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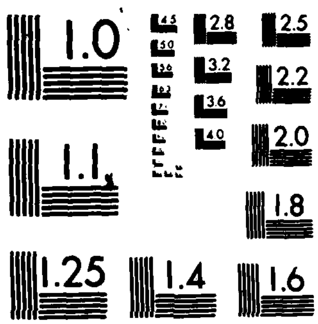

MICROCOPY RESOLUTION TEST CHART
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FOREIGN TECHNOLOGY DIVISION

SWIRL AT GAS-INTAKE INLET

by

A.Ya. Miroshnichenko

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EDITED TRANSLATION

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SWIRL AT GAS-INTAKE INLET

By: A.Ya. Miroshnichenko

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

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All figures, graphics, tables, equations, etc. merged into this translation were extracted from the best quality copy available.

SWIRL AT GAS-INTAKE INLET

A. Ya. Miroshnichenko.

The fact of formation of a swirl at a gas-intake inlet was already noted in literature [1, 2, 3 etc.]. It was indicated that such a swirl can promote suction of solid particles into the gas intake from the Earth's surface, and this leads to the damage of machines, located directly behind the suction line and having movable working elements. It is possible to avoid damages, having installed a rather thick filter at the inlet to the suction line. However, in a number of cases such a method proves to be completely unacceptable for different reasons, in particular, due to the large hydraulic resistance of the filter. Therefore, attempts are made to find other methods, preventing solid particles from the Earth's surface from getting into the channel of the gas intake.

During the experimental check of various methods the suction of solid particles into the gas intake is possible. In connection with this, it is expedient to conduct tests on a special installation, for which the solid particles are not dangerous and which permits conducting diverse research, including the thorough study of peculiarities of vortex motion at the suction channel inlet.

The working part of the installation, designed taking such requirements into account, consists of a horizontal suction channel and a vertically moving horizontal platform, which simulates the Earth's surface. In the construction of the platform there is provided the possibility of connection of a smoke generator. The flow of air at the inlet to the working part is created by a supersonic ejector. The velocity of the air flow is regulated by change of the ejector operating mode.

Some concept of the character of motion of air in the region of the gas-intake inlet was obtained by direct observation. Visualization of the flow was done with the aid of smoke or talc. Smoke gives the possibility to see well the nucleus of the vortex, not shaded by the flow pattern around it. The initial substances for producing smoke were hydrochloric acid and ammonium hydroxide.

The application of talc makes it possible to observe motion in the vast zone outside the core of swirl both near the surface of the platform and in the space between the platform and the gas intake

(Fig. 1).

Fig. 1.

Motion outside the swirl core carries a clearly expressed spiral character. On the horizontal surface solid particles, carried away by the swirl, move to its core, i.e., in the direction, opposite the pressure gradient. Near the base of the swirl core the solid particles are thrown upwards, scattering to the sides under the action of centrifugal forces (Fig. 2), the base of the core is marked by an arrow.

Fig. 2.

In the tests, conducted with coarser solid particles (crushed granite up to 1.5 mm in diameter), their motion on the surface of the platform had the same character. During capture of a large quantity of coarse particles by the swirl only some of them moved along trajectories, encompassing the core of the swirl. These particles, and also particles, which, being scattered to the sides from the base of the core, proved to be in the immediate vicinity of the deflector, fell into the suction channel.

Thus, visualization of flow by various methods and with the aid of different materials makes it possible to more deeply study the qualitative side of phenomenon.

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