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Russian State Library: old buildings and new solutions

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Abstract

The report deals with the Russian State Library's reconstruction. It has been discussed a lot about the necessity of the RSL old buildings' reconstruction and in particular, about the main book depository block as far back as 80s.

The theme of the modern engineering systems' installation to the old buildings is splendidly revealed in the describing of our experience in the RSL main book depository

reconstruction. Therefore the larger part of the report is dedicated to this building, to be précised, concerning all details of our repair technology without funds evacuation thought over by our specialists; describing modern engineering automation of the old building that must serve its main function, which is to preserve the world intellectual wealth.

Realization of the whole complex of works made it possible to reconstruct the block “D” in accordance with all basic demands to the modern buildings. The report describes also conditions for the documents storage, state of premises and communications before and after reconstruction, given schedules describe temperature and moisture conditions before and after reconstruction.

The Federal State Institution “Russian State Library” (RSL) is a particularly valuable object of the cultural heritage of the peoples of the Russian Federation, which celebrated 175th anniversary in 2003. As of January 1, 2005 the holdings of the library amount to 42.8 million items embracing books, manuscripts, periodicals, maps, posters and many more. Our main mission is to preserve these cultural values for future generations.

In the RSL the storage conditions of documents are under constant supervision of specialists of the Research Document Conservation Centre (RDCC). However the material and technical condition of the library structures has long excited apprehension of the preservation of the stocks. To keep the stocks according to the standards it is necessary to possess not less than 110 thousand square meters whereas the library has only 60 percent of this floor space (64650 square meters) at its disposal. The annual growth rate of the stocks numbers about 350 thousand items that is 875 square meters and the library has not been receiving any new premises for more that 40 years. As a result the process of the natural aging of the documents has quickened leading up to the gradual destruction of documents in particular cases. The reconstruction of the available buildings and new construction have become the only possible way out of the present situation.

Since 1985 both reconstruction and expansion of the RSL have been regulated by a series of government documents. In 1994-1997 the RSL in conjunction with the Committee of architecture and city building of Moscow drew up the “Conception of reconstruction, restoring and the RSL construction”.

In 2003, the year of 175th anniversary of RSL, the Government of Russian Federation approved the plan of developing, reconstructing, restoring, putting up the complex of the RSL buildings for 2003-2010 under which the reconstruction and the new construction of the complex of library edifices are to proceed in several stages. On the first phase the following is to be realized:

- Restoration and reconstruction of the ensemble “Mansion house of the Shakhovskois” measuring more than 4 thousand square meters and fitted to one of the world richest collections of literature in 115 languages of the peoples of Asia and Africa (centre of Oriental literature).
- Restoration and reconstruction of the ensemble “Pashkov house” measuring about 12 thousand square meters meant to accommodate manuscript, map, printed music departments as well as the cultural and exhibition complex.
- Technical re-equipment of the main book depositary of the RSL measuring upward of 30 thousand square meters and containing the greater part of the RSL holdings which is 23 million books out of the available 43 million.
- Design of a new library building with the area about 100 thousand square meters.

Technical re-equipment of the main book depository – the principal direction in improving the preservation of stocks.

Since the early nineteen forties, that is under the entire service life of the building, it has not been repaired, no engineering systems have been renewed. The wiring did not meet the fire prevention requirements. The air conditioning system had three obsolete and played out ventilation systems situated in another house without dampers, refrigerating plants and automatic controls. The ventilating fans mounted on the roof were technically used up. As a result the main indices of the storage rate such as temperature and humidity were beyond control and depended on the temperature of the surroundings.

Upon a recommendation of a UNESCO commission of experts the Russian Government raised in 1997 a French investment credit for 63 million francs (10000000 USD) to finance the reconstruction of the engineering systems of the main book depository of the Russian State Library. In 1999 the library set about reconstructing the depository. Such reconstructing is still without equal in the library construction.

Reconstruction has worsened the problem of housing the library stocks, which was difficult anyway. The first task was to move the documents as doing any kind of repair work was possible only with the stocks being completely isolated. Since the clearance of such a huge amount of stocks takes several years and remarkably sizable financial expenses the decision was made to reconstruct without carting off any stocks and cover them with special protecting stuff. It is worthy of note that such tremendous repairs without moving the stocks have taken place for the first time in the world practice.

To prepare a tier for repair work it was necessary to empty the first and the last shelves of the racks. Only then it was possible to “swaddle” the rack from every side. The cloth was to secure dependable protection during the construction works. Any stockholder is aware of the fact that it is impossible to take away one of the shelves from the rack without violating the sequence of the arrangement of the books which renders extremely difficult its reinstatement afterwards. For that very reason the library keepers resolved to pile up the books on the racks. It allowed to drastically reduce the volume of the stock to be removed out of the precincts of the depository but the volume of work in the depository skyrocketed. Almost all stocks were displaced and piled up as good as on all tiers with about 2.5 million items piled up on the shelves and only 10 percent of the book array of the central main stock of the RSL were removed out of the precincts of the depository.

The prepared racks were covered with specially impregnated cloth with fire-preventing properties which excludes any chemical attack on the books. The Centre of security of cultural values of the Directorate of the Museum Stock of Russian Federation and the Research Document Conservation Centre of RSL investigated the cloth.

To resume the services to the readers as soon as possible the library has taken the decision to have the building workers put tiers into operation in blocks of four. The essence of the method resembles the sliding tabbing in construction. At first they cover book shelves on the first four tiers with special protecting cloth and do engineering work there. After that they place furniture and technological fittings on the tiers. Thereupon they cover the next four tiers and launch out on reconstruction there. That kind of technology permits to minimize all errors and faults in each subsequent block and later dust and check the stock by stages after the repair work has finished. In this manner the tiers can be put in full operation by stages.

In three years of reconstructing the library has accomplished a great deal of work. Protective metallic screens of inter-tier ceilings have been installed on even tiers. Prior to the reconstruction the even tiers were divided from the odd tiers by metallic grids which

complicated extraction of smoke and rendered difficult extinguishing eventual fires in that the cubic volume of the premises would double. Now protective metallic screens have been mounted on the even tiers providing protection from penetrating smoke in emergency cases.

All usual doors of the book depository have been replaced by fire-prevention doors. Special fire-prevention cut-offs have been installed in the staircases of the Northern and Southern zones on the 9th, central, and 10th tier. The floor covering has been replaced on all tiers by linoleum meeting the fire-prevention standards.

Due to the reconstruction the lighting storage rate is in the process of changing. The book storage represents a 19 tiered building with windows opening on the East and the West. Both natural and artificial sources of radiation shine in the premises of the book depository.

In olden days the artificial sources were represented mainly by incandescent lamps and by luminescent lamps on some tiers. By now the obsolete lamps have been completely replaced by incandescent lamps with the necessary degrees of protection IP-S. As a result the working conditions of the staff are now better with the lighting rate on the racks meeting the requirements.

The arrangement of the third glazing circuit is over. The original glazing represented a two layer system of frosted glasses in the shape of the honeycomb. Now the glazing system has three layers with toned light absorbing composite windows of Netherlandish production make mounted on the outside. A comparative analysis of the lighting before the reconstruction and after the reconstruction shows the light level to have come down 50 to 70 percent on the average on the shelves near the windows.

The main engineering systems have been changed and perfected from the ground up. The library has completed through repairs of the power current equipment and of the electric power supply and changed the entire electric wiring. A new connection switch board with modern systems of protection from overload and short circuit is henceforth at work; new technological channels for the engineering systems are now available. In the central sections of the tiers all communications have been tucked away into gypsum cardboard boxes. Gone are some posts of the racks which allow widening employees work zones.

The air conditioning and ventilating system has been practically created afresh. Three flow plants with a capacity of 33 thousand cubic meters per hour, serving premises measuring 9 thousand cubic meters, two refrigerating plants are automatized; they are bound together in a unified complex guided by a computer equipped control desk. The hood system has been entirely replaced.

Measures allowing to automatically regulate the systems and fittings situated in the building in case of fire have been taken. The library is through with a present-day "fire" fighting system. The system is out-and-out automatized, it responds to fire alarm. These systems are ten in number since each subsystem serves two tiers; they are independent of each other. Each subsystem has a controller of its own; they watch the state of the signaling and govern a fire station as well as issue all orders concerning the implementation of the complex of fire fighting measures. The signaling functions with the aid of address signalers responding to both fire and smoke. It is thus possible to determine the spot where the fire has broken out. To put out fires directly on the tiers there are fire fighting stations extinguishing them by employing fine-sprayed water and sprinkling irrigators. Two signalers sounding the alarm, the command to launch, putting out the fire is given through the controller. The putting out comes off on the spot where the alarm has been raised. All ten systems make connection to the computer-equipped control desk in the office of the fire warden where the monitoring of the appliances in charge of the efficiency of the fittings is done.

An automatized system of the smoke protection of the building is here to take fire prevention measures. The system switches itself on automatically allowing to clear away smoke from the premises of the building. The system being an address one too the valves open on the tier where it is necessary to remove smoke.

Under the project of automatizing the control of the engineering equipment an automatized system of remote control and check developed by the firm “Apmis”, a distributor of Moeller equipment and assuring control of and uninterrupted check on the work of the engineering systems has been introduced. It is a quite new departure in the library applied to the main book depository for the first time.

It comprises the following:

- A workstation of the controller of the central control desk in the engineering building;
- a control and dispatching subsystem of the central heating plant,
- a control and dispatching subsystem of the air conditioners in the engineering building,
- a control and dispatching subsystem of the flow plant on the 19th tier of the main book depository,
- a monitoring subsystem of temperature and humidity in the chief book depository.

In each of the subsystems a check is kept on the state of the parameters of the object, the engineering equipment is guided automatically; data on the state of the subsystems of the objects are passed through the local network on to the upper level.

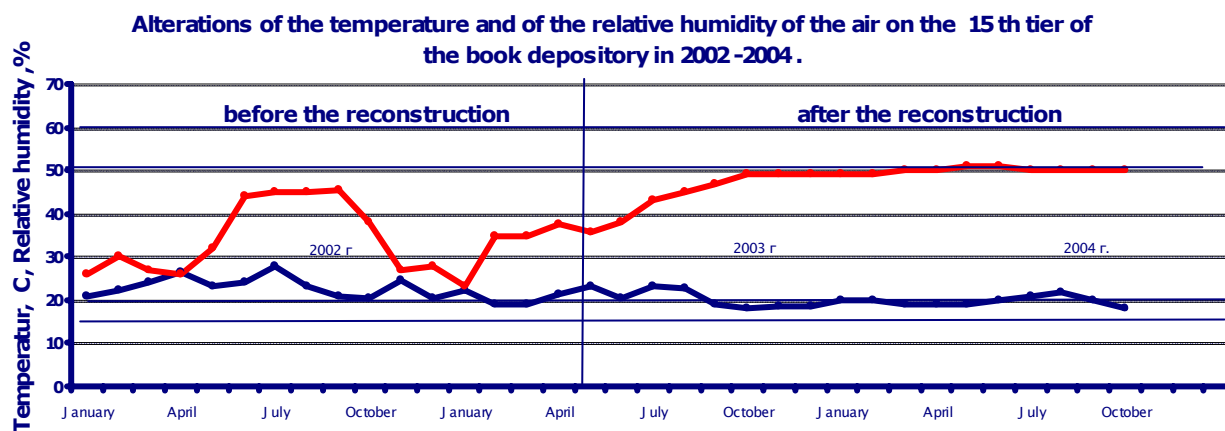
Workstation of the controller of the central control desk ensures the following:

- remote control of and check on the state of the subsystems,
- reflection of information in the shape of mnemotechnic diagrams and tables,
- printout of the parameters and keeping the necessary records,
- possibility of the survey of the archives of the events in the subsystems,
- other service options.

As a result of the reconstruction a multifunctional system ensuring control of and uninterrupted check on the work of the engineering system and meeting the main modern requirements imposed on the buildings is now in operation.

Presently the adjustment of all afore-mentioned systems and the selection of the rates meeting the normative requirements regarding the maintenance of the building and of the normative climatic conditions for keeping the stocks are drawing to a close.

By way of comparative analysis the dynamics of the fluctuation of the main indices of the storage rate is shown for two years odd (2002 to 2004). On the 2nd drawing seasonal alterations of the temperature and of the relative humidity on the 15th tier of the main book depository both before the reconstruction and after the reconstruction are indicated.



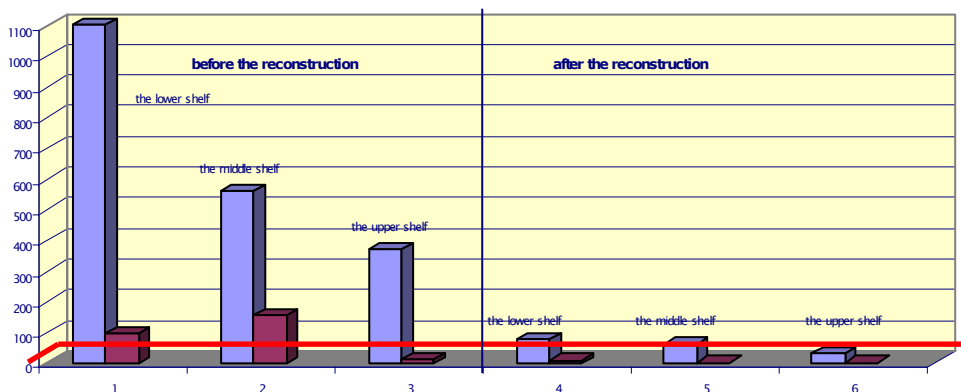
— air temperature GOST 7.50 16-20°C
— relative humidity of the air GOST 7.50 50-60%

The section of the graph “before the reconstruction” goes to show that in the cold season (January – March and November – December) the humidity on the tier does not go beyond the value of 30 percent and the air temperature in this span of time rises from 24° to 28°. The cold season over, the temperature goes down to 21°-23° and the humidity rises slowly to reach the upper limit of 45 to 55 percent. The cold season setting in late in October, the temperature rises again to 22° - 25° with the humidity sinking to 26 to 30 percent.

The section of the graph “after the reconstruction” goes to show that between January and October the temperature fluctuated within the limits of 18° to 22° in October 2003 with the relative humidity being 10 percent higher than in the same period in 2002. It changed from 22 percent in October that is at the beginning of the work of the air conditioning and ventilating system to 51 percent in October. By the beginning of the cold season in November 2003 the humidity on all tiers amounted to the value of 50 to 51 percent recommended by the GOST 7.50 – 2002 (55+/-5 percent) and further on it was kept up on this level.

Thanks to the work on both natural and artificial sources of radiation in the depository the lighting rate is now in line with the standard. The 3rd drawing reflects the trend of the illumination of the stocks.

Parameters of the lighting intensity and of the ultraviolet component on the tiers of the main depository on the racks near the window openings.



Standard of the storage lighting intensity does not go beyond 75 lux and the ultraviolet component does not go beyond 75 micro Watt/lumen.

As the building workers turn blocks of tiers over for operation the library fits them out with the necessary technological equipment. Before the reconstruction of the book depository the number of the computer workstations in the local network did not exceed 10, it operated on morally obsolete and played out hardware. Now a local computing network embraces all 19 tiers, 82 workstations have been equipped. Both equipment and materials applied in the local computing network come up to the fifth category which allows to keep up the velocity of the information transfer at 100 megabytes per second. All workstations are linked up directly with the main case of the server of the RSL. Further on it will make it possible to broaden the local computing network of the building to the necessary extent. Computers, organizational equipment and software the workstations are flitted out with are on the level of the latest technologies owing to which any tasks can be fulfilled correspondingly.

Introduction of new information technologies and impetuous computerization of the library (over the years of the reconstruction the stock of computers in the RSL has increased 300%) have brought the issue of organizing the inner space in the depository to a head.

Designers of the Technological department develop a relevant design project for each tier. Upon their approval the library makes drafts, model furniture and then passes them on to the manufactures and what is more the designers take the control of the delivery, of the assembling and installing of the furniture too. In this manner they considerably hasten putting the premises into operation. By now the complex project of placing the technological equipment in the book depository has been completed.

It can be said in conclusion that as a result of the reconstruction the Russian state library has a building meeting main modern requirements and providing a long term preservation of all documents kept by it in the aggregate. A world precedent of carrying out all work of such complexity without removing the stocks has been created; no other national library has ever done any reconstructing without removing its collections. For our part we regard as before the interrupted working process of the library as an indispensable condition of the reconstruction. We are hopeful that the “Conception of reconstructing, restoring and putting up the buildings of the RSL” will render it possible to realize all our intentions. Then, in “distant” 2010 our new building will be flinging its doors open and the Russian state library will be saying to the readers the world over “Welcome”.