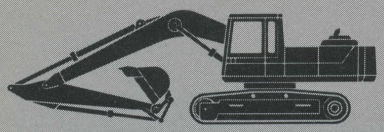


Competitive Information

Hydraulic Excavator

INTERNAL USE ONLY

FIELD TEST REPORT

CI-J-101-E0
Sep., 1987

KOMATSU PC280LC-3 vs. LIEBHERR R942LC

Subject: Performance comparison between KOMATSU PC280LC-3 and LIEBHERR R942LC
Objective: To evaluate the working performance of both machines
Study date: June, 1987
Location: Moha, Belgium
Equipment studied:

Item \ Model		KOMATSU PC280LC-3	LIEBHERR R942LC
Operating weight	kg (lb)	27600 (60,850)	30400 (67,020)
Flywheel horsepower	PS (kW)/rpm	170 (125)/2100	170 (125)/2150
Bucket capacity (CECE)	m^3 (cu.yd)	1.2 (1.57)	1.4 (1.83)
Arm length	mm (ft.in)	3050 (10')	3000 (9'10")
Track length on ground	mm (ft.in)	4045 (13'3")	3885 (12'9")
Track gauge	mm (ft.in)	2580 (8'6")	2400 (7'10")
Shoe width	mm (in)	710 (28")	710 (28")
Service meter	Hour	10	3377

Test results at a glance:

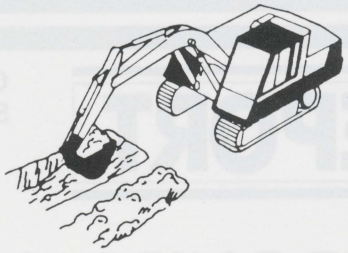
Ditching:	Hourly production:	KOMATSU PC280LC-3 (S-mode) is 24% higher than the LIEBHERR R942LC.
	Fuel consumption:	KOMATSU PC280LC-3 (L-mode) is 5% less than the LIEBHERR R942LC.
	Fuel efficiency (m^3/ltr.):	KOMATSU PC280LC-3 is 15% more efficient than the LIEBHERR R942LC.
Loading:	Hourly production:	KOMATSU PC280LC-3 (S-mode) is 18% higher than the LIEBHERR R942LC.
	Fuel consumption:	KOMATSU PC280LC-3 (L-mode) is 7% less than the LIEBHERR R942LC.
	Fuel efficiency (m^3/ltr.):	KOMATSU PC280LC-3 (L-mode) is 12% more efficient than the LIEBHERR R942LC.
Lifting capacity:	The lifting capacity of the PC280LC-3 is 25% higher than the that of the LIEBHERR R942LC.	

KOMATSU

High productivity and economy

Featuring two-mode selection : STANDARD mode and LIGHT-DUTY mode.
The more suitable mode can be selected in response to the user's demand.

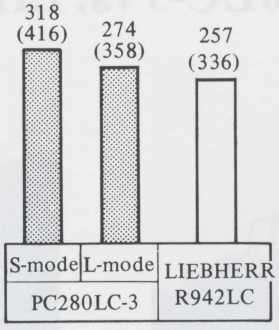
Ditching



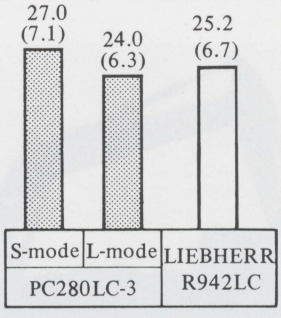
The productivity of the PC280LC-3 in the S-mode is one class higher than the LIEBHERR R942LC.
For projects which demand economy, the fuel consumption of the PC280LC-3 in the S-mode is 15% less than the LIEBHERR R942LC.

Conditions

- **Banked sticky soil with rock.**
- **Ditch depth : 2 m (6.6 ft.)**
- **Ditch width : The same as bucket width**
- **Excavated soil deposited at side of ditch**
- **Dumping at 30° swing**

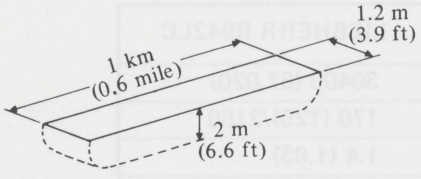


Hourly production
m^3/h (cu.yd/h)



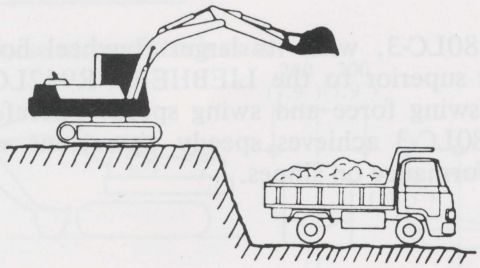
Fuel consumption
ltr./h (U.S. Gal/h)

When the PC280LC-3 and the LIEBHERR R942LC were used under test conditions to dig a ditch 1 km (0.6 mile) in length, the fuel and time required were as shown in the chart on the right.



Item \ Model	KOMATSU PC280LC-3		LIEBHERR R942LC
	S-mode	L-mode	
Fuel required	204 ltr [100%] (53.9 U.S.Gal)	210 ltr [103%] (55.5 U.S.Gal)	235 ltr [115%] (62.1 U.S.Gal)
Time required	7 h. 33 min [100%]	8 h. 46 min [116%]	9 h. 20 min [124%]

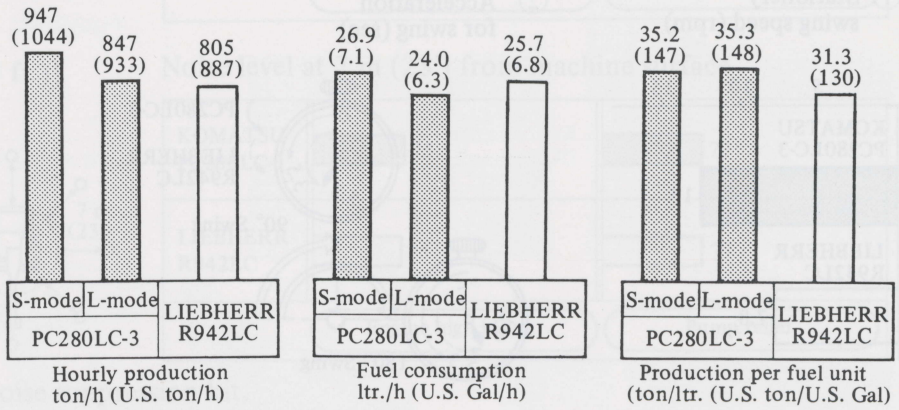
Loading



The productivity of the PC280LC-3 is 18% higher than the LIEBHERR R942LC.
The efficiency of the PC280LC is 12% higher than of the LIEBHERR R942LC.

Conditions

- Loose soil with gravel
- Excavator and dump truck on different ground
- Loading at 90° swing
- 18 ton (20 U.S. ton) dump trucks (MAN trucks made in West Germany)
- 7 buckets loading

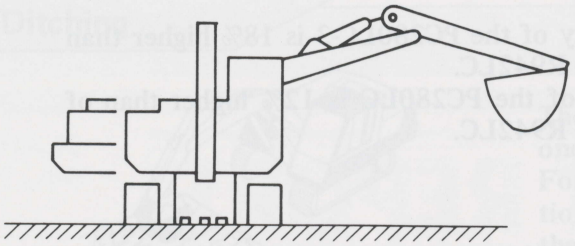


When the PC280LC-3 and the LIEBHERR R942LC were used under test conditions for one day's operations, the number of dump trucks which could be loaded and the fuel required for one dump truck were as shown in the chart on the right. The PC280LC-3 is 14% less than that of the R942LC.

Model \ Item	No. of 18-ton dump trucks which can be loaded (= 20)	Fuel consumption per dump truck
PC280LC-3 S-mode	316 [100%]	0.51 liter (0.13 U.S.Gal) [100%]
LIEBHERR R942LC	268 [85%]	0.58 liter (0.15 U.S.Gal) [114%]

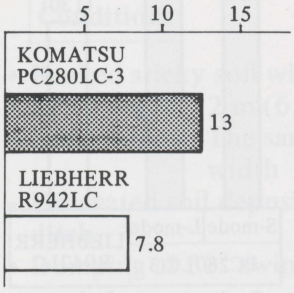
Calculation conditions :
Daily hours of operation : 8 hours
Job efficiency : 0.75
Bucket capacity :
PC280LC-3 1.2 m^3 (1.57 cu.yd)
LIEBHERR R942LC 1.4 m^3 (1.83 cu.yd)
Bucket factor : 1.0

Excellent swing performance

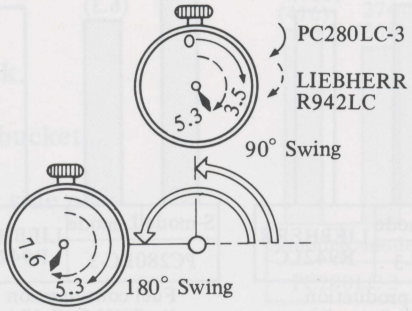


The PC280LC-3, with its larger flywheel horsepower, is superior to the LIEBHERR R942LC in both its swing force and swing speed. Therefore, the PC280LC-3 achieves speedy operations with good performance on slopes.

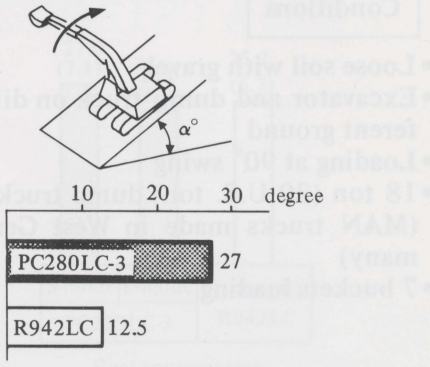
① Stationery swing speed (rpm)



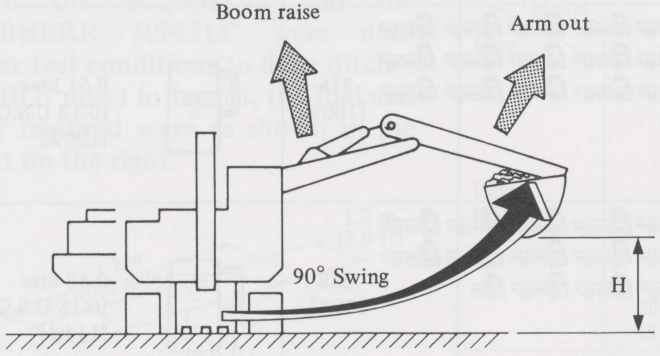
② Acceleration for swing (sec)



③ Swing gradeability (°)

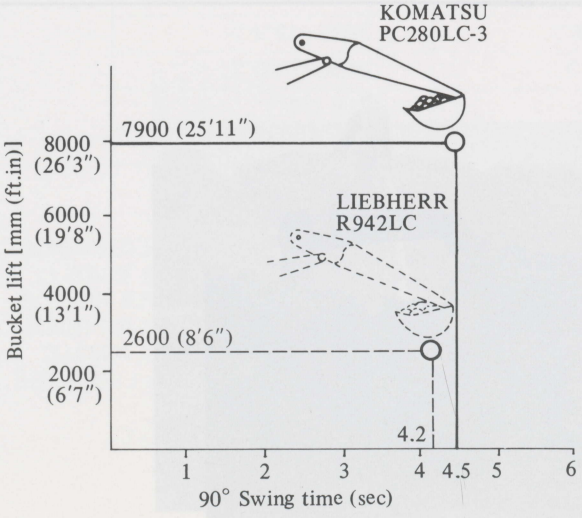


Outstanding simultaneous ability



Conditions

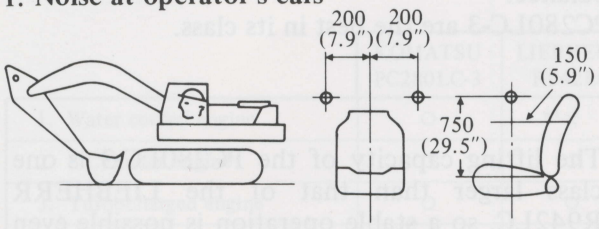
Swing, boom raise & arm out are controlled simultaneously with the bucket loaded. The bucket raised height "H" and the 90° swing time were measured.



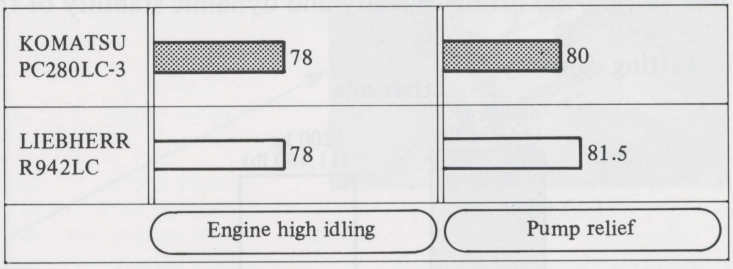
The compound operation of swing, boom raise and arm out is one of the most frequently used movements in daily operations. The PC280LC-3 has the best match of bucket lift and swing time. The R942LC has a longer swing time, and the bucket is lifted almost 1/3 as high as the PC280LC-3. This means the swing must be controlled; thus, the swing time needed will be triple.

Noise

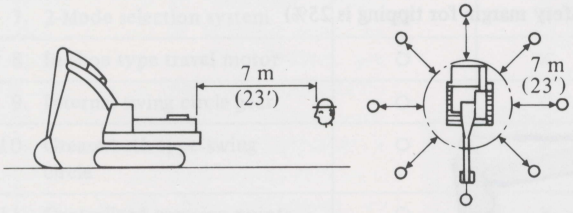
1. Noise at operator's ears



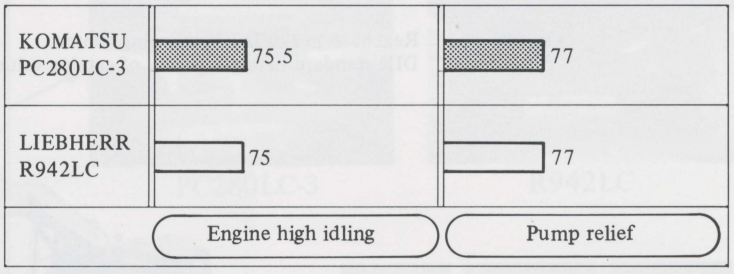
Noise level at operator's ears unit: dB (A)



2. Noise around the machine [7 m (23 ft.)]



Noise level at 7 m (23') from machine surface



Note: R942LC equipped French noise suppression kit.
Though PC280LC-3 is standard machine, noise level is low.

Speedy work equipment

In commonly used swing and arm dumping speeds, the PC280LC-3 is faster than the R942LC.

Item			Model	
			PC280LC-3	R942LC
Boom	Raise	sec	3.3	5.3
	Lower	sec	3.0	3.5
Arm	In	sec	4.5	7.0
	Out	sec	3.0	3.2
Bucket	Curl In	sec	4.2	2.9
	Curl Out	sec	2.5	2.2
Total		sec	20.5	24.1

Conditions

Engine speed; full
Bucket; no load

It is difficult for the LIEBHERR R942LC to perform finishing operations because the work equipment speed is slow and the time lag is large when operating the bucket or arm in a vertical position.

Time lag

Unit: sec

Item	PC280LC-3	R942LC
Bucket	0	3.5

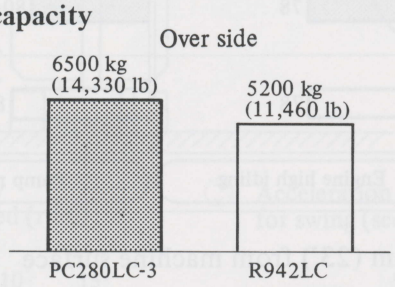
Conditions

Engine speed; low idling
Bucket; no load

High stability

The PC280LC-3 has outstanding hydraulic power and is well-balance.
Due to this, the lifting capacity and dynamic stability of the PC280LC-3 are the best in its class.

1. Lifting capacity



The lifting capacity of the PC280LC-3 is one class larger than that of the LIEBHERR R942LC, so a stable operation is possible even when a large capacity bucket or long arm is equipped.

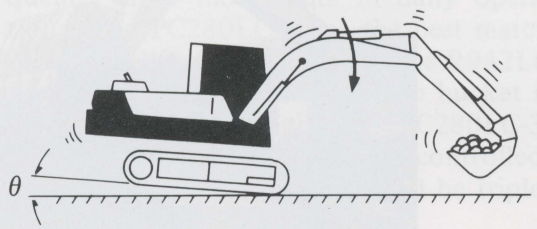
Conditions Reach: 6 m (20 ft.) from swing center.
DIN standard lifting capacity of catalog value (Safety margin for tipping is 25%)

2. Dynamic stability

Item		Model	KOMATSU PC280LC-3	LIEBHERR R942LC
Dynamic stability	Lengthwise	deg	0.7	2.4
	Transverse	deg	2.3	6.0
Track length on ground		mm (ft.in)	4045 (13'3")	3885 (12'9")
Track gauge		mm (ft.in)	2580 (8'6")	2400 (7'10")

Conditions

1. **The boom lowers from a 2 m (7 ft) higher position of the boom foot pin with the bucket loaded.**
2. **Stop the lowering control at the height of the boom foot pin and measure the tipping angle "θ".**

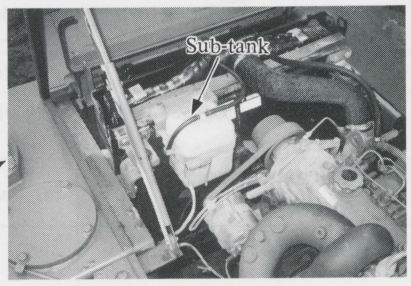


Structure and function comparison

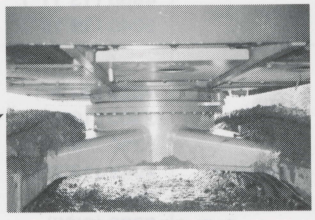
	KOMATSU PC280LC-3	LIEBHERR R942LC
1. Water cooled engine	○	*1 ×
2. 6-Cylinder engine	○	○
3. Turbocharged engine	○	○
4. Sub-tank for checking engine water level	○	×
5. Variable-capacity piston pump	○	○
6. Function of O.L.S.S. system	○	×
7. 2-Mode selection system	○	×
8. In-shoe type travel motor	○	×
9. Internal swing circle gear	○	○
10. Grease-bath type swing circle	○	×
11. Centralized greasing points for swing circle	○	×
12. Centralized greasing points for work equipment (Boom cyl. top pin & arm cyl. bottom pin)	○	×

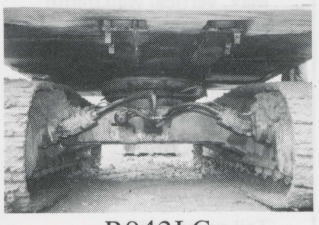
○: Equipped
×: Not equipped

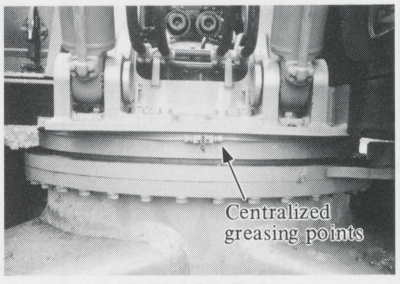
*1 : In case of LIEBHERR engine, engine water cooled.



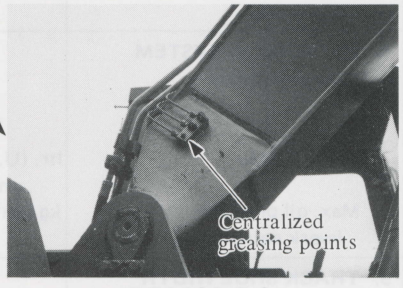
PC280LC-3


PC280LC-3


R942LC



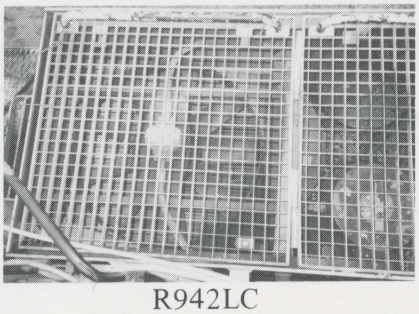
PC280LC-3

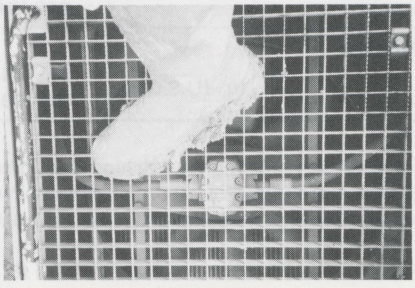


PC280LC-3

Others

There is suction port for hydraulic oil cooler on a way of the step for daily maintenance.
Therefore, dust or mud fall down into the cooler and it will damage fan or core.


R942LC


R942LC

Comparative specifications (Catalog value)

Item	Maker / Model	Komatsu PC280LC-3	Liebherr R942LC	
1. OPERATING WEIGHT*	kg (lb)	27560 (60760)	30230 (66650)	
2. FLYWHEEL HORSEPOWER	PS (kW)/RPM	170 (125)/2100	Deutz 170 (125)/2150 Lieb. 180 (132)/2000	
3. BUCKET CAPACITY RANGE (SAE)	m^3 (cu.yd)	0.44 ~1.4 (0.58 ~1.83)	0.6 ~2.5 (0.78 ~3.3)	
4. WORKING RANGE				
(Arm length)	mm (ft.in)	(2500 (8'2"))	(2400 (7'10"))	
Max. digging height		9085 (29'10")	9700 (31'10")	
Max. dumping height		6310 (20'8")	6400 (21')	
Max. digging reach on ground		9490 (31'2")	10200 (33'6")	
Max. vertical wall depth		4850 (13'11")	5800 (19')	
Max. digging depth		6040 (19'10")	6700 (22')	
5. DIMENSIONS				
Overall length	mm (ft.in)	9820 (32'3")	10170 (33'4")	
Overall height		3200 (10'6")	3300 (10'10")	
Overall width		3290 (10'10")	3285 (10'9")	
Length of track on ground		4045 (13'3")	3885 (12'9")	
Track gauge		2580 (8'6")	2400 (7'10")	
Tail swing radius		2900 (9'6")	2920 (9'7")	
Ground clearance		530 (1'9")	470 (1'7")	
6. PERFORMANCE				
Swing speed	RPM	13	7.8	
Max. travel speed	km/h (MPH)	2.5 (1.6)	2.6 (1.6)	
Gradeability	% (degree)	70 (35)		
(Arm length)	(mm (ft.in))	(2000 (6'7"))	(1900 (6'3"))	
Max. crowd force (arm)	kg (lb)	14990 (33050)	17000 (37480)	
Max. digging force (bucket)	kg (lb)	14700 (32410)	18000 (39680)	
7. ENGINE				
Model		Komatsu S6D110	Deutz BF6L913	Liebherr D906T
Piston displacement	ltr. (cu.in)	7.13 (435)	6.13 (374)	8.4 (510)
No. of cylinder-bore x stroke	mm (in)	6–110 x 125 (4.3 x 4.9)	6– 102x125 (4x4.9)	6– 115x135 (4.5x5.3)
8. HYDRAULIC SYSTEM				
Hydraulic pump		Variable displacement piston pump	Variable displacement piston pump	
Max. oil flow	ltr. (U.S.Gal)/min	2 x 193 (51)	2 x 200 (53)	
Max. oil pressure (work equipment)	kg/cm^2 (PSI)	320 (4550)	320 (4550)/ 380 (5400)	
9. TRACK SHOE WIDTH	mm (in)	610 (24") 710 (28") 760 (30") 810 (32") 860 (34")	500 (20") 600 (24") 750 (30")	
10. CAPACITY (Refilled)				
Fuel tank	ltr. (U.S.Gal)	280 (74.0)	425 (112)	
Hydraulic tank		150 (39.6)		

* Operating weight of each above mentioned machine is indicated as following
PC280LC: One piece boom, 2.5 m arm, SAE 1.4 m^3 bucket and 710 mm shoe
R942LC : One piece boom, 2.4 m arm, SAE 1.45 m^3 bucket and 750 mm shoe

Standard and optional equipment may vary depending on regional requirement.

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(16)