



# CASE STUDY DUNLOP SUPERFORT® HANSON WHATLEY QUARRY

Customer name: **Hanson Aggregates. Heidelberg Cement Group**

Industry: **Limestone quarry**



Whatley has been operating since the 1960s and is the largest of Hanson UK's quarries. It is situated between the villages of Mells and Chantry in the Mendip Hills Natural Character Area around four miles west of Frome. It employs over 60 people directly, along with a wide range of support staff and contractors. The quarry supplies crushed limestone aggregate to local markets by road, and to depots in London and South East England via a dedicated rail link. It operates 24 hours a day and produces between 4 to 5 million tonnes of aggregate a year. There are further on-site plants producing asphalt and ready-mixed concrete. Limestone reserves are in the order of 100 million tonnes. The site extends to 173 hectares, of which 120 hectares comprises of the limestone extraction site.

Whatley Quarry approached Vulcanising South West Ltd on the 15th May 2019 with the view to carrying out a belt calculation on CV07 conveyor. The maximum expected life of the belt 1000/4 6+2 (of unspecified origin) was on average 6–12 months with a number of repairs required during this period especially the splice. Each repair carrying extra cost and downtime.

C7 conveyor at Whatley Quarry is a horizontal conveyor carrying crushed limestone aggregate at a size of 63mm – 250mm. The conveyor is a key asset in the process as without this conveyor in operation all primary and secondary crushing operation is halted.



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Conveyor layout – Horizontal

Conveyor length – 42.7 meters

Angle of incline – 0°

Tonnage – 2300 ton per hour

Material lump size – max 150 mm

Max stone drop – 600 mm

Head drum – 630 Ø

Tail drum – 500 Ø

Gravity tension unit drum – 500 Ø

Snub drums – 355 Ø

Belt speed – 2.2 m per second

Motor – 28Kw

## CONVEYOR C7 \* SPECIFICS



### **CALCULATIONS CONCLUDED TYPE 1000/4 WAS EXCESSIVE ESPECIALLY FOR THE DRUM DIAMETERS ON THE SYSTEM ADDING STRAIN TO THE BELT SPLICE.**

The snub roller diameters are too small for a 1000/4 6+2. Belt dimensions 98000 X 1200mm.

Under normal running conditions the belt carries between 500 and 1400 tons of material per hour depending on the number of crushers in operation. Average tonnage in normal operation is 1200tph. The average tonnage carried by C7 over a 24 hour period is 18,000t. The site is operational 5 days per week.

With a maximum material size of 150mm, flowing onto the belt from a 600mm height, it was determined that a Dunlop 630/4 6+2 RA Superfort® or UltraX3 spec belt would be more than capable in dealing with the demands of this application. However, in light of the historical data, VSW decided to increase the spec to a 800/4 6+2, knowing that this would maximise the expected life of the belt whilst still falling within the range of Dunlop's 'Safety Factor'. VSW and Dunlop were certain that with the abrasive resistant 'RA' covers coupled with the correct tensile strength selection, Superfort® would offer a significant increase in lifespan as well as a reduction in downtime and operating costs compared to previous belts installed.



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## TECHNICAL DATASHEET



**Superfort 800/4 6.0 + 2.0 RA Moulded edges**  
Complying with EN ISO 14890

CARCASS	STANDARD	DUNLOP	AVERAGE
<b>The carcass is built up of 4 fabrics of Polyester warp and Polyamide weft (EP).</b>			
Tensile strength at break [N/mm]	≥ 800	974	ISO 283
Adhesion between plies [N/mm]	≥ 4.5	9.1	ISO 252
Thickness [mm]	5.0	5.0	ISO 583
Elongation at 10% TS nom [%]	≤ 1.5	1.0	ISO 283
COVERS	STANDARD	DUNLOP	AVERAGE
<b>Abrasion resistant (DIN Y), anti-static as per ISO 284, SBR</b>			
Top cover thickness [mm]	6.0	6.0	ISO 583
Bottom cover thickness [mm]	2.0	2.0	ISO 583
Minimum adhesion between cover and carcass [N/mm]			
Top	≥ 3.5	11.7	ISO 252
Bottom	≥ 3.5	11.7	ISO 252
<b>TECHNICAL DATA OF COVERS</b>			
Tensile strength at break [MPa]	≥ 20	20.3	ISO 37
Elongation at break [%]	≥ 400	476	ISO 37
Tear strength [N]/[MPa]	≥ 48.0/6.0	60.0/7.5	ISO 34-2
Abrasion resistance [mm²]	≤ 150	108	ISO 4649
Hardness, ±5 [Shore A]	60	60	ISO 7619
TEMPERATURE RANGE			
Minimum ambient temperature [°C]	-30		
Maximum continuous material temperature [°C]	+80		
Maximum peak material temperature [°C]	+100		
MINIMUM PULLEY DIAMETERS FOR BELT-LOADS FROM 60% UP TO 100%			
Drive pulley [mm]	630		
Tail pulley [mm]	500		
Bend/Snub pulley [mm]	400		
BELT CHARACTERISTICS			
Belt width [mm]	1200		
Weight per metre [kg/m]	17.9		
Total thickness [mm]	13.0		ISO 583

The Dunlop averages data shown above is generated via our ongoing quality-testing program. All information is collected with great care but may be changed at any time without prior notice.

## SUPERFORT® 800/4 6+2 RA DIN Y, MOULDED EDGES

A report of our findings and analysis was discussed with Whatley Quarry and a quote requested for Vulcanising South West Ltd to supply and install Dunlop Superfort® 800/4 6+2 RA DIN Y, moulded edges. A technical data sheet provided was supplied to Hanson with our offer.



Dunlop conveyor belts are ozone resistant (EN ISO 1431), REACH compliant (EC 1907/2006) and suitable for use in ATEX regulated zones.



## SPLICE AND HOT VULCANISE ON SITE

Prior to our team arriving on site a SSOW (Safe Systems Of Work) was completed by Craig Jones, our Health & Safety manager, and the safe installation planned in conjunction with the Hanson on site. On arrival our team carried out job specific risk assessment and method statement prior to any work. In coordination with the team at Hanson all the lifting and handling equipment had been arranged for us prior to our arrival on site. The splice was hot vulcanised using our Almex press.



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## STATEMENT FROM HANSON

In June 2019, a new belt was fitted. On this occasion, the belt was supplied by VSW and the belt provided was a Dunlop Superfort 800/4 6+2 RA.

This belt was operational for 12 months and only changed due to a mechanical failure of a liner plate cutting the belt its full length 8 inches from its edge. During its time in operation, maintenance and inspection activities continued as normal with a significant reduction in repair and belt maintenance costs.

The Dunlop Superfort belt has outperformed the previously used belt and saved as a result on both downtime and additional maintenance costs during its life. Total belt life currently estimated at 18 months which is a 75%-100% increase in life against tonnage and an annual 45% cost saving.

**LOWEST COST OF OWNERSHIP  
LONGEST LASTING CONVEYOR BELTS  
IN THE WORLD**

## CREDITS AND THANKS TO



**Craig Jones** (Operations / Health and Safety Manager)  
**Freddie Pier** (National Sales Manager)  
**Greg Page** (Managing Director)



**Stephan Koops** (Sales Manager)  
**ing. Rob van Oijen** (Application Engineer)