The report highlights a broad spectrum of environmental impacts triggered due to construction, operation, and maintenance and their mitigation for four sectors: (i) power transmission, (ii) distribution, (iii) run-of-river hydropower, and (iv) solar photovoltaic generation projects for dissemination among Asian Development Bank specialists working in the energy sector and environment fields.

This book is a simple manual containing the practical step-by-step for designing hydroelectric plants, including legislation, with a general view of the project.
estimate and measure erosion rates. Packed with clear illustrations and how-to examples, the book gives you the know-how to: master sediment transport processes in reservoirs; apply mathematical and physical models to analyze sediment processes; route inflowing sediment through or around reservoir storage pools; use turbid density currents to control sedimentation; empty and scour sediments from a reservoir by means of hydraulic flushing and much more.

**Design of Hydraulic Gates, 2nd Edition**

The 26 papers in this volume cover: catchment treatment and reservoir sedimentation; de-silting and silt disposal; modelling techniques; hydraulic design considerations; and mechanical design and material technology.

**Hydrogenerator Design Manual**

The manual has been prepared to encourage, and support the design of improved village electrification schemes, anticipating its usefulness for rural development agencies, as well as for national, and provincial energy companies, and authorities. Theoretical and field experiences describe power mini-grid - i.e., low voltage network within a village, supplied at a single point by a diesel genset, or micro-hydro power plant. The manual focuses on the design of the system to distribute the power generated to consumers, and, designs covered in this manual range from low-cost designs to serve basic lighting needs, to more conventional designs that may become interconnected to the grid within the near future. Discussions on mini-grids do not involve the use of medium voltage (MV), however; it should be recognized that it may occasionally be necessary to use MV to reduce overall costs. The manual includes several examples of mini-grids, to illustrate the context in which such projects have been implemented, with additional detailed case studies. It also contains qualitative descriptions of the issues to be addressed in planning for mini-grids, and a range of design options for the various components of mini-grids, how these are sized, and incorporated into a mini-grid.

**Technical Factors in Small Hydropower Planning**

This book deals with the narratives of water to watt, which includes elementary conceptual design, modern planning, scheduling and monitoring systems, and extensive pre- and post-investigations pertaining to hydropower facilities. It also includes explorations to ensure aspects of dam safety evaluation, effective contract management, specialized construction management techniques, and preferred material and equipment handling systems. Special emphasis is placed upon health, safety, environmental, and risk management concepts. The book discusses a standard QA/QC system to measure and assure quality and an environmental impact assessment to reach the set target in the stipulated timeline within the approved budget. Key Features: Offers comprehensive coverage of hydro-structures and practical coverage from an industry perspective Helps readers understand complexity involved in large-scale interdisciplinary projects Provides good insights on building procedures, precautions, and project management Includes project planning, construction management and hydropower technology, QA/QC, HSE, and statutory requirements illustrates how to integrate good constructability/buildability into good design for the best monetary value.

**Cellular Cofferdams**

**Design of Hydroelectric Power Plants – Step by Step**

This handbook serves as a guide to deploying battery energy storage technologies, specifically for distributed energy resources and flexibility resources. Battery energy storage technology is the most promising, rapidly developed technology as it provides higher efficiency and ease of control. With energy transition through decarbonization and decentralization, energy storage plays a significant role to enhance grid efficiency by alleviating volatility from demand and supply. Energy storage also contributes to the grid integration of renewable energy and promotion of microgrid.

**Handbook on Construction Techniques**

The design of a hydroelectric plant, along with an installation of transformation of potential energy of water into electricity, is an activity that is not standardized. Each new project is an interesting engineering challenge, and teams need to work in different conditions of each site, integrated to design a functional, economical and environmentally sustainable project. The development of a project, here understood as the plant itself, the reservoir, the maneuver substation and the associated transmission line, is a multidisciplinary activity that encompasses areas of civil engineering, geology, mechanical and electrical engineering, environmental engineering, economic engineering, construction and assembly, and the engineering of operation and maintenance of civil works and electromechanical equipment. The book is organized to facilitate the performance of professional life of the new generations of engineers who will join the Electric Sector, or in other sectors that demand the knowledge regarding hydraulic structures. The book is a simple manual providing the practical step-by-step procedure for designing hydroelectric plants, including legislation, with a general view of the project.


This manual provides guidance on estimating the energy potential of a hydropower site, selecting a project’s installed capacity, determining the need for for the project’s output, evaluating hydropower benefits, and estimating powerhouse costs.

**Micro-hydro Pelton Turbine Manual**

This book offers comprehensive coverage of the operation and maintenance of large hydro generators. This book is a practical handbook for engineers and maintenance staff responsible for the upkeep of large salient-pole hydro generators used in electric power plants. Focusing on the physics and maintenance of large vertical salient pole generators, it offers readers real-world experience, problem description, and solutions, while teaching them about the design, modernization, inspections, maintenance, and operation of salient pole machines. Handbook of Large Hydro Generators: Operation and Maintenance provides an introduction to the principles of operation of synchronous machines. It then covers design and construction, auxiliary systems, operation and control, and monitoring and diagnostics of generators. Generator protection, inspection practices and methodology and auxiliaries inspections are also examined. The final two chapters are dedicated to maintenance and testing, and maintenance philosophies, upgrades, and uprates. The handbook includes over 420 color photos and 180 illustrations, forms, and tables to complement the topics covered in the chapters. Written with a machine operator and inspector in mind, Handbook of Large Hydro Generators: Operation and Maintenance is an ideal resource for scientists and engineers whose research interest is in electromagnetic and energy conversion. It is also an excellent book for senior undergraduate and graduate students majoring in energy generation, and generator operation and maintenance.
Feasibility Studies for Small Scale Hydropower Additions

Energy Research Abstracts

The Water Footprint Assessment Manual

This is a guide to the use of induction motors for electricity generation in remote locations. It is written as a practical handbook for engineers and technicians involved in designing and installing small water-power schemes for isolated houses and communities. This revised edition brings in new concepts developed and tested to expand the power range of application of motors as generators, to make this technology safer and more reliable, while keeping costs low and making it accessible to developing countries. It also contains a new chapter on mains-connecting micro-hydro generators. This edition also draws on the practical experience of manufacturers and installers of induction generator units working in village locations in a large number of countries, among them Sri Lanka, Nepal, Peru, Kenya and others.

Hydropower Engineering Handbook

Suitable for individuals who design hydro power facilities, maintain and procure equipment, or produce and distribute electricity, this book presents an overview of some of the best practices.

Hydraulic Design of Reservoir Outlet Structures

Waterpower is the largest source of renewable energy in the world today, and microhydro is a mature, proven technology that can provide clean, inexpensive, renewable energy with little or no impact on the environment. Serious Microhydro brings you dozens of firsthand stories of energy independence covering a complete range of systems, from household pressure sites to higher pressure installations capable of powering a farm, business, or small neighborhood. Topics include: Low head and medium head sites AC-only systems as well as ones using a battery/inverter subsystem Stand alone power supply or grid intertie setups Hybrid systems (combined with photovoltaics or wind) With all the variables involved in microhydro, there is no "typical" system. These case studies represent the most comprehensive collection of knowledge and experience available for tailoring an installation to meet the needs of a site and its owner or operators. If you are considering building a system, you are bound to find a wealth of creative solutions appropriate to your own circumstances. Serious Microhydro shows how scores of people are achieving a high standard of living from local energy sources with a minimal ecological footprint. It has particular appeal to homeowners, teachers, renewable energy professionals, activists, and decision makers who want to understand the technology from a "hands-on" perspective. Scott Davis is an award-winning renewable energy project developer with decades of experience operating, installing, designing, selling, and teaching microhydro technology. He is a founder and president of Friends of Renewable Energy BC, and the author of Microhydro: Clean Power From Water.

Sustainable Hydropower in West Africa

National Engineering Handbook

Where flow is limited but high heads of water are available the Pelton wheel is one of the most useful turbines. It can be fabricated in small engineering shops with basic facilities. Jeremy Thake explains how to design, make and use them.

Reservoir Sedimentation Handbook

Silting Problems in Hydropower Plants

Hydroelectric Energy

Manual for Survey and Layout Design of Private Micro-hydropower Plants
Design of Hydroelectric Power Plants - Step by Step

Micro-Hydro Design Manual has grown from Intermediate Technology's field experiences with micro-hydro installations and covers operation and maintenance, commissioning, electrical power, induction generators, electronic controllers, management, and energy surveys. There is an increasing need in many countries for power supplies to rural areas, partly to support industries, and partly to provide illumination at night. Government authorities are faced with the very high costs of extending electricity grids. Often micro-hydro provides an economic alternative to the grid. This is because independent micro-hydro schemes save on the cost of grid transmission lines, and because grid extension schemes often have very expensive equipment and staff costs. In contrast, micro-hydro schemes can be designed and built by local staff and smaller organizations following less strict regulations and using 'off-the-shelf' components or locally made machinery.

Engineering and Design

Sustainable Hydropower in West Africa: Planning, Operation, and Challenges provides a comprehensive overview of the planning, deployment, and management of hydropower in West Africa and similar regions. The authors use a practical approach to analyze available technology, modeling methodologies and sustainability aspects, such as the dependence between climate and hydropower, and socio-economic and environmental impacts. They discuss the need for innovative solutions and how to close research gaps in the field for this region. Although more than 50% of West Africa's hydropower potential is still untapped, re-engineering and maintenance of existing hydropower plants is a key issue and is discussed. Issues of productivity and optimization are also covered, as well as the introduction of new technology and integration of hydropower into existing energy systems. Renewable energy systems, in particular. Policy and regulation are also examined, considering competing needs when managing water resources. The final chapter offers a summary of activities, strategies, policies, and technology for easy reference and practical use. Due to its wide coverage and real-life examples, this is a useful reference for engineering professionals in the field of hydropower, working in West Africa and regions with similar conditions. This book helps engineers make technology and location decisions for planning, deploying, and operating hydropower plants. The book's accessible language and international authorship also allows for easy use by energy researchers, analysts, and policy makers who need information for the analysis, modeling, financing, implementation, and regulation of hydropower in West Africa and related regions. Presents the most current issues related to hydropower deployment and management in West Africa and regions with similar conditions. Discusses key challenges, focusing on practical aspects and methodologies. Explores the technological, sustainability, and economic aspects to be considered when deploying, operating, and maintaining hydropower plants in West Africa and similar regions.

Handbook of Large Hydro Generators

Small hydro power installations have the potential to provide a renewable supply of energy to people in remote, hilly communities, far from the national grid. This book is based on the authors' considerable experience of installing hydroelectric schemes that produce up to 500 kW for powering small communities. It describes not only the electro-mechanical equipment and how it is installed, but also the correct siting of the installation and how to design and build the channels leading up to the turbine so as to optimize performance. These civil works can be carried out by local manpower, using materials that are usually available locally. Chapters cover the main components of small hydroelectric plants from the intake and the headrace channel, via the conveyance channel, to the forebay tank, penstock, turbine, and generator. Designing and Building Mini and Micro Hydropower Schemes is essential reading for engineers, NGO managers, and consultants planning and implementing micro-hydro schemes. This book's strength is that it is based on years of experience out in the field of designing micro-hydro systems that work. Dr Arthur Williams, School of Electrical Electronic Engineering, The University of Nottingham, UK. For remote communities lucky enough to live near hill streams or rivers, micro-hydro power is the most cost-effective way of generating electricity. And it is clean energy. But it takes years of experience and skill to design the weirs, canals, and spillways that are needed. Experienced practitioners take you through the whole design process, with drawings and calculations, so that anyone with good practical building skills can learn enough from the many years of knowledge crammed into this instruction book to build a solid scheme, without over-spending. Ray Holland, Manager, EU Energy Initiative, Partnership Dialogue Facility.

Small Hydropower Series.

Steel Penstocks

MOP 79 provides practical, comprehensive guidance regarding the technical, economic, safety, and environmental aspects of designing and implementing steel penstocks at hydroelectric power stations.

Handbook on Battery Energy Storage System

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