

Author's Accepted Manuscript

Integrated optimization for shelter service area demarcation and evacuation route planning by a ripple-spreading algorithm

Fuyu Hu, Saini Yang, Xiaobing Hu, Weiping Wang



www.elsevier.com/locate/ijdr

PII: S2212-4209(17)30204-2
DOI: <http://dx.doi.org/10.1016/j.ijdr.2017.06.006>
Reference: IJDRR581

To appear in: *International Journal of Disaster Risk Reduction*

Received date: 22 February 2017
Revised date: 3 June 2017
Accepted date: 5 June 2017

Cite this article as: Fuyu Hu, Saini Yang, Xiaobing Hu and Weiping Wang, Integrated optimization for shelter service area demarcation and evacuation route planning by a ripple-spreading algorithm, *International Journal of Disaster Risk Reduction*, <http://dx.doi.org/10.1016/j.ijdr.2017.06.006>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Integrated optimization for shelter service area demarcation and evacuation route planning by a ripple-spreading algorithm

Fuyu Hu^{a,b1}, Saini Yang^{a,b*}, Xiaobing Hu^{a,b2}, Weiping Wang^{a,b3}

^aState Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, Beijing, China

^bAcademy of Disaster Reduction and Emergency Management, Ministry of Civil Affairs & Ministry of Education, Beijing Normal University, Beijing, China

hufuyu@mail.bnu.edu.cn

yangsaini@bnu.edu.cn

huxiaobing@bnu.edu.cn

weipingwang@mail.bnu.edu.cn

*Corresponding author at: Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing 100875, P. R. China. Tel.: +8615010882575.

Abstract

Shelter is one type of emergency facilities and plays a critical role in disaster response. In operation level, a shelter is the destination of post-disaster evacuation route, whose scientific service area demarcation can have a great positive influence on evacuation route planning. Effective evacuation route planning can also validate and support the service area demarcation of shelter. This study aims to optimize shelter service area demarcation and post-disaster evacuation route planning simultaneously in order to improve the efficiency of current shelter operation and further reduce disaster risk, which is seldom addressed before. We proposed an integrated optimization model for jointly solving shelter service area demarcation and evacuation route planning problems, which keeps contiguity of service areas, ensures an evacuation route within the same service district, shortens the evacuation route, satisfies capacity constraints and maintains integrity. To solve the problem, a ripple-spreading algorithm is adopted with combining contiguity and capacity operators. A real-world case study was conducted in the Chaoyang district of Beijing, China. A locally optimal scheme for service area demarcation and evacuation route planning was obtained with satisfying

¹ **Present address:** Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing 100875, P. R. China. Tel.: +8613269960558.

² **Present address:** Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing 100875, P. R. China. Tel.: +8615210285641.

³ **Present address:** Beijing Normal University, No. 19, XinJieKouWai St., HaiDian District, Beijing 100875, P. R. China. Tel.: +17888842549.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات