

UDC 529

## REALIZED TRANSITIONS TO ISSUE OF SCIENTIFIC PRODUCTION IN FORESTRY OF JAPAN AND FINLAND

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On the fractional composition of raw wood and semi-timber products can be divided into groups: 1) **round timber** – large parts of a tree trunk, 2) **timber** – longitudinal parts timber, 3) **plates**, which use wood fraction of wood substance in the form of **wood particles**, flake (re- crushed chips), and (or) chips (including chips and as elements in the stratified part of the fibers of the chip) 4) **paper**, including cardboard, pulp, etc., then there is a group that uses **wood fibers**. In the fourth group of raw materials is extended beyond the forest, including the lignified part of agricultural and wild plants. The possibilities of the fifth group of products at the cellular level, the wood fibers.

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### **Wood production group ranking.**

On a modification of fractional structure of raw wood and semis wood production group can be divided under the following preferability order:

- 1) **sticks** – is large tree stem parts;
- 2) **saun wood** – is longitudinal sticks parts;
- 3) **cauls**, in which factions of xyloid substance as **wood particles** of chip, shredding (repeatedly crushed chip) and (or) particle (including cooms as elements of stratified on a part on fibrils particle wood) are used;
- 4) **paper**, including a carton, paper pulp and so on, that is group of wood production, in which the wood fibrils and their pieces are used (therefore area of raw maintenance extends for limits of a growing wood, including sclerotic parts of agricultural and wild plants).

This ranked number of wood production groups is classified on a physical indication of a dimi-nution of elements from tree stem (entire tree length), its parts (timber or merchandise as functionally certain timber) up to fibrils from sclerotic any plant kind cells. For want of it first two groups of wood production relate to

integral wood massif, and third and fourth groups – to the crushed wood.

The less fractional structure of raw wood, the more industrial possibilities of use by the cut down trees as by activest component of wood exploitation. Therefore paper production magnification and production decrease of cauls, saun wood, furthermore sticks, is the main tendency of forestry in all over the world on nearest 50 and more than years (we heuristically suppose, that this tendency of de-velopment will be expanded technically and technologically in all countries up to an extremity XXI centuries, and then there century of a heavily wood replacement by other kinds of artificially created materials will come, however use of raw wood as renewed source will not be stopped never).

Each group since magnification of number (or decrease of fractional wood structure in finish products) has the higher status.

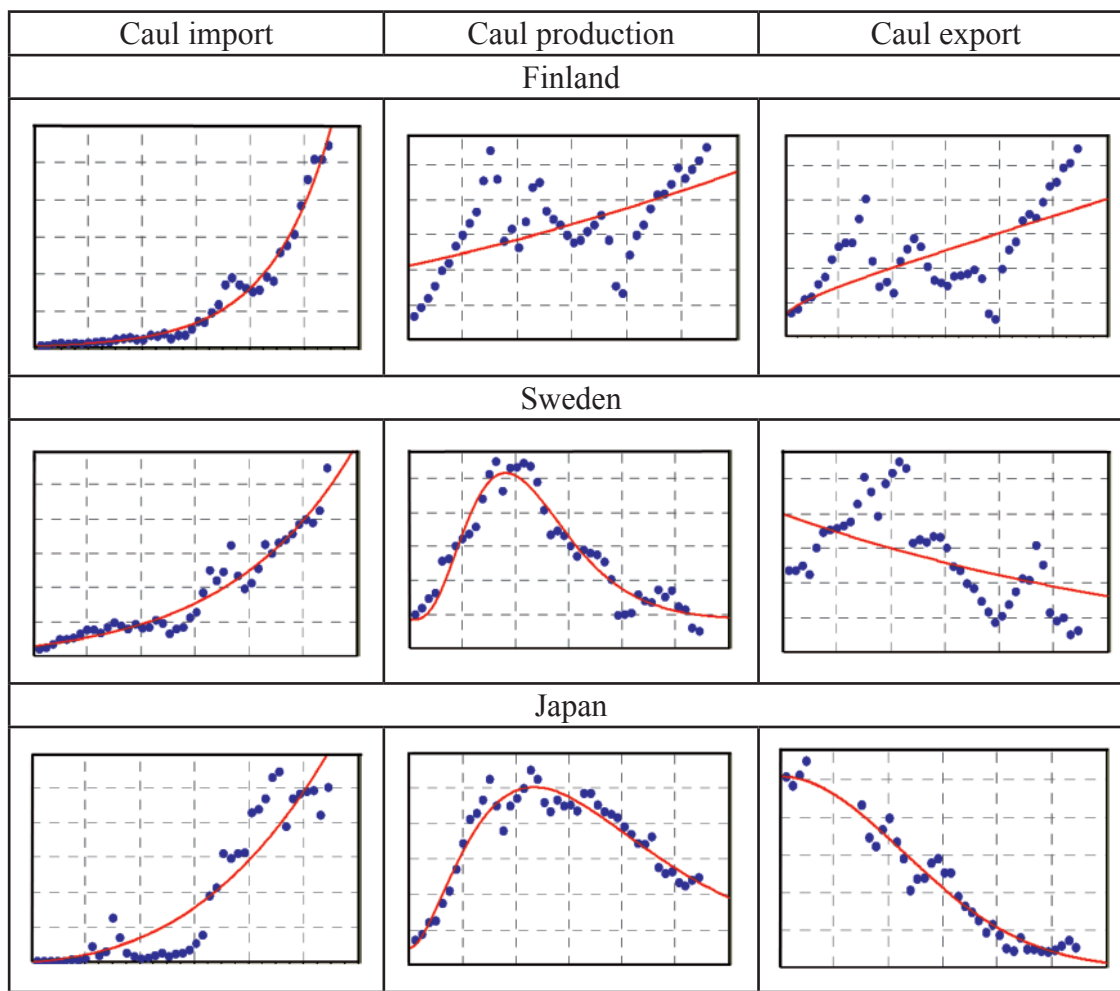
**Features of wood cauls.** The wood cauls have appeared by the extremely successful person in-vention. They have appeared then, when in many countries oldgrowth with straight timbers having high-quality wood have become extinct.

Besides caul volume dynamics is less connected to sticks dynamics. This circumstance for wood exploitation normal sub-

stantiation, will allow correlating wood caul production volumes to national wood square, instead to sticks volume (table 1).

Table 1

World dynamics of wood plates, m<sup>3</sup>



In USSR, and then in Russia all wood products were compared to sticks production volume. However the sticks import was not taken into account, as it is not characteristic for our country (there are nearby no countries with large wood arrays), and the more so fact that the significant prepared sticks share is removed abroad without additional processing, was not taken into account.

Therefore correlating of production of wood cauls, and furthermore papers and

carton, to one cubic prepared or exported wood meter does not receive an inclusive sense. Besides in production of wood cauls are used not only refuse wood from sticks production and buck of it on sawn wood, but in addition resources from other plants are as well involved. In this connection the correlating of produced wood caul volume to one cubic prepared wood meter (exported from woods, delivered to the consumer etc.) is methodologicalally correct.

It is best to correlate wood production to one wood hectare (of ground plots relating to wood fund category). But we shall be still far on production management from raw wood from a present condition of Sweden and Japan.

From a middle of the 70-th years of the last century Sweden behaved under the new wood ex-ploitation doctrine reducing actively production of cauls. Therefore wood caul export volumes from Sweden are also decreased. For want of it the wood caul import was sharply enlarged from other countries, that is wood cauls, as in the beginning sticks and saun wood, became only by one from va-rieties of initial raw.

The cauls concern to more high level of raw and semis – they consist not only of enriched wood (after barking and decay removal, flour assorting and other

technological innovations). They contain also the organized in new fashion ready forms of the future items (plastics, tiles, dimensions for sup-ports, draft details of cabinet-work furniture and so on). The price of such product in the world market sharply will increase on a comparison with fire chore and balances.

Japan was also conducted the similar strategy since middle of the 70-th years of the last XX century. That said it behaved more precise in decrease of board export. Therefore Japanese strategies rather approach for our subjects of Russian Federation with resort and recreational woods, and also having a set of national parks and reserves.

Wood caul circulation trends. The statistical equations are of the form (import, production and export of wood cauls):

#### – Finland

$$Q = 3160,04 \exp(0,085742t^{1,05522}); \quad (1)$$

$$Q = 1142591,0 \exp(0,010135t); \quad (2)$$

$$Q = 521600,0 \exp(0,10222t^{0,56714}); \quad (3)$$

#### – Sweden

$$Q = 50835,0 \exp(0,10530t^{0,87294}); \quad (4)$$

$$Q = 776500,0 + 2371,60t^{3,75095} \exp(-0,26237t); \quad (5)$$

$$Q = 726779,7 \exp(-0,015847t); \quad (6)$$

#### – Japan

$$Q = 207,0 \exp(4,43392t^{0,23000}); \quad (7)$$

$$Q = 4757700,0 + 229344,8t^{1,86238} \exp(-0,10093t); \quad (8)$$

$$Q = 363121,7 \exp(-0,0016575t^{1,97755}). \quad (9)$$

Thus, three groups of wood production (sticks, saun wood and the wood cauls) already determine appearance of forestry for each subject of Russian Federation, and it concerns also to well forested territories. All subjects of federation, without dependence from a woodiness level, receive those or other long-term behaviour variations. And everyone will receive the powerful incomes of forestry, in particular from the leasers as the wood plot proprietors.

Paper and carton dynamics. In the beginning of XXI century production of high technology products from wood fibrils becomes a priority direction, and it can be partially displaced by a 2050 year only by production from a wood powder.

Practically anyone saun wood and even wood cauls can be replaced by production group as a paper and cardboard.

Advanced wood production group. By the beginning of XXI century this group of wood production is most broad on the consumer possibilities. Basically, paper and cardboard can replace all previous groups, converting them in semis that is in more enriched raw wood.

We should be taken into account this fact for want of construction wood and agricultural national program for 2010-2040 years, conscious annually increasing the forestry transformation plans on territories of Russian Federation subjects in the fourth wood production group party. For want of it wastes agricultural and plant-growing production recycling will have all a growing share in raw material for manufacturing a paper. In deficient on wood regions of country it is necessary to enter capacities almost completely using sclerotic parts of agricultural and other plants (a cane, bush, heath plants, garden waste and so on).

Handling materials from wood fibrils. World dynamics of those countries, which carry out the realized national wood

square growth strategy (only 31 countries), on three processes of handling paper and accompanying its wood production from wood fibrils, is indicated in table 2.

In all over the world paper and carton are fairly considered as wood high level production. Therefore world generally on this group of wood production develops rhythmically and equally for very small wave perturbations.

Application of fibrils, including the field of production cauls (hardboards), allows essentially expanding area of handling, by connecting in fibril production not only wood, but also any plants including vegetative fibrils.

Such countries, as: Germany, Egypt, Spain, Italy, Canada, Netherlands, New Zealand, Norway, Portugal, Finland, France, Switzerland, and partially Japan (export have significant wave perturbation) execute most precisely process triad of handling production as «import – production – export».

Russia actively adjusts exponential growth of all three processes of handling paper and carton. However the tendency of production recession of a paper and carton by a 2010 year is already appreciable.

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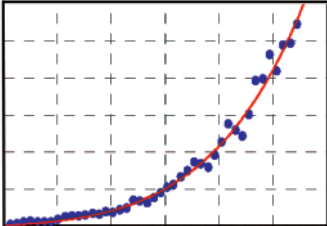
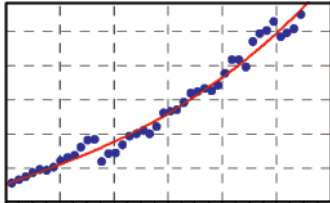
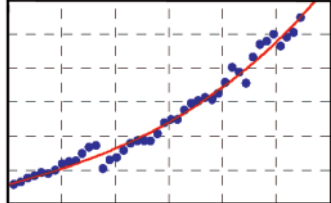
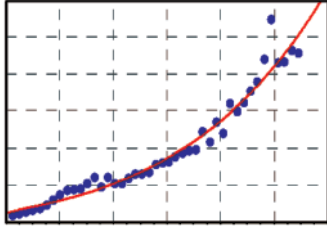
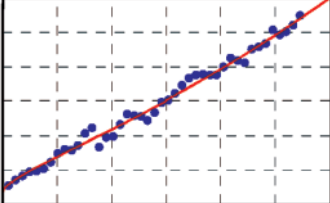
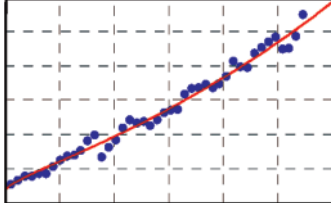
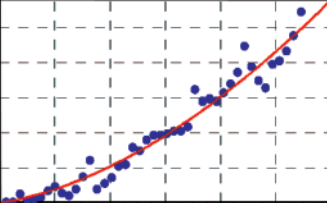
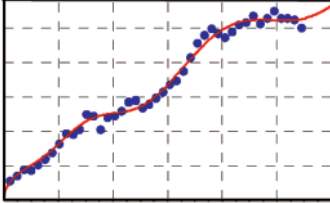
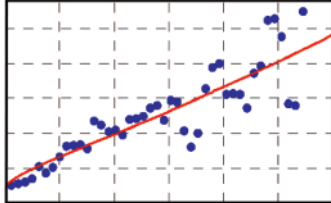
Russia actively adjusts exponential growth of all three processes of handling paper and carton. However the tendency of production recession of a paper and carton by a 2010 year is already appreciable.

Despite the interdiction by a management of country and not recognizing by the Soviet economists of cyclical

regularities (such as crises and downturns of capitalism for USSR economy are not possible), import and export of a paper in USSR are developed with wave perturbation, increasing on amplitude. And production naturally was indignant up to downturn in an USSR disorder extremity. In the total experience of USSR is only knowledge, how it is not necessary to operate by wood exploitation in a part of handling paper and carton.

**Table 2**

World dynamics of paper and carton,  $t$

Paper import	Paper production	Paper export
Finland		
		
Sweden		
		
Japan		
		

In Russia it is quite possible to align and to accumulate production by volumes of competitive in the world market kinds of paper production. For this purpose the experts on high technology wood technologies should explicitly study experience of such countries, as Germany, Italy, Canada,

Portugal, Finland, France, Sweden and simultaneously to adjust issue of domestic papermachines.

Trends of handling paper production. The statistical equations are of the form (import, productions and export of a paper and carton):

– **Finland**

$$Q = 773,415 \exp(0,87293t^{0,52637});$$

$$Q = 2374985,8 \exp(0,091979t^{0,79090});$$

$$Q = 2077899,8 \exp(0,066549t^{0,87899});$$

– **Sweden**

$$Q = 36102,83 \exp(0,17745t^{0,74859});$$

$$Q = 1992441,3 \exp(0,21859t^{0,55275});$$

$$Q = 1095699,8 \exp(0,29387t^{0,53315});$$

– **Japan**

$$Q = 0,0098484 \exp(13,9258t^{0,084890});$$

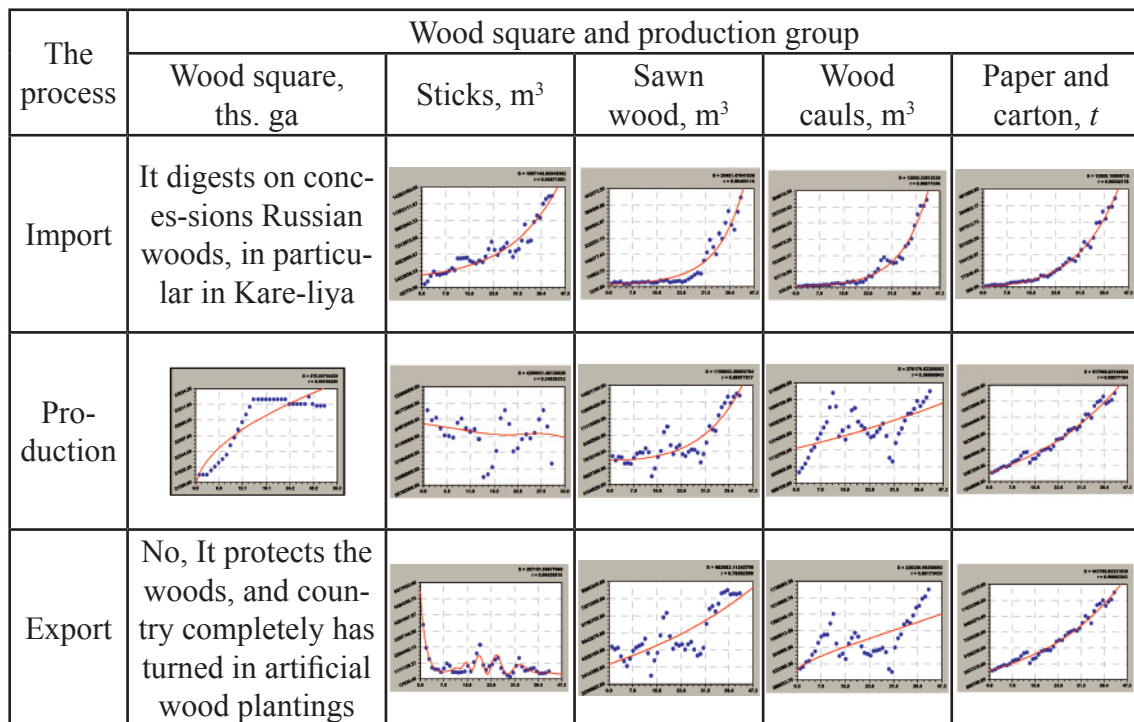
$$Q = 2776057,7 \exp(0,69864t^{0,33867}) - A \cos\left(\frac{\pi t}{P} - 2,99101\right);$$

$$A = 89088,01t^{0,98528}; \quad p = 3,76030 + 0,33181t^{0,73360};$$

$$Q = 144486,0 \exp(0,46622t^{0,41681}).$$

Simultaneously ever since adjustment of forestry on all said four groups of wood production it will be necessary to pay the special attention on production fifth group. The fact is that a little who pays attention to shops of wood powder, scattered on territory of Russia and pro-

ducing raw material lot for production of explosive substances, for example, trotyl. These shops should be saved, and it is possible to produce from a wood powder at the same enterprises very much plenty of production kinds useful to growth of economy to Russia.



**Fig. 1.** Finland (dynamics of a wood from 1961 till 1994, wood production from 1961 till 2004)

Only the import of Finland forestry is stable. Also the oscillatory perturbation because of reaching a limit of growth on wood square is observed. Besides the gradual comprehension to transition as in Sweden happens. But, in difference from it, the growth rates of sticks dimension are much lower than growth rate of wood square. Therefore probability of cardinal changes in forestry is high (import from Russia has perverted wood policy of this country). Country concerns to the second group in a world structure [1].

The stability of woods and processes of wood exploitation in Japan is observed on production rates of all production groups, except for wood square growth. By a 1965 there was a realized turn to sticks production volume decrease, by a 1970 – saun wood, and after a 1975 –

wood cauls. Because of high recreational values of wood arrays the growth rates of sticks production annually are reduced on a comparison with wood square growth. Country concerns to the fourth group.

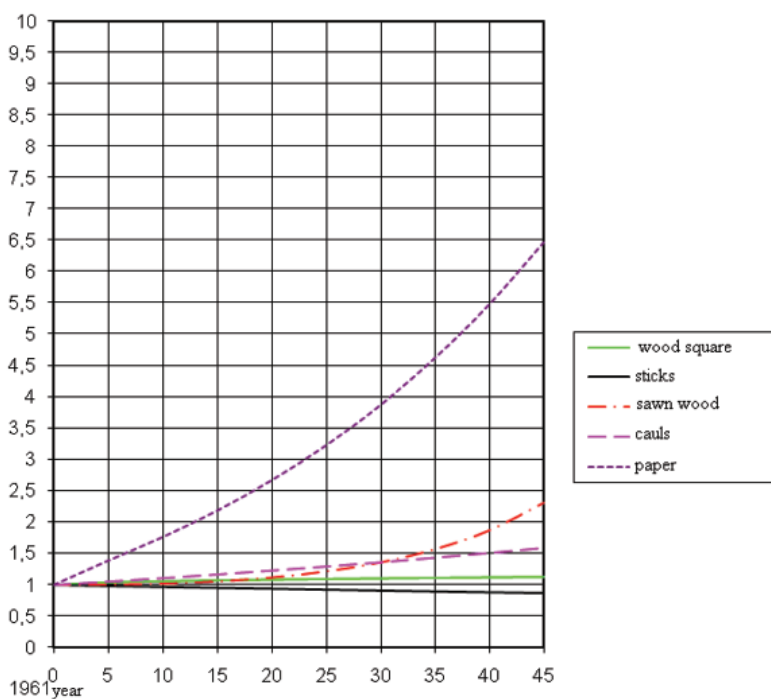
**Finland.** Main advantages of forestry in Finland are following (fig. 3):

1) retardation of sticks production growth rates from wood square increase rates. Sticks production is noticeably lower than a level of a 1961 (reason is clear, it is happens from woods of Karelia and other Russian Federation subjects);

2) Country long since paid attention to sharp production magnification of a paper and carton, and also best quality in all over the world (the reason are lost opportunities of Russia, where base for processing bad quality and deciduous wood is absent; the Finns buy up our birch wood and balances at a low price).

The process	Wood square and production group				
	Wood square, ths. ga	Sticks, m <sup>3</sup>	Sawn wood, m <sup>3</sup>	Wood cauls, m <sup>3</sup>	Paper and carton, t
Import	It digests on concessions woods in Asia Southeast countries				
Production					
Export	No, all national woods as natural parks				

**Fig. 2.** Japan (dynamics of wood from 1961 till 1994, wood production from 1961 till 2004)



**Fig. 3.** The graphs of relative wood production dynamics and wood production in Finland



The sharp gain of production of saun wood also is connected with cheap Russian sawlog, and the decrease of sticks production volume gives less refuse wood. Therefore wood caul production growth rates are rather insignificant.

Therefore next question is quite natural: what will Finland do for want of technological increase in Russia? The answer is clear: the Finns will by all forces brake our movement in production of a paper and carton. It will be exhibited in dictatorship for sale of papermachines and appropriate equipment by Russia.

Unique path is shaping of an own wood mechanical engineering in all groups of wood production, even in the beginning on basis of Finnish furnishing and bodily on purchases of their machine plants. At the expense of raw wood policy

it is necessary for consequent 10-20 years to acquire controlling interests of all near-border self-contained paper mills and other major concerns.

As well as on the boundary with China, all near-border with Finland self-contained paper mills should become Russia property.

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