THE PREMIER AGGREGATE

1-70 GLENWOOD CANYON "BEGS FOR THE ULTIMATE ASPHALT MIX DESIGN" - EXECUTIVE SUMMARY

Challenge:

The design, construction and aesthetic beauty of the Glenwood Canyon corridor is recognized at local, national and international levels. The complexity of the highway design resulted in innovative construction methods including viaduct structures, cantilever roadways, reinforced detainment walls, surcharged embankments, post-tensioned bridge decking and extensive tunnel systems. This complex highway requires superior aggregates, improved gradations, polymer and natural asphalt modification, and Superpave technology to extend pavement life by reducing permanent deformation, increasing strength and durability, and reducing moisture permeability.

A long life asphalt pavement is needed to continue to provide an environmentally pleasing roadway system with minimal maintenance disruptions. The integrity of Glenwood Canyon begs for the ultimate asphalt mix design and pavement structure.

Solution:

The Colorado Department of Transportation - Region 3, in conjunction with CTL/Thompson, Inc. developed a high performance asphalt concrete mixture with the potential to provide a longer lasting, impermeable pavement. The Hot Bituminous Pavement - Special design, HBP (special) utilizes 100 percent crushed aggregates with very low abrasion properties, absorptive and high strength steel furnace slag, and polymer-modified asphalt, further modified with Trinidad Lake Natural Asphalt (TLA).

Sixteen aggregate sources from the Roaring Fork and Eagle River valleys were tested and properly combined to form eight aggregate design blends. Four asphalt crude sources were tested with conventional and Performance Grading testing methods. Each of the four asphalts was also modified with TLA using two different percentages. A total of fourteen optimal blends of asphalt and aggregate were developed for specialized testing including, moisture sensitivity, stability, rut susceptibility and permeability. A test strip placed east of Eagle, Colorado in May, 2000 proved that the HBP (special) asphalt mix design meets the unique constructability requirements necessary for placement. Based upon test results from this report, we recommend that HBP (special) utilize the COOT R3 Standard Design with 25 percent steel furnace slag and Koch PG 76-28 modified with 25 percent TLA.

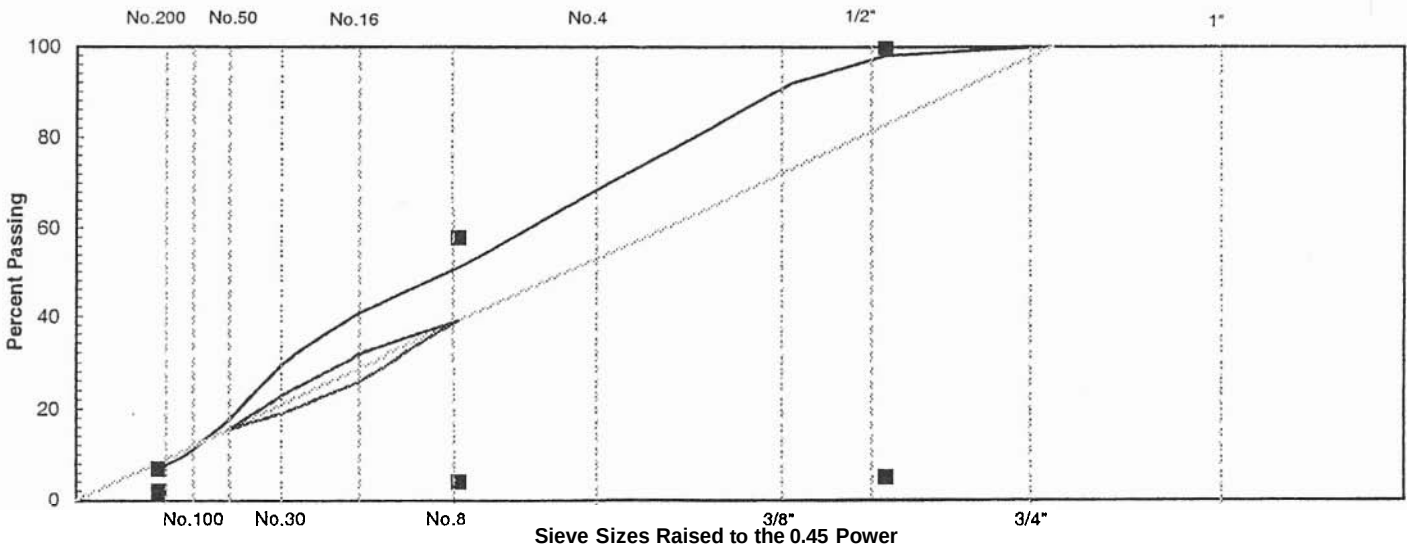
(over)

ASPHALT CONCRETE MIX DESIGN
DESIGN AGGREGATE STRUCTURE

CLIENT	CDOT RIII	**MIX ID**	RIII Stand **Slag**
PROJECT NUMBER	30,141	**COMPACTION TEMPERATURE, F**	300
DATE	411712000	**MIXING TEMPERATURE,** F	325
ASPHALT CEMENT/ADDITIVE	Koch **PG 76-28** w/ 25% TLA	**COMPACTION METHOD**	N-Design (100)
ASPHALT SPECIFIC GRAVITY	1.028	**DESIGN METHOD**	Superpave

AGGREGATE PHYSICAL PROPERTIES

PRODUCT	*GR 9/16" RCK*	*KWC CS*	*ELM-VAG CF*	*PUEBLO SLAG*	ACTUAL GRADING	DESIGN GUIDELINES	JOB MIX TOLERANCES
% OF BLEND	12%	21%	42%	25%			
SIEVE SIZE	% PASSING	% PASSING	% PASSING	% PASSING	% PASSING	% PASSING	+/-
37.5 mm (1 1/2 in)	100	100	100	100	100	100	0
25.0 mm (1 in)	100	100	100	100	100	100	0
19.0 mm (3/4 in)	100	100	100	100	100	100	0
12.5 mm (1/2 in)	100	100	100	92	98	90-100	5
9.5 mm (3/8 in)	74	100	100	80	92		5
#4	6	100	82	52	69		4
#8	1	89	57	33	51	28-58	4
#16	1	73	46	23	41		
#30	1	52	35	17	30		3
#50	1	21	23	13	17		3
#100	1	7	15	9	10		
#200	0.9	3.0	10.3	6.9	6.8	2-7	2.0
BULK SPECIFIC GRAVITY	2.624	2.623	2.606	3.102	2.721		
FINE AGG. BULK SPEC. GRAV.		2.623	2.623	2.988	2.717		
BULK SPECIFIC GRAVITY (SSD)	2.658	2.647	2.641	3.186	2.763		
APPARENT SPECIFIC GRAVITY	2.717	2.687	2.702	3.390	2.845		
ABSORPTION, %	1.30	0.91	1.17	2.39	1.271		
ASPHALT CEMENT, %					7.2		0.2
EFFECTIVE SPECIFIC GRAVITY					2.843		
FLAT & ELONGATED, %					1.5	3 MAX	
LA ABRASION, WEAR, %					24	30 MAX	
FINE AGGREGATE ANGULARITY					48	45 MIN	
FRACTURED FACES (2 or more), %					100	100 MIN	
ADHERENT FINES, %					0.1	0.5 MAX	
SAND EQUIVALENT, %					59	45 MIN	



Job No. 30,141

Fig. 1