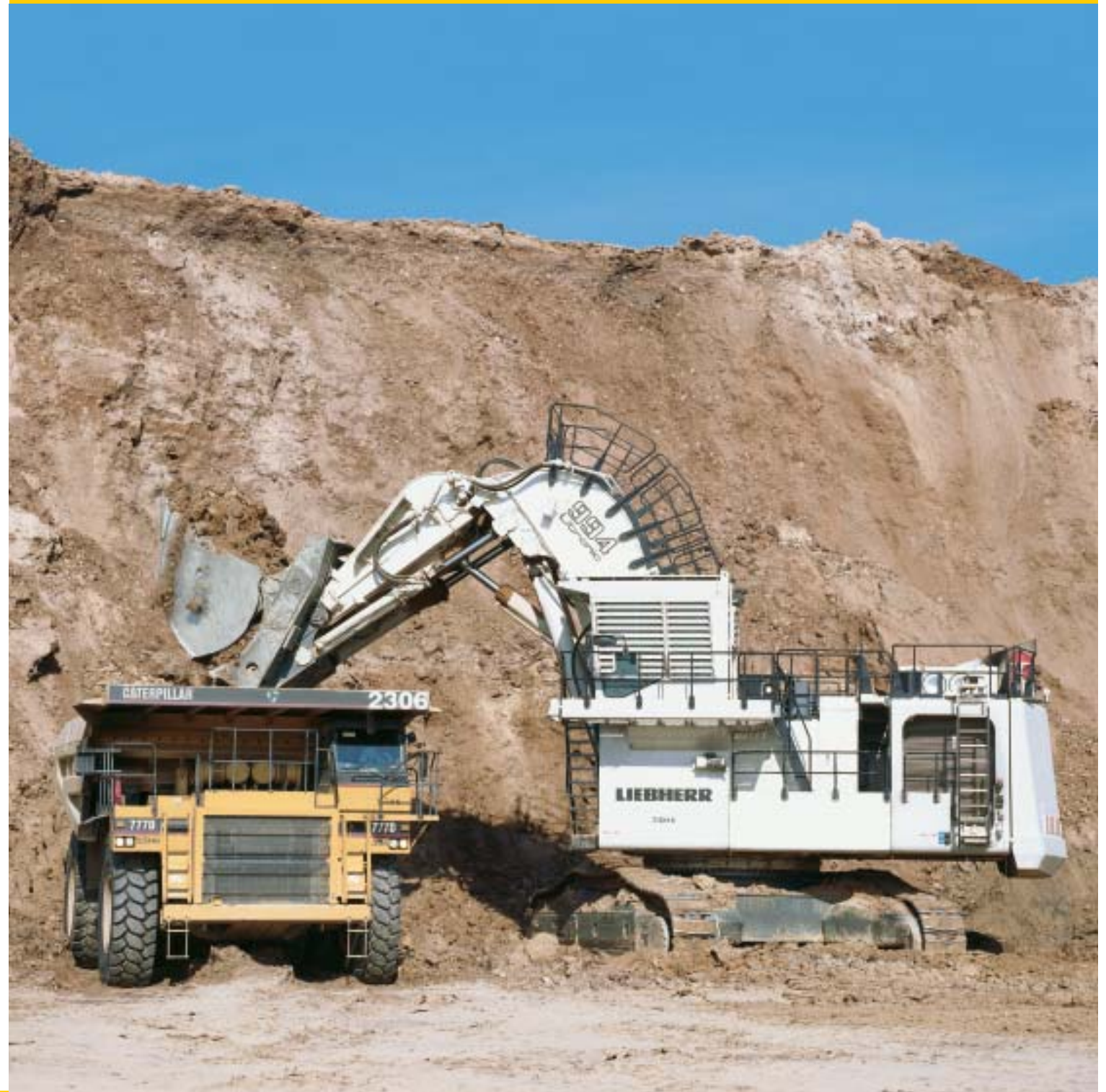


Job Report

R 984 C/R 994 B
Litronic® Litronic®

**Liebherr Large Hydraulic Excavators Move
46 Million Cubic Yards of Material at
Madrid Airport Expansion.**



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LIEBHERR

Situation

The largest construction project in Europe is being completed near the Spanish capital of Madrid. The international airport, "Barajas", is expanding its role as a natural pivot point between Europe and Latin America. The annual passenger volume has reached over 30 million.

The air traffic of 70 take-offs and landings per hour could not be disturbed, despite construction activities. After the completion of this project in 2004, the airport capacity will expand to 120 take-offs and landings per hour with potential passenger annual increase to 70 million. Madrid's "Barajas" airport will then be one of the 10 largest airports in the world.



Assignment Report

In addition to the existing facilities, two more terminals are being added, one for the domestic and European traffic and one for international flights. A huge amount of earth moving needed to be done to construct the new runways. Altogether 60 million cubic meters of material needed to be excavated and moved a maximum distance of 13 km. "EPSA", the largest Spanish contractor received the contract award to move 75% of the volume, i.e., 45 million cubic meters.

The entire ambitious airport project needed to be completed within a clearly defined time frame to avoid negative economic impact. Consequently, during the selection process, the dependability and quality of the participating companies and their equipment was of utmost importance.



Solution

Beginning in September 2002, approximately 200 construction machines and 600 workers were assigned to the project. Seven Liebherr large hydraulic excavators have performed about 77% or moved approximately 35 million cubic meters of the terraced excavation. The key excavator utilized was the R 994 B Litronic along with six of the R 984 C Litronic machines. The R 984 C Litronic machines have an operating weight of approximately 120 t and an engine output of 504 kW/685 HP and are equipped with a 9,3 cubic meter backhoe bucket. The R 994 B Litronic has an operating weight of 305 t with a 20,0 cubic meter bottom dump bucket and is powered by a Cummins diesel engine with an output of 1120 kW/1500 HP. 130 dump trucks with payloads of 100 t have been utilized for the transporting of the excavated material.

Performance

The R 984 C Litronic excavators provide an average loading performance of 600 cubic meters/h which corresponds to 1.180 t. Peak output is approximately 800 cubic meters per hour.

The R 994 B Litronic is served by 14 dump trucks. The machine loads 1200 cubic meters or 2.100 t of material per hour. It is the largest hydraulic excavator delivered by Liebherr to the construction industry as well as the largest machine in Spain that is utilized for such tasks.

The operational work schedule is based on three shifts per day with the entire excavation to be completed within a 24 month period. After 13 months, the contractor "EPSA" had already moved 37 million cubic meters, i.e., this difficult project was 62% complete. The performance of the seven Liebherr large hydraulic excavators contributed largely to this success. More Liebherr machines on site, utilized for other jobs, were 3 Liebherr wheel excavators for the utility and pipeline construction and several Liebherr mobile cranes for the unloading and placement of pre-fabricated concrete parts.



Technical Data

R 984 C Litronic

with 600 mm double-grouser-pads
 Operating weight _____ 120 t
 Engine _____ Cummins diesel QSK-19 C 750
 Engine output per SAE J 1995 ___ 504 kW/685 HP at 1800 RPM

R 994 B Litronic

with 850 mm forged double-grouser-pads
 Operating weight _____ 305 t
 Engine _____ Cummins diesel QSK-45
 Engine output per SAE J 1995 _____ 1120 kW/1500 HP
 at 1800 RPM

Attachment

R 984 C Litronic

Backhoe attachment
 Gooseneck boom _____ 7,8 m
 Stick _____ 3,4 m
 Bucket capacity _____ 9,3 m³
 Cutting width _____ 2800 mm
 Max. digging force _____ 437 kN/46,6 t
 Max. breakout force _____ 590 kN/60,2 t

R 994 B Litronic

Front shovel attachment
 Bottom dump bucket capacity _____ 20,0 m³
 Cutting width _____ 4100 mm
 Max. crowd force _____ 1300 kN/132,5 t
 Max. breakout force _____ 1060 kN/108,0 t