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#### **Published**

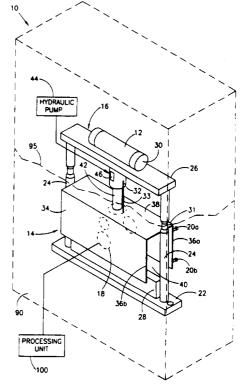
With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(88) Date of publication of the international search report: 1 May 1997 (01.05.97)

#### (54) Title: SYSTEM AND METHOD FOR CONTROLLING CONCRETE PRODUCTION

#### (57) Abstract

A system (10) is designed to measure concrete rheological properties which includes a concrete plant (2), a measuring unit and a mix changing unit (6). The measuring unit includes a surface in contact with a part of a mass of the concrete mix (31), a shearing unit (42) for effecting shear deformation in the mass and at least one sensor (18) which senses a measure of the force which is transferred to the surface by the concrete mass as a result of the shear deformation. The rheological profile is produced by: a) sensing at least one measure of the force which is transferred to the surface under at least two different stress states, b) determining i) the sensitivity of each of the at least one measure to a change in stress state and ii) the workability of the mix and c) creating the rheological profile from at least the sensitivity and workability.



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A. CLASSIFICATION OF SUBJECT MATTER  IPC(6) :Please See Extra Sheet.							
US CL:73/760, 784, 790, 841, 818, 821, 844, 845 According to International Patent Classification (IPC) or to both national classification and IPC							
B. FIELDS SEARCHED							
Minimum d	ocumentation searched (classification system follow	ved by classification symbols)					
U.S. :	73/760, 784, 790, 841, 818, 821, 844, 845						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched							
Electronic d	lata base consulted during the international search (	(name of data base and, where practicable	, search terms used)				
APS search terms: concrete, test, mix, force, stress, sens, detecet, measure, cell, shear							
C. DOC	UMENTS CONSIDERED TO BE RELEVANT						
Category*	Citation of document, with indication, where	appropriate, of the relevant passages	Relevant to claim No.				
X	US 4,825,700 A (VARDOULAKIS et al) 02 May 1989, see the entire patent.		1, 14				
Υ	the offine patent.		2-13, 15-25				
A	US 5,160,540 A (JOHANSSON et al) 03 November 1992, see the entire patent.		26-32				
A	US 3,640,126 A (TE'ENI) 08 Feb patent.	1-25					
A	US 3,974,679 A (NASSER) 17 August 1976, see the entire patent.		1-25				
A	US 5,258,622 A (PRATT, JR) 02 November 1993, see the entire patent.		1-25				
X Furthe	er documents are listed in the continuation of Box (	C. See patent family annex.					
"A" docu	cial categories of cited documents:  Amount defining the general state of the art which is not considered	"T" later document published after the inter date and not in conflict with the applicat principle or theory underlying the inve	tion but cited to understand the				
to be of particular relevance  earlier document published on or after the international filing date  (L' document which may throw doubts on priority claim(s) or which is		"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone					
cited	ment which may throw doubts on priority claim(s) or which is to establish the publication date of another citation or other ial reason (as specified)	"Y" document of particular relevance; the	claimed invention cannot be				
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	P* document published prior to the international filing date but later than "&" document member of the same patent family the priority date claimed						
Date of the actual completion of the international search  O6 DECEMBER 1996  Date of mailing of the international search report  2 1 MAR 1997							
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International application No.
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	tion). DOCUMENTS CONSIDERED TO BE RELEVANT			
Category*	Citation of document, with indication, where appropriate, of the relevant passages		Relevant to claim N	
	US 4,789,244 A (DUNTON et al) 06 December 1988, entire patent.	see the	26-32	

International application No. PCT/IL96/00042

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)
This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:
1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
2. Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claims Nos.:     because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).
Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)
This International Searching Authority found multiple inventions in this international application, as follows:
Please See Extra Sheet.
1. X As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
Remark on Protest The additional search fees were accompanied by the applicant's protest.
No protest accompanied the payment of additional search fees.

International application No. PCT/IL96/00042

A. CLASSIFICATION OF SUBJECT MATTER: IPC (6):

G01N 3/24, 3/00; G01B 5/30, 7/16

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claims 1-25, drawn to contrete measuring and production control. Group II, claims 25-32, drawn to design and production of concreate.

The inventions listed as Groups do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I relates to concrete testing, measuring and concrete production monitoring systm, generally calissified in class 73. Group II relates to design and production of the concrete mix along with a concrete plant and other related components, which is bassically of different nature with that of testing and measuring and requires different search.