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BETREFFENDE:

Investigations into the strength of automatically made welds containing notches.

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Investigations into the strength of automatically made welds containing notches.

Summary of testing program to be presented at the Kyoto-colloquium 1969.

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The strength of welds depends to a large extent on the number, size and orientation of defects. When brittle fracture is concerned it is probable that the quality of the material at these defects is at least as important as the mentioned geometrical factors.
One possible cause of damage is the mechanical and thermal treatment exerted on the material at a notch in an existing weld when a new weld is made close to the former one. This situation particularly occurs at weld- crossings and where stiffeners pass over butt welds. The unfavourable effects of straining notched material, particularly when this occurs at temperatures between 200 and 400°C, are well realized today.
One original point of the present investigation is that these effects are studied for weld-metal. For comparison similar specimens are included in which the notches are made after welding. The study of casualties has shown that weld metal which has not been embrittled is in general not prone to brittle fracture.
It is thought that the most attractive welding methods to be considered in this respect are automatic methods with one or a limited number of runs. In the first place the general quality of these welds as determined by conventional acceptance tests is a point of discussion. In the second place these methods are very attractive from an economical point of view.
The program comprises two steels with yield points respectively above and below the yield point of the weld metal. The reason is that a difference in yield point between weld metal and base metal strongly influences the overall and the local deformations in case of notched transverse welds, while little effect is expected in notched longitudinal welds. The practical importance of this point fully justifies an experimental verification.

Tensile tests will be performed on plate-specimens 1000 x 500 x 25 mm each containing two or three weld-crossings and the same number of notches.
The tips of the notches are located at the points where the most severe damage is expected.
The welding processes used are one run Electrogas-welding and four-run submerged-arc welding. Load- and ductility (C.O.D.) criteria are used for the assessment of the performance of the specimens.
Priority is given to the tests where notches in Electrogas welds are embrittled by a neighbouring submerged-arc weld.

Proefstuk uitvoering A, B, C en D (hoge vloeigrens)

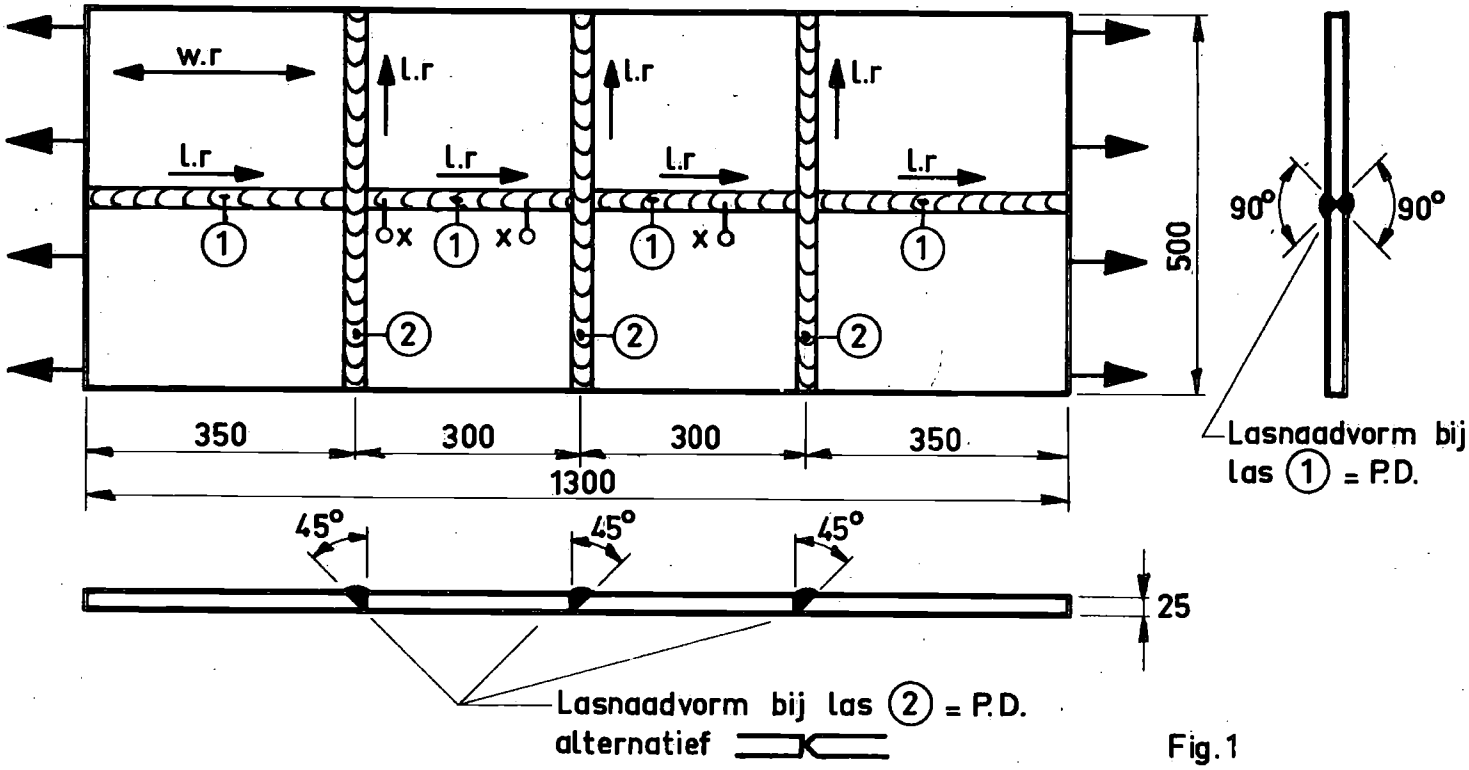
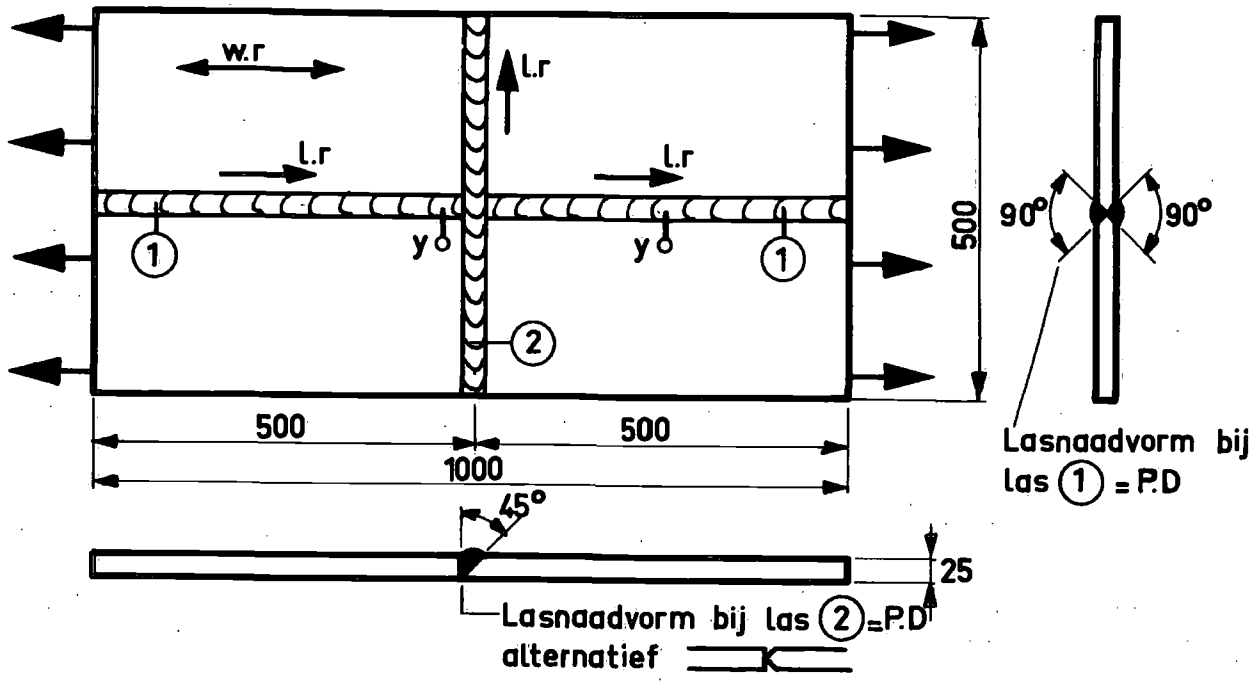


Fig. 1

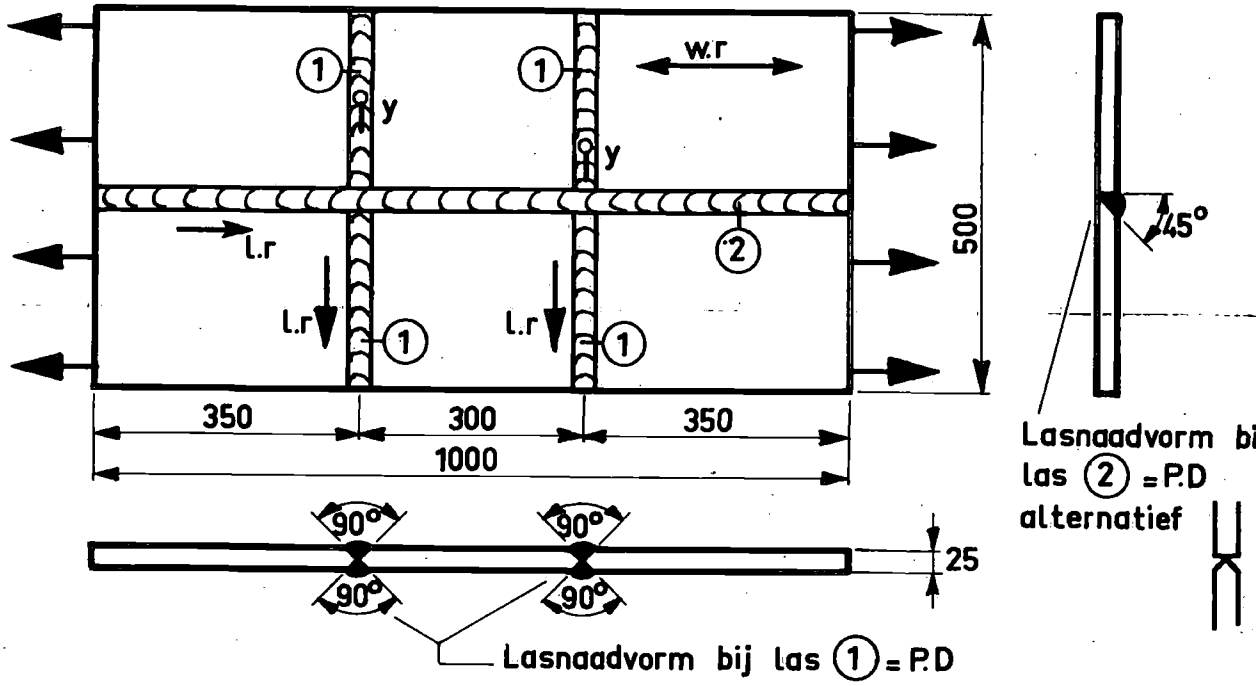
Proefstuk code	A.H.	B.H.	C.H.	D.H.
Aantal proefstukken	3	3	3	3
Las (1)	E.G	E.G	P.D	P.D
Las (2)	E.G	P.D	E.G	P.D

l.r = Lasrichting
w.r = Walsrichting
E.G = Electrogaslas.
P.D = Poederdeklas.
x = Kerf verbrost door las (2)
y = Kerf aangebracht na de lassen (1) en (2) (niet verbrost)



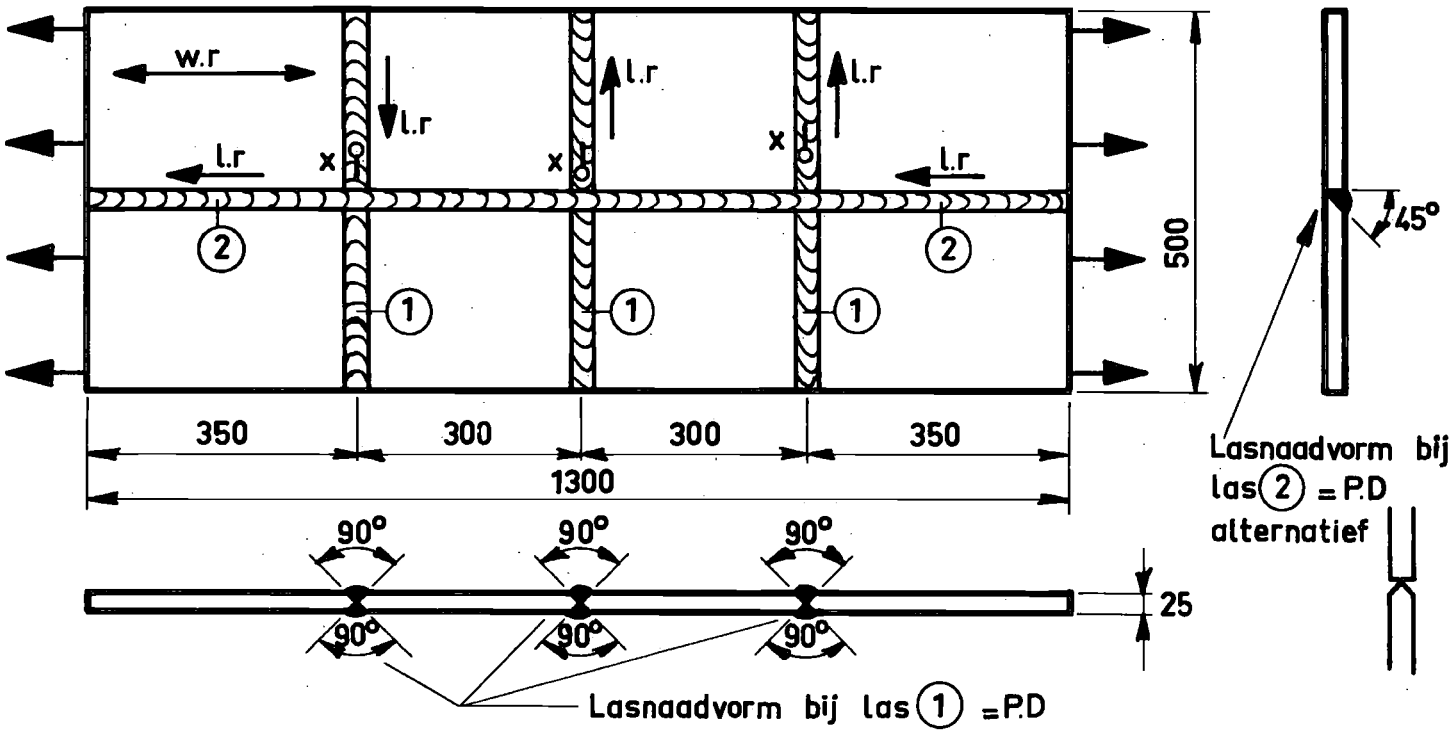
Proefstuk code	E.H	F.H
Aantal proefstukken	2	2
Las 1	E.G	P.D
Las 2	P.D	E.G

Fig. 2 Proefstuk uitvoering E en F (hoge vloeigrens)



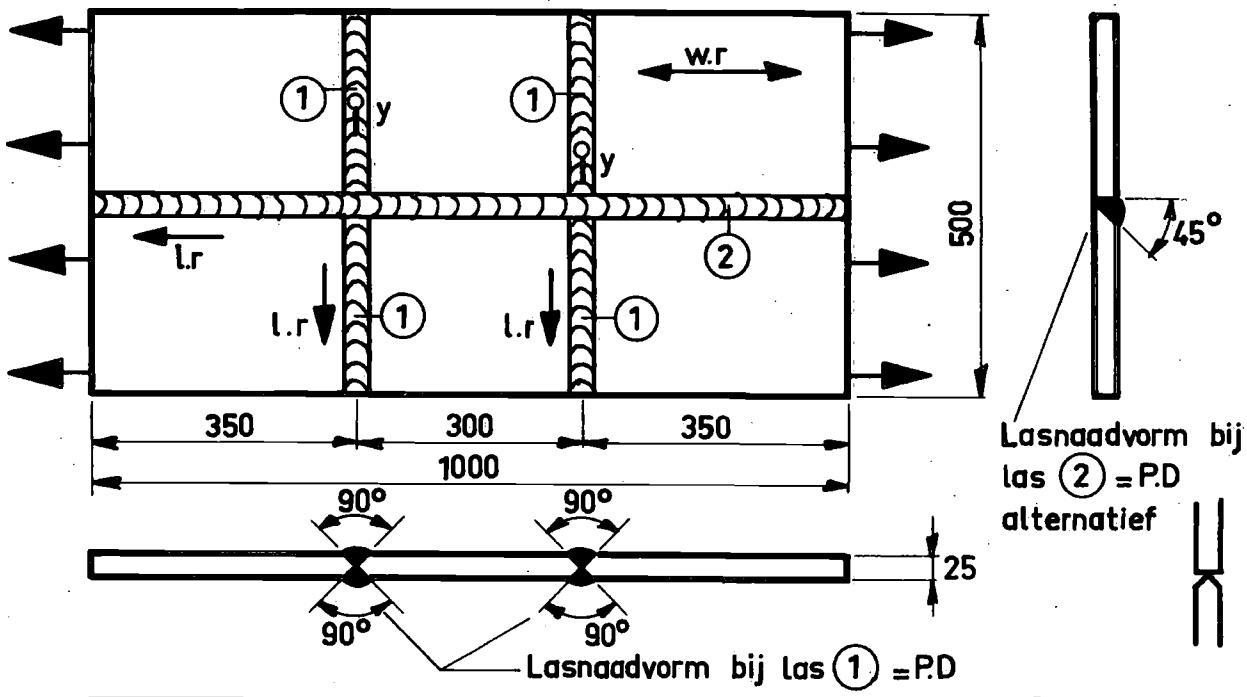
Proefstuk code	G.H	H.H
Aantal proefstukken	2	2
Las 1	E.G	P.D
Las 2	P.D	E.G.

Fig. 3 Proefstuk uitvoering G en H (hoge vloeigrens)



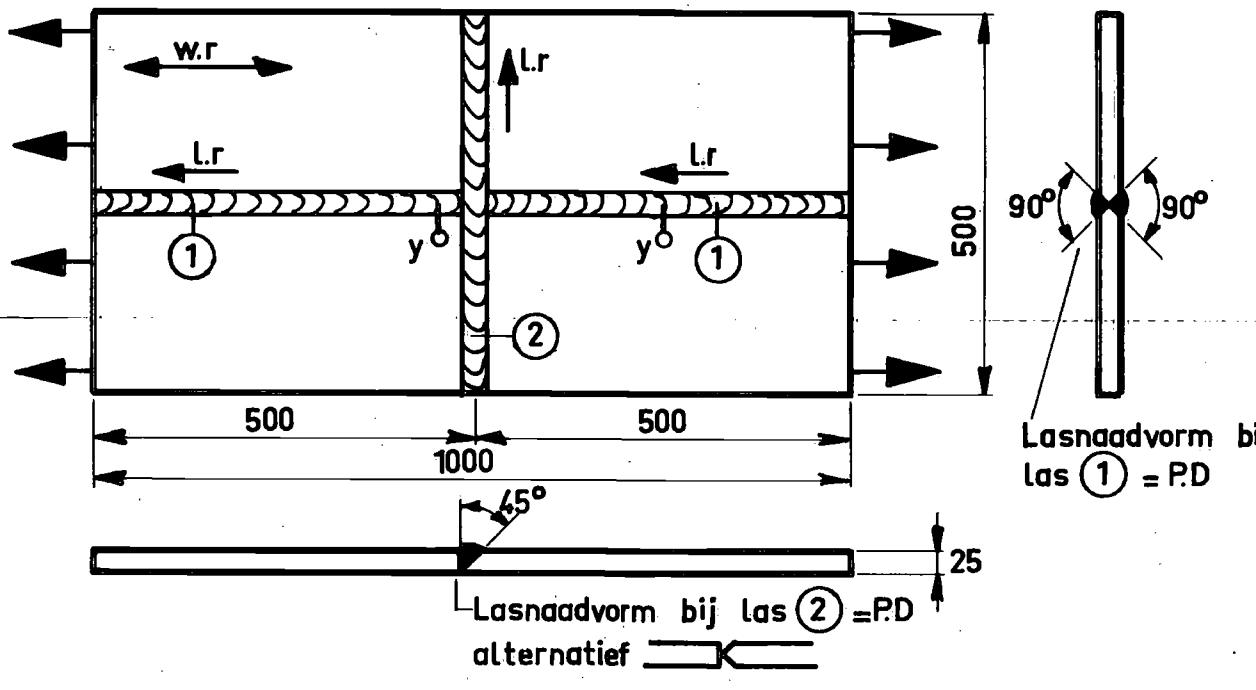
Proefstuk code	A.L	B.L	C.L	D.L
Aantal proefstukken	3	3	3	3
Las (1)	E.G	E.G	P.D	P.D
Las (2)	E.G	P.D	E.G	P.D

Fig.4 Proefstuk uitvoering A,B,C en D (lage vloeigrens)



Proefstuk code	E.L	F.L
Aantal proefstukken	2	2
Las (1)	E.G	P.D
Las (2)	P.D	E.G

Fig.5 Proefstuk uitvoering E en F (lage vloeigrens)



Proefstuk code	G.L	H.L
Aantal proefstukken	2	2
Las (1)	E.G	P.D
Las (2)	P.D	E.G.

Fig.6 Proefstuk uitvoering G en H (lage vloeigrens)